

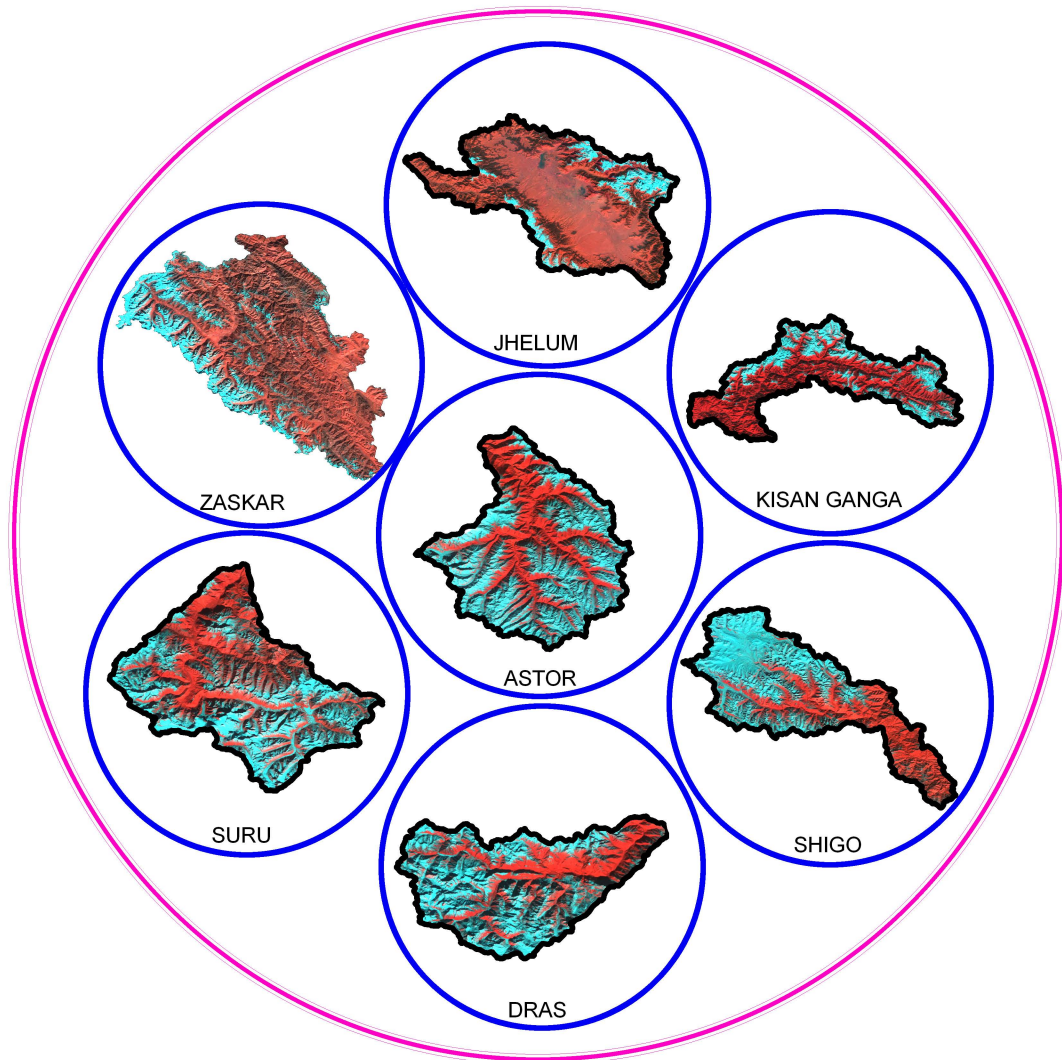
SNOW COVER ATLAS OF THE INDUS BASIN

Sub basins

Jhelum, Kisan Ganga, Astor, Shigo, Dras, Suru and Zaskar.

(A Joint Project of Indian Space Research Organization and
Ministry of Environment and Forests, Govt. of India)

Year 2012 -13



Volume I



Space Applications Centre (ISRO)
Ahmedabad - 380015
December 2013

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DOCUMENT CONTROL AND DATA SHEET

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Originating Unit	Geo Sciences Division, Marine, Geo and Planetary Sciences Group, Earth, Ocean, Atmosphere, Planetary Sciences and Applications area, Space Applications Centre (ISRO), Ahmedabad-15
Abstract	This atlas gives subbasin-wise distribution of snow cover in the Indus basin from October 2012 to June 2013. The subbasins included in this report are Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar. The areal extent of snow cover was estimated in fully automatic mode using Normalized Difference Snow Index (NDSI) based algorithm. For this purpose AWiFS sensor of Resourcesat satellite was used. This atlas gives snow cover products, statistics and seasonal snow depletion curve. It is expected that this data will be useful for hydrological and climatological applications.
Key words	Snow cover, NDSI, AWiFS, depletion curve, Jhelum, Kisan ganga, Astor, Shigo, Dras, Suru and Zaskar basins.
Security Classification	Unrestricted
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CONTENTS

	Page No.
1. INTRODUCTION	1
2. STUDY AREA	2
3. DATA USED	2
4. NORMALISED DIFFERENCE SNOW INDEX	2
5. SNOW COVER MONITORING ALGORITHM	3
6. RESULTS AND DISCUSSIONS	4
JHELUM BASIN	8
KISAN GANGA BASIN	30
ASTOR BASIN	53
SHIGO BASIN	76
DRAS BASIN	99
SURU BASIN	122
ZASKAR BASIN	145

1. Introduction

Snow covers almost 40 per cent of the Earth's land surface during Northern Hemisphere winter. This makes albedo and areal extent of snow as important component of the Earth's radiation balance (Foster and Chang, 1993). In addition, large areas in the Himalayas are also covered by snow during winter. Area of snow can change significantly during winter and spring. This can affect stream flow for rivers originating in the higher Himalayas. All the rivers originating from higher Himalayas receive almost 30-50 % of annual flow from snow and glacier melt run off (Agarwal et al., 1983). In addition, snow pack ablation is highly sensitive to climatic variation. Increase in atmospheric temperature can influence snowmelt and stream runoff pattern (Kulkarni et al., 2002). Therefore, mapping of the areal extent and reflectance of snow are important parameter for various climatological and hydrological applications. In addition, extent of snow cover can also be used as input for numerous other applications.

Mapping and monitoring of seasonal snow cover using field methods are normally very difficult in a mountainous terrain, like the Himalayas. Therefore, remote sensing techniques have been extensively used for snow cover monitoring. Snow cover monitoring using satellite images were started by using the TIROS-1 satellite from April 1960 (Singer and Popham 1963). Since then, the potential for operational satellite-based mapping has been enhanced by the development of higher temporal frequency and satellite sensors with higher spatial resolution. In addition, satellites with better radiometric resolutions, such as NOAA have been used successfully for snow mapping (Hall et al., 1995). This is possibly due to the distinct spectral reflectance characteristics of snow in visible and near infrared regions. India has launched series of Indian Remote Sensing satellite (IRS) to study the different earth resources. Previously launched satellites have flown with many sensors having different spatial, temporal and spectral resolutions. Recently launched RESOURCESAT-1 satellite has three different sensors namely LISS III, LISS IV & AWiFS with different spatial, temporal and spectral resolutions as desired for different applications. AWiFS (Advanced Wide Field Sensor) is an advanced version of earlier Indian satellite sensor WiFS (Wide Field Sensor) with improved spectral and spatial resolutions maintaining the same repetivity. There are a series of other polar orbiting satellites, like Landsat, NOAA and MODIS etc., which have provided information on different aspects of

snow. Geo-stationary satellites also proved their utility in mapping/monitoring the snow-covered regions. Information generated from satellite observations has been extensively used for snowmelt runoff modeling (Kulkarni et al., 1997).

2. Study Area:

This Atlas gives distribution of snow cover in seven subbasins of the Indus basin. These are Jhelum, Kisan ganga , Astor, Shigo, Dras, Suru and Zaskar sub basins. Locations of these basins are shown in Figure 1.

3. Data used:

AWiFS data from October 2012 to June 2013 were used in this study.

4. Normalised Difference Snow Index (NDSI):

In general, the reflectance of snow is high at the red end of the visible spectrum. It tends to decline in the near-infrared region until 1090 nm, where slight gain in reflectance occurs and gives a minor peak at approximately 1090 to 1100 nm. One of the important difficulties in snow cover monitoring is the presence of cloud cover. Cloud has strong reflectivity in visible, NIR and SWIR regions while snow absorbs in SWIR, and this difference can be utilized for snow/cloud discrimination. Normalized Difference Snow Index (NDSI) utilize the normalized ratio of green and SWIR and is used as an automated approach for snow mapping addressing the shadow and cloud problems in snow bound areas.

Normalized Difference Snow Index was calculated using the ratio of green wavelength (band 2) and SWIR (band 5) of AWiFS sensor:

$$\text{Normalized Difference Snow Index(NDSI)} = (\text{band2} - \text{band5}) / (\text{band2} + \text{band5}) \quad \dots(1)$$

To estimate NDSI, DN numbers were converted into reflectance. This involves conversion of digital numbers into the radiance values, known as sensor calibration, and then estimation of reflectance from these radiance values. Various parameters needed for estimating spectral reflectance are maximum and minimum radiances and mean solar exo-atmospheric spectral irradiances in the satellite sensor bands, satellite data acquisition time, solar declination, solar zenith and solar azimuth angles, mean Earth-Sun distance etc. (Markham and Barker, 1987; Srinivasulu and Kulkarni, 2004).

5. Snow cover monitoring algorithm

An algorithm is developed to provide changes in the areal extent of snow (Kulkarni et. al., 2006). Snow extent is estimated at an interval of 5-days and 10-days, depending upon availabilities of AWiFS data. In 5-daily product, snow extent is generated scene-wise. In this product, snow and cloud extents are given. Estimate of cloud is important because, at times, snow is covered by cloud and this may be classified as non-snow area, leading to erroneous conclusions. In 10-daily product, three scenes are analyzed, if available. For example, 10 March product data of 5, 10 and 15 March was used. If any pixel is identified as snow on any one date then this pixel will be classified as snow on final product. This provides snow cover at an interval of 10 days, an important requirement in hydrological applications. Therefore, this product is generated basin-wise. Since this product is using three scenes, probability becomes high that at least in one scene, pixel may be cloud-free and this helps in overcoming problem associated with snow under cloud cover. If three consecutive scenes are not available, then all available scenes in 10 days window was used in the analysis. Differentiation between water and snow is difficult using NDSI image. In addition, separation of snow and water pixels is also difficult based on reflectance due to mountain shadow. Therefore, in the present algorithm, water bodies are marked in pre-winter

season and are masked in the final products during winter. Flow diagram of the algorithm is given in Figure 2.

6. Results and discussions

In this atlas, basin-wise snow cover statistics, maps, and seasonal depletion curves have been provided from October 2012 to June 2013. Snow ablation pattern varies from basin to basin, depending on area altitude distribution in the basins. Accumulation and ablation pattern in Astor and Dras is same. Accumulation and ablation pattern in Kisanganga, Shigo and Suru is also same. In all the five basins accumulation starts from mid of November and ablation starts from mid of March. In Zaskar basin melting was observed in the month of January. Accumulation starts from November in Jhelum basin. Maximum snow was observed in end of January and ablation starts from February itself. It may be due lower altitude and latitude.

Acknowledgements

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Figure 2: Algorithm for snow cover mapping using AWiFS data

JHELUM BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: JHELUM

BASIN AREA: 14472 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	6-Oct-12	170	1	2	8-Oct-12	251	2
3	27-Oct-12	1843	13	4	28-Oct-12	1746	12
5	30-Oct-12	1148	8				
November 2012							
6	1-Nov-12	1269	9	7	2-Nov-12	1146	8
8	4-Nov-12	817	6	9	6-Nov-12	1489	10
10	11-Nov-12	1021	7	11	13-Nov-12	730	5
12	14-Nov-12	676	5	13	16-Nov-12	934	6
14	20-Nov-12	3914	27	15	25-Nov-12	4305	30
16	26-Nov-12	3515	24	17	30-Nov-12	6609	46
December 2012							
18	2-Dec-12	5568	38	19	3-Dec-12	4755	33
20	22-Dec-12	6814	47	21	31-Dec-12	8743	60
January 2013							
22	3-Jan-13	8276	57	23	7-Jan-13	7431	51
24	22-Jan-13	13275	92				
February 2013							
25	8-Feb-13	8751	60				
March 2013							
26	2-Mar-13	8935	62	27	4-Mar-13	7506	52
28	6-Mar-13	5695	39	29	8-Mar-13	6296	44
April 2013							
30	19-Apr-13	4157	31				
May 2013							
31	3-May-13	2843	20	32	15-May-13	2541	18
33	17-May-13	2256	16	34	20-May-13	1862	13
35	22-May-13	1830	13	36	24-May-13	1783	12
June 2013							
37	1-Jun-13	1364	9	38	8-Jun-13	1029	7
39	20-Jun-13	544	4	40	22-Jun-13	514	4

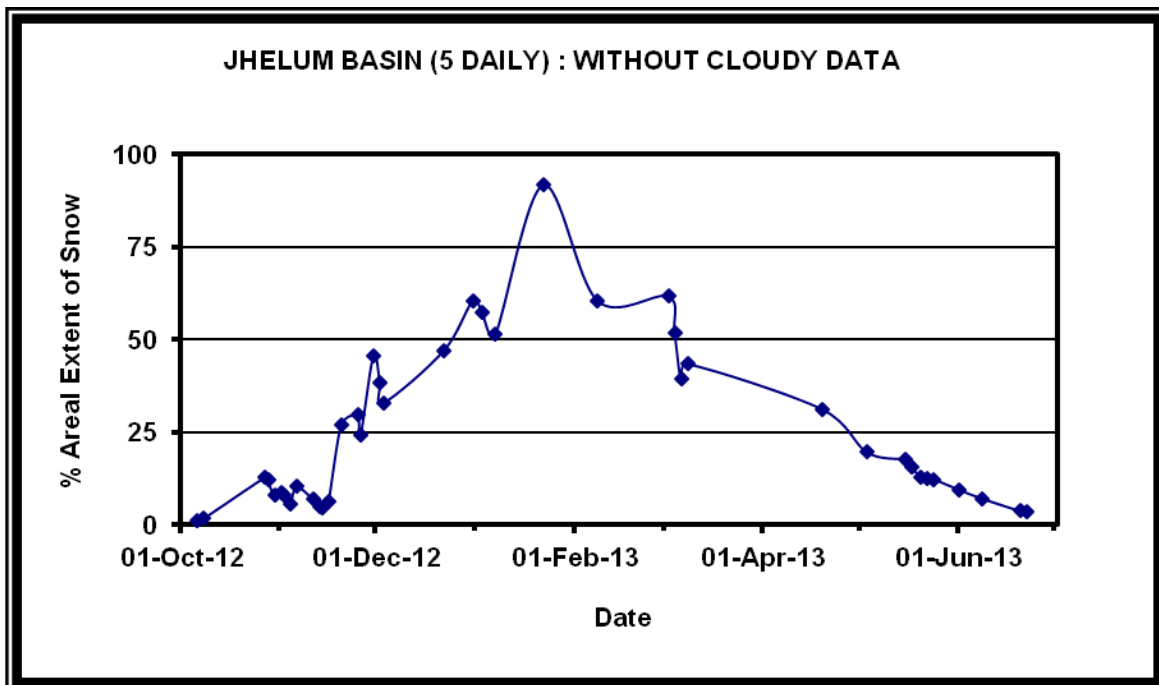
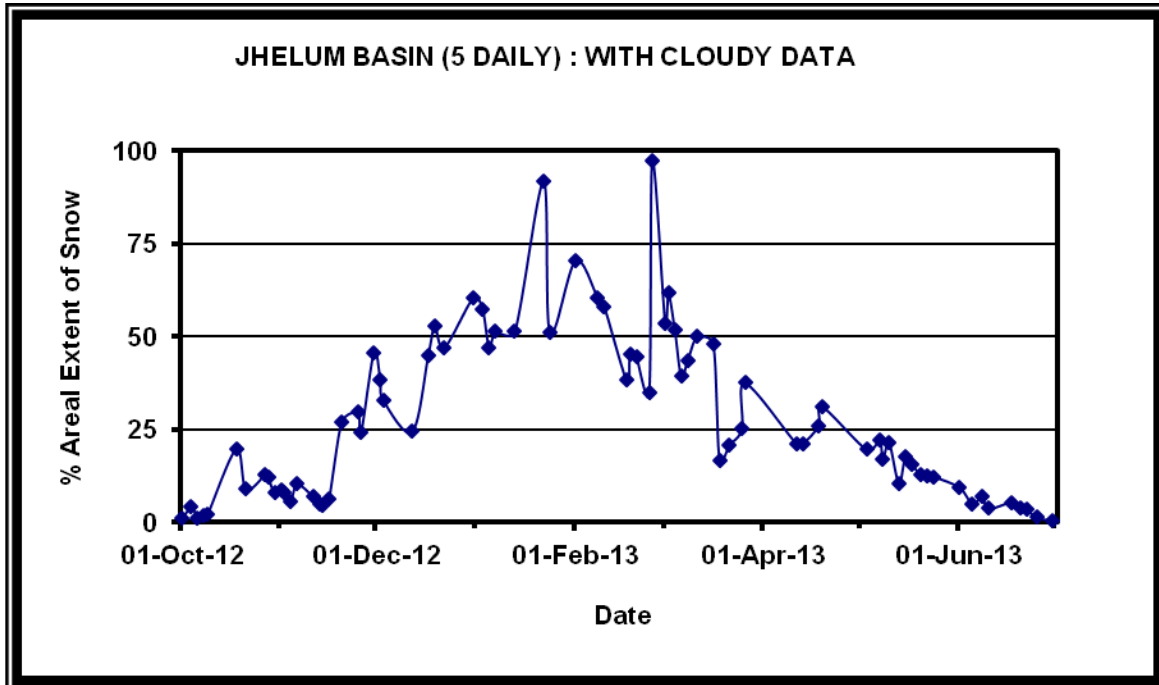
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: JHELUM

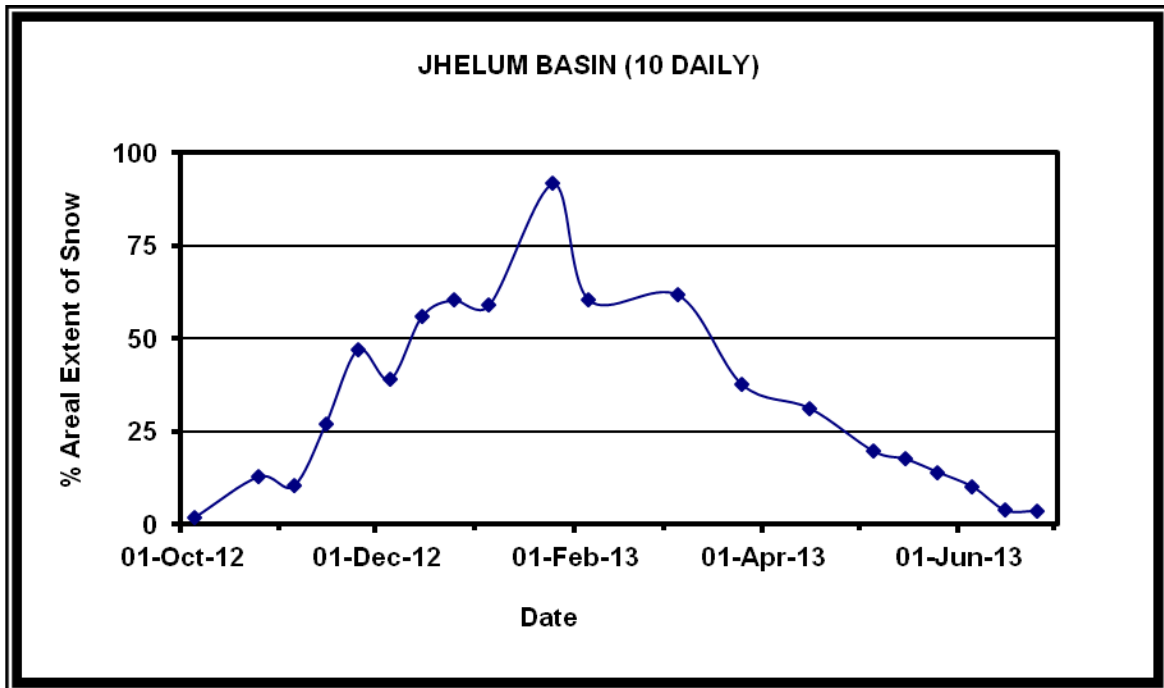
AREA: 14472 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	224	2	2	25-Oct-12	1843	13
November 2012							
3	5-Nov-12	1329	10	4	15-Nov-12	3914	27
5	25-Nov-12	6785	47				
December 2012							
6	5-Dec-12	5643	39	7	15-Dec-12	8069	56
7	25-Dec-12		60				
January 2013							
8	5-Jan-13	8509	59	9	25-Jan-13	13275	92
February 2013							
10	5-Feb-13	8743	60				
March 2013							
12	5-Mar-13	8935	62	13	25-Mar-13	5438	38
April 2013							
14	15-Apr-13	4522	31				
May 2013							
15	5-May-13	2843	20	16	15-May-13	2610	18
17	25-May-13	2014	14				
June 2013							
18	5-Jun-13	1446	10	19	15-Jun-13	544	4
20	25-Jun-13	514	4				

Snow cover depletion curve



Snow cover depletion curve

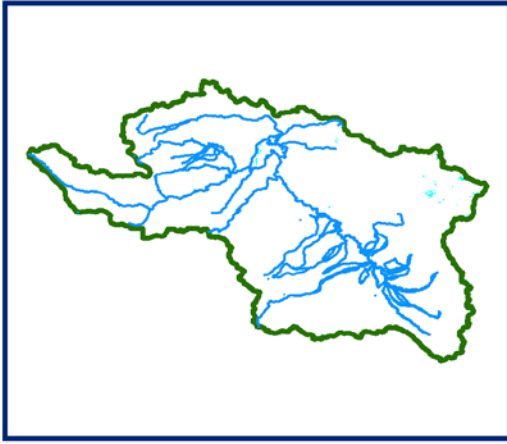


SNOW COVER MAP

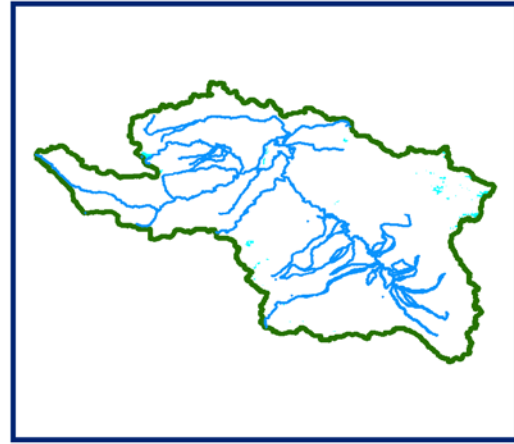
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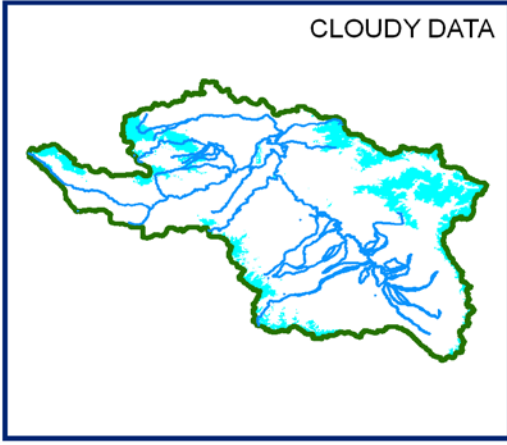
JHELUM BASIN



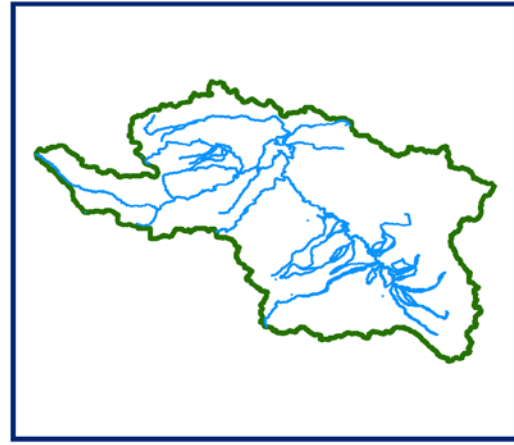
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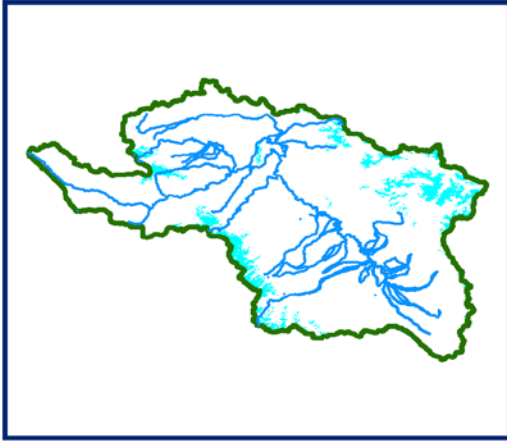
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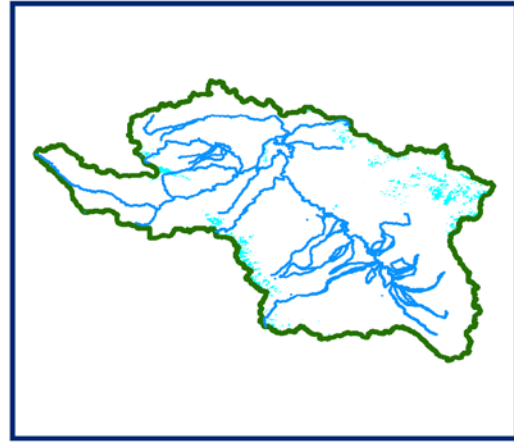
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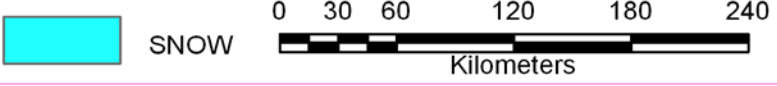
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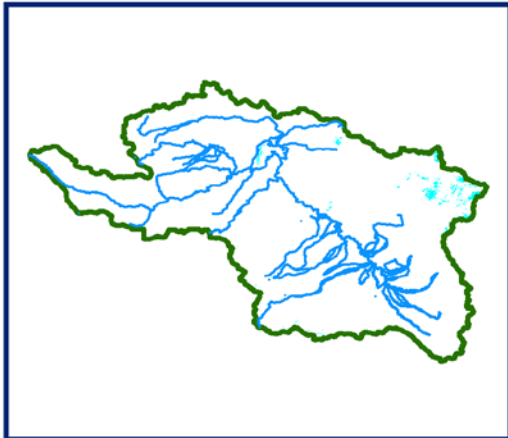
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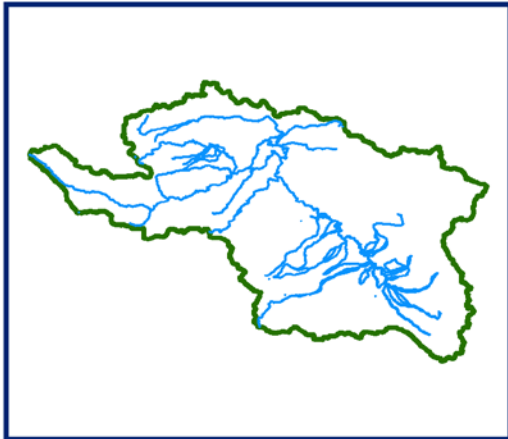
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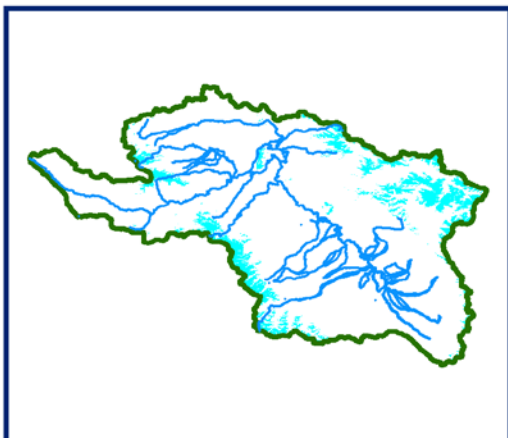
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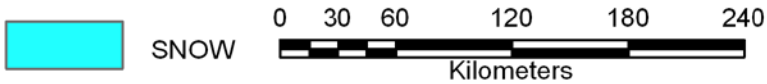
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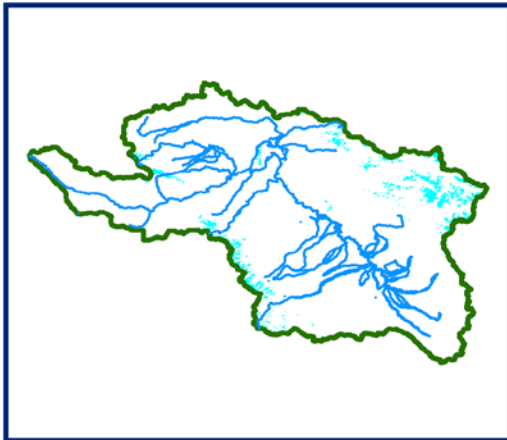
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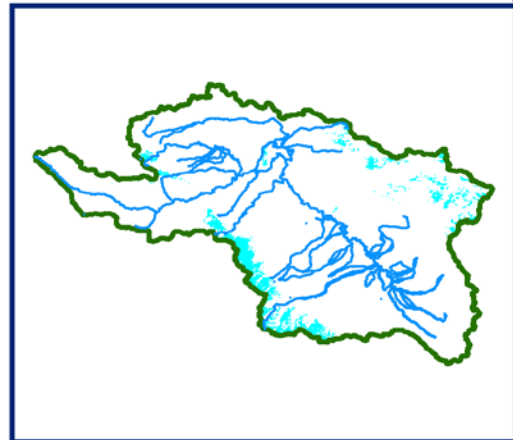
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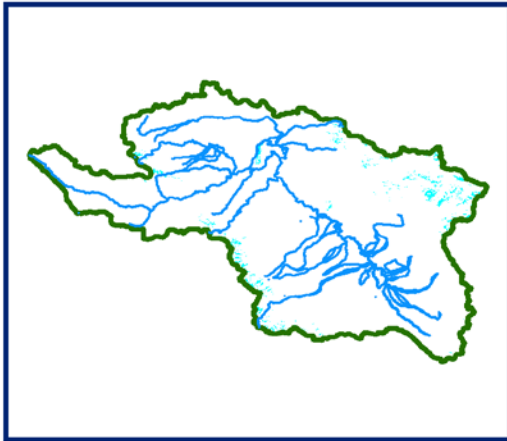
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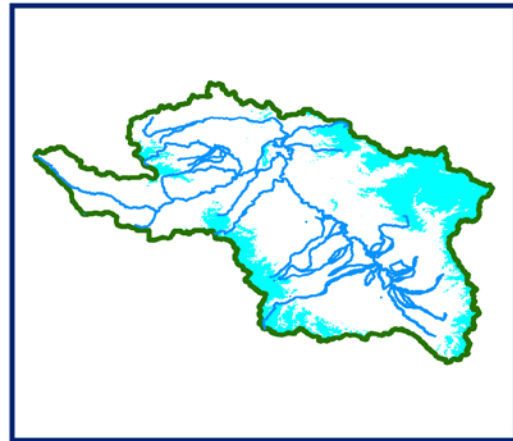
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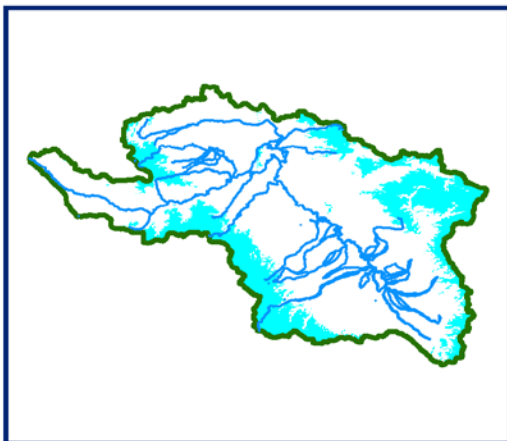
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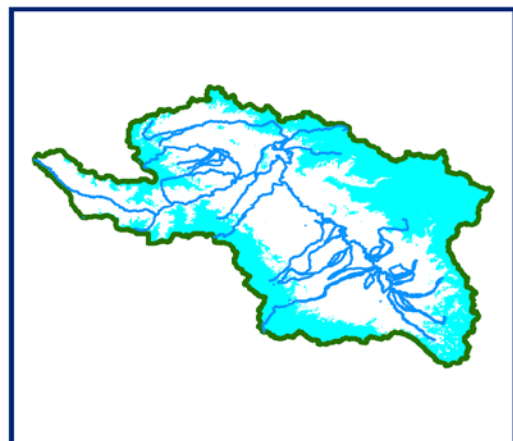
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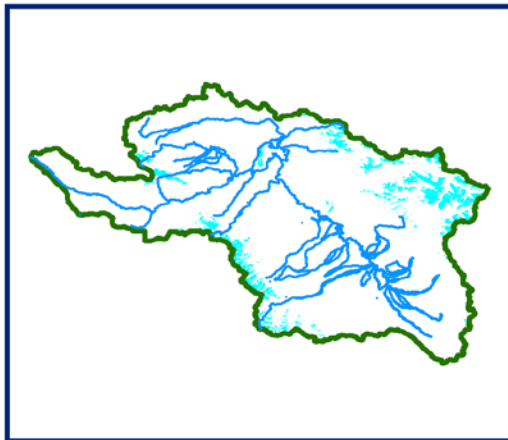
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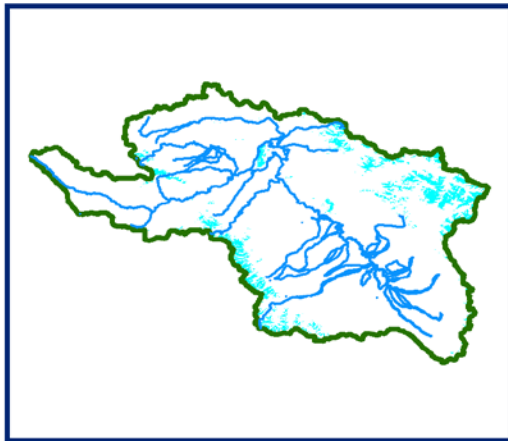


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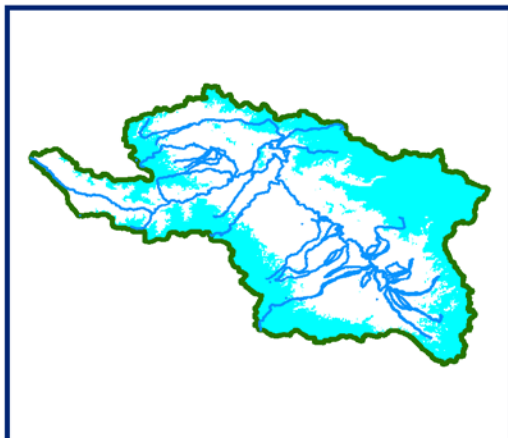
10 DAILY SNOW COVER MAP: JHELUM BASIN



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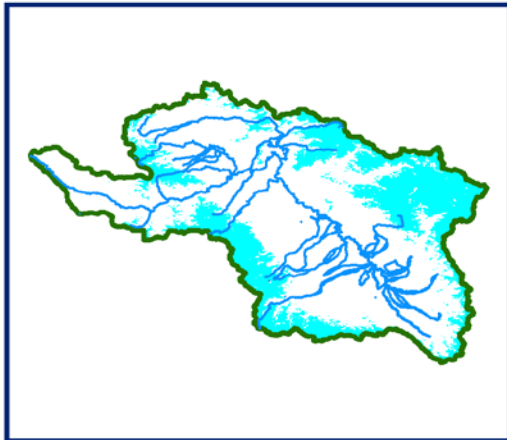
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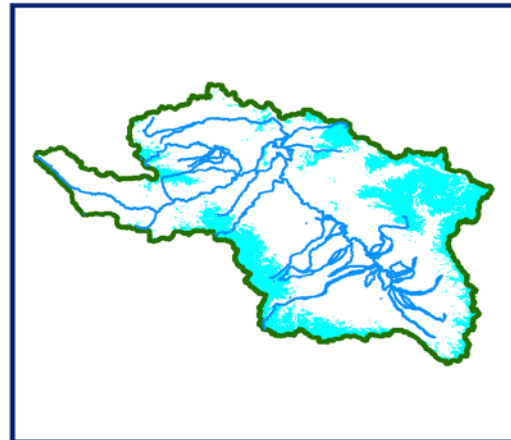
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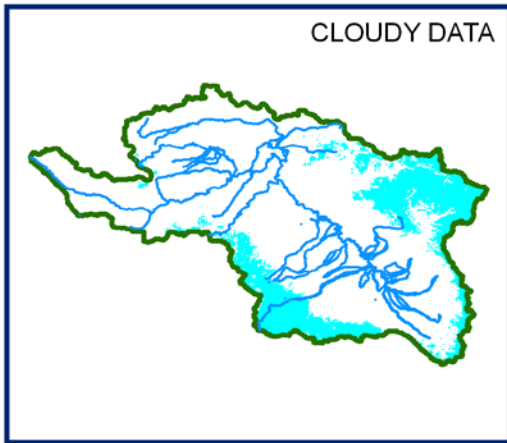
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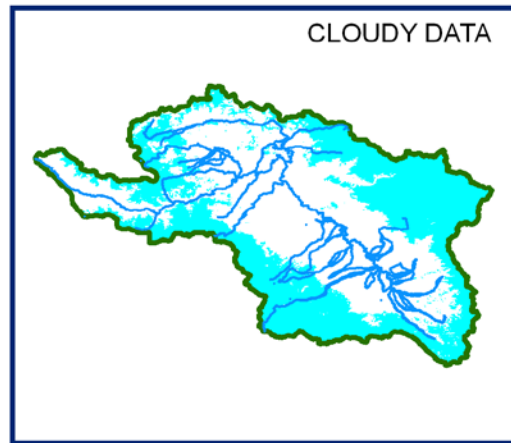
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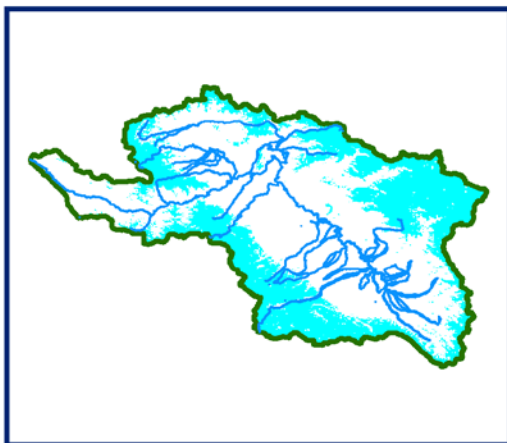
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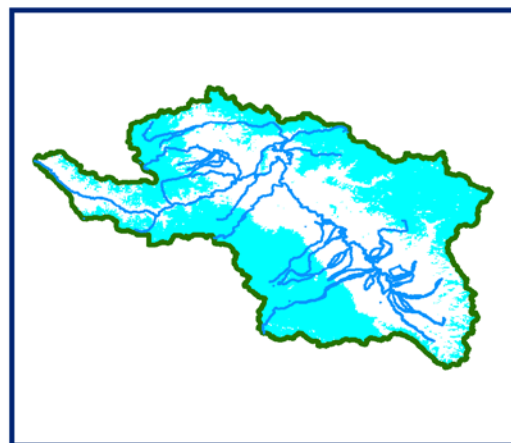
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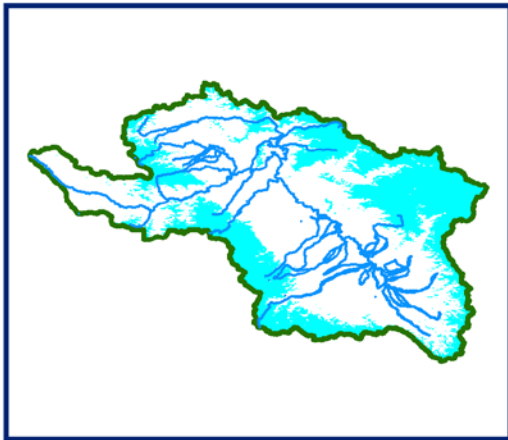


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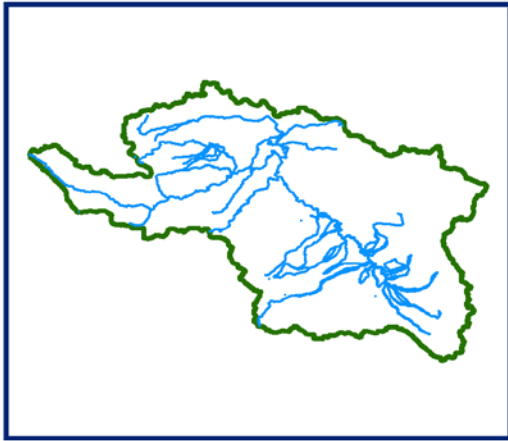
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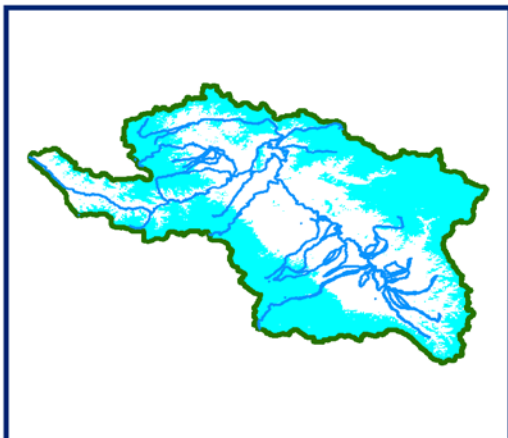
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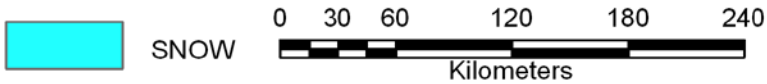
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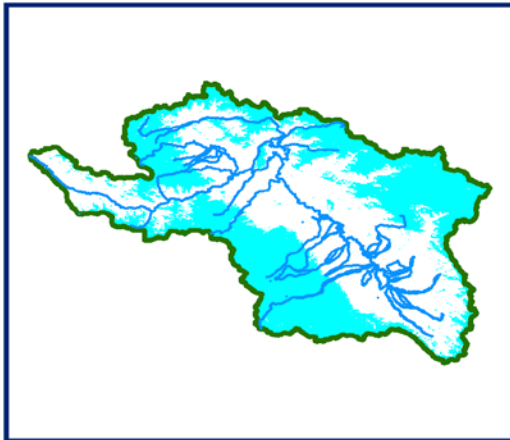
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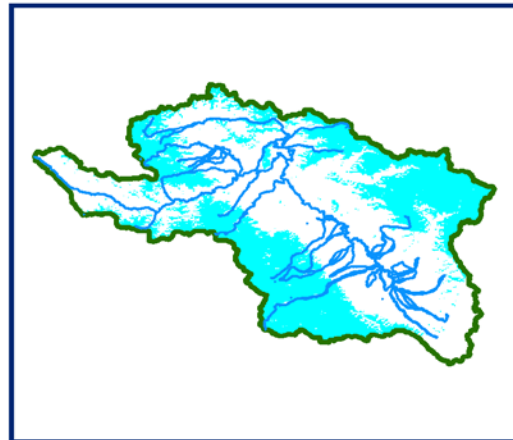
SNOW COVER MAP

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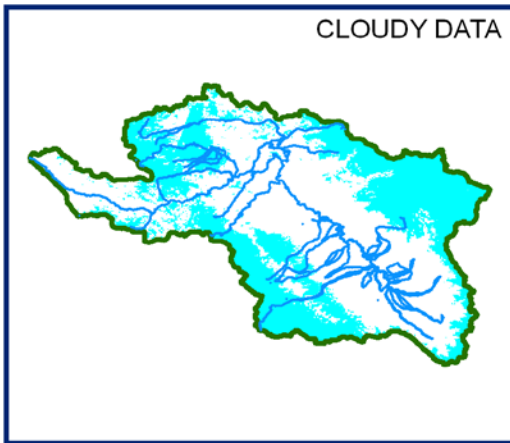
JHELUM BASIN



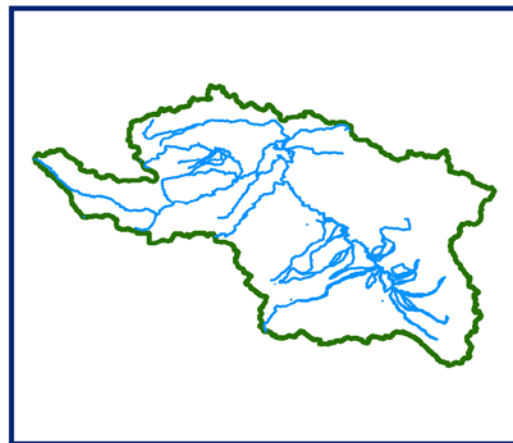
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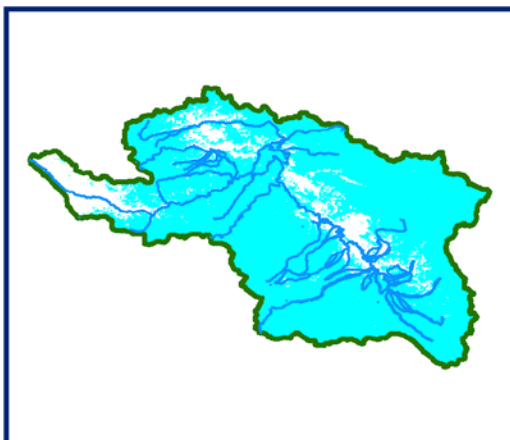
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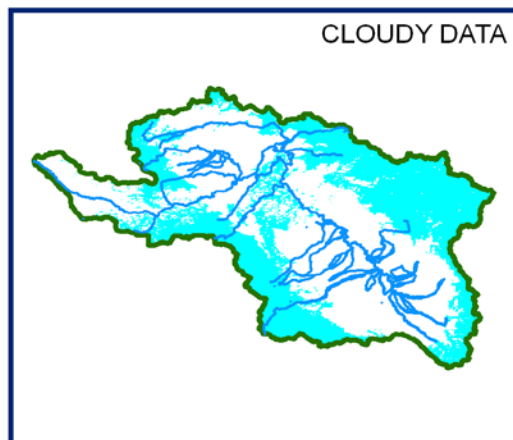
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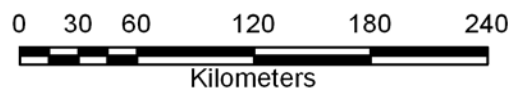
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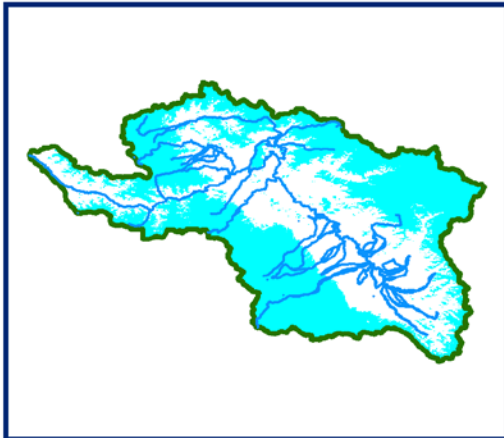
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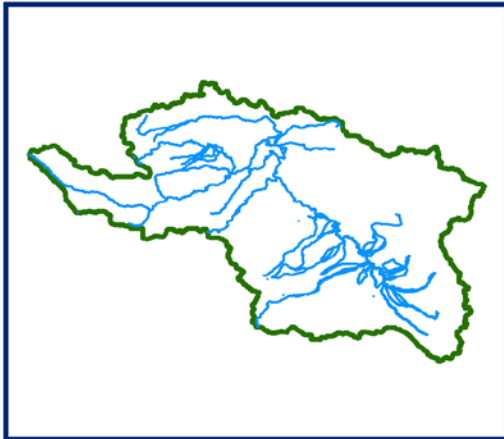
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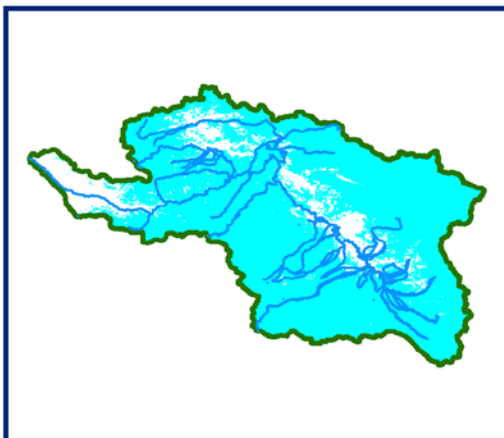
10 DAILY SNOW COVER MAP: JHELUM BASIN



DATA USED
03 JANUARY 2013
07 JANUARY 2013

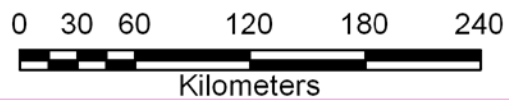


DATA USED
DATA NOT AVAILABLE



DATA USED
22 JANUARY 2013

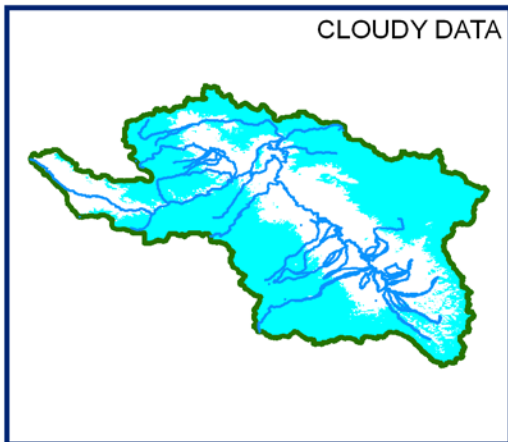
 SNOW



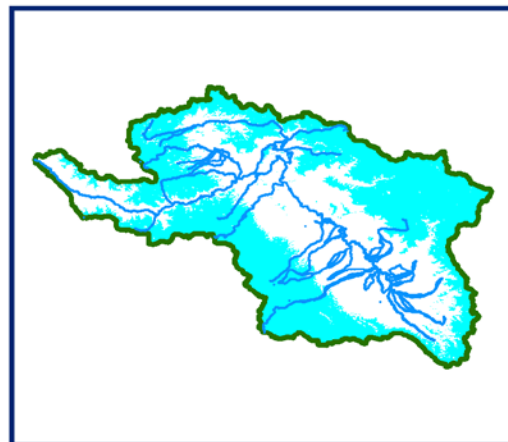
SNOW COVER MAP

:

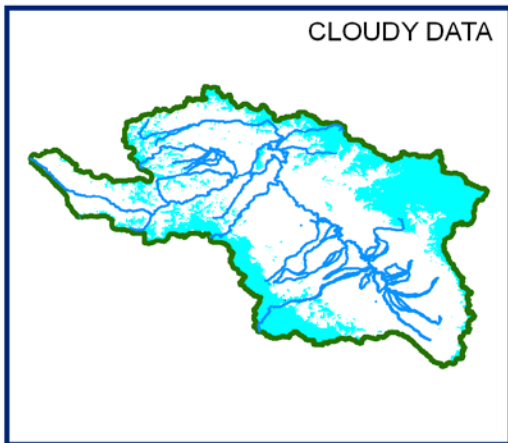
JHELUM BASIN



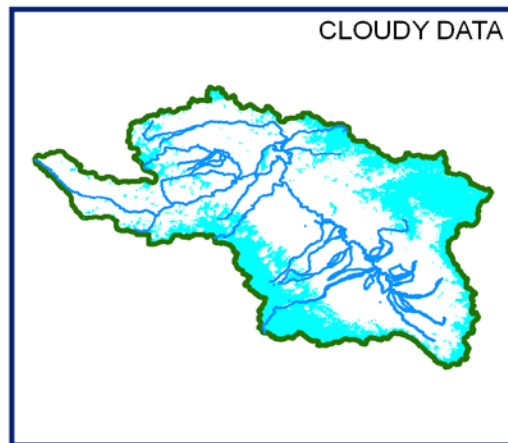
01 FEBRUARY 2013



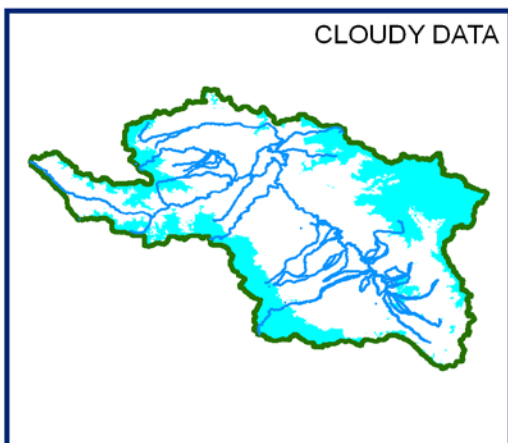
08 FEBRUARY 2013



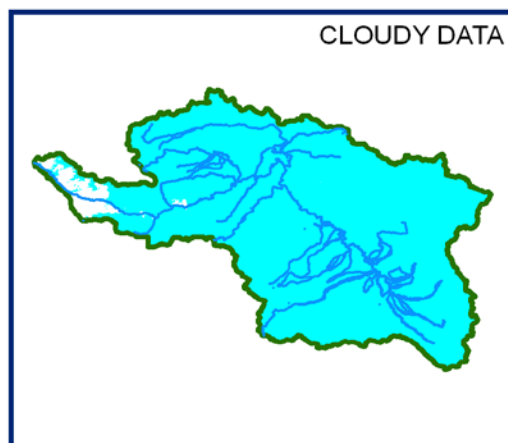
17 FEBRUARY 2013



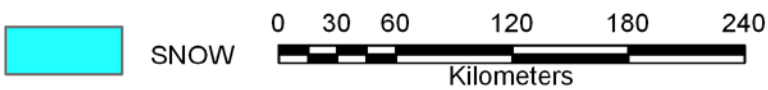
20 FEBRUARY 2013



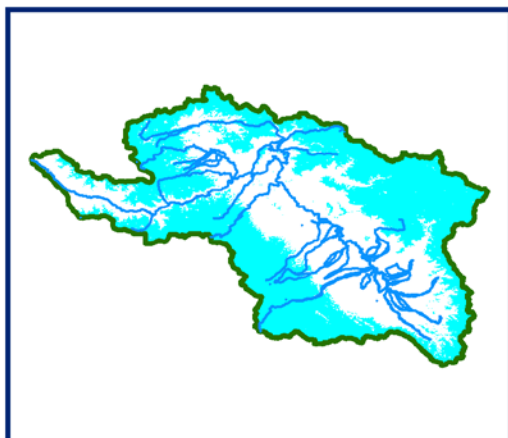
24 FEBRUARY 2013



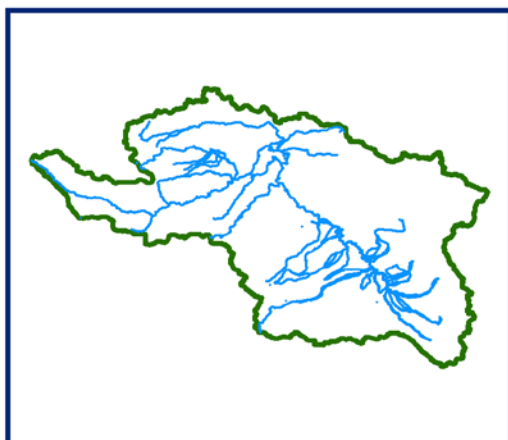
25 FEBRUARY 2013



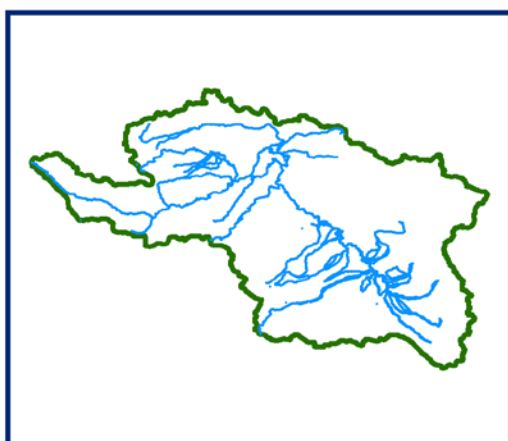
10 DAILY SNOW COVER MAP: JHELUM BASIN




DATA USED
08 FEBRUARY 2013



DATA USED
DATA NOT AVAILABLE



DATA USED
DATA NOT AVAILABLE

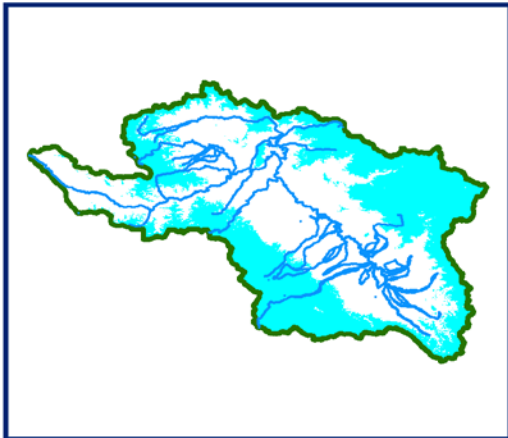
 SNOW



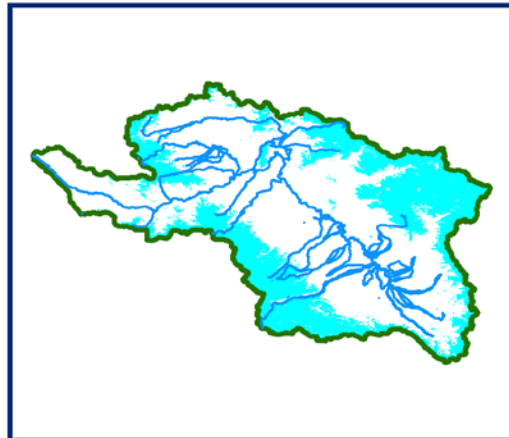
SNOW COVER MAP

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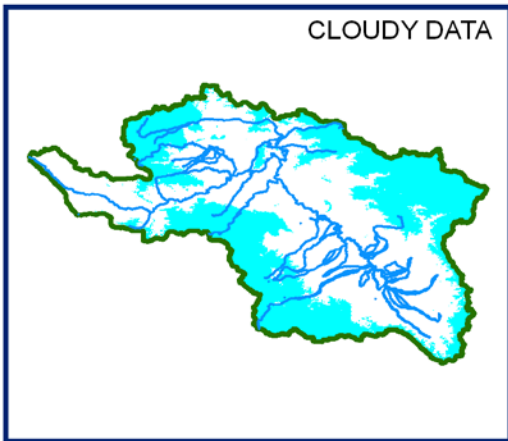
JHELUM BASIN



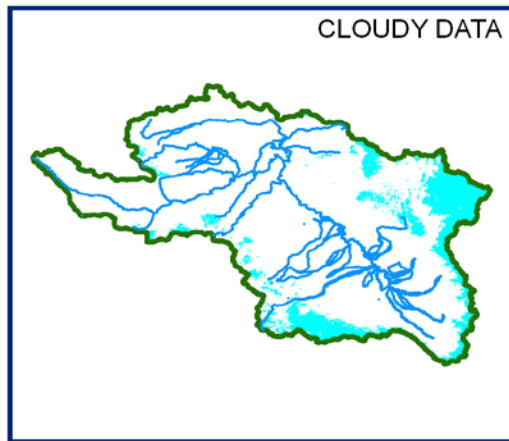
04 MARCH 2013



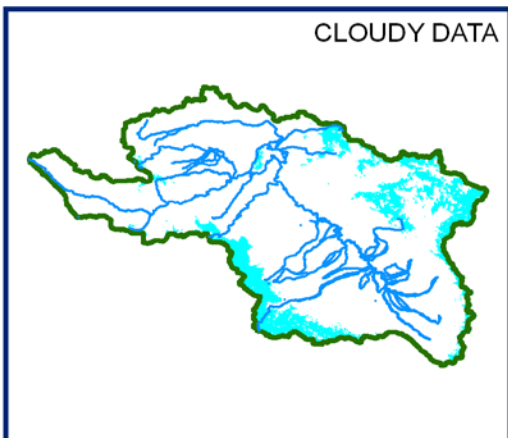
08 MARCH 2013



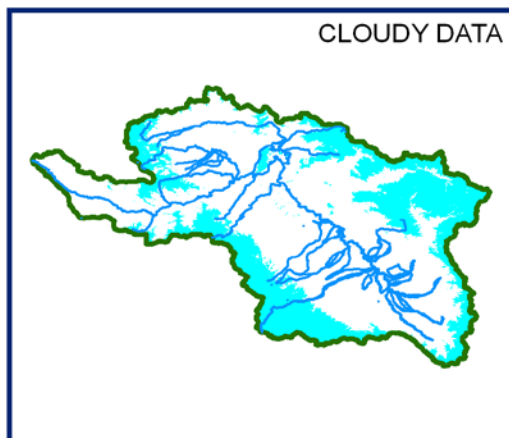
11 MARCH 2013



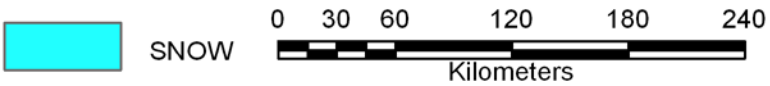
18 MARCH 2013



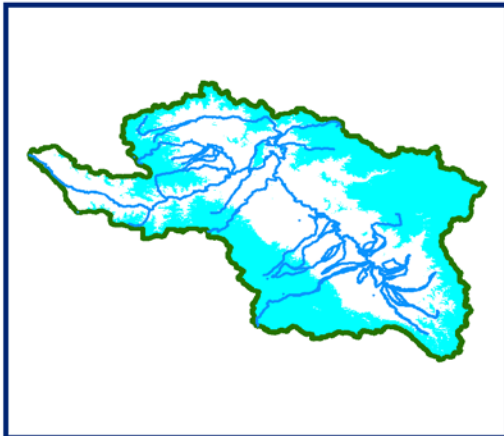
21 MARCH 2013



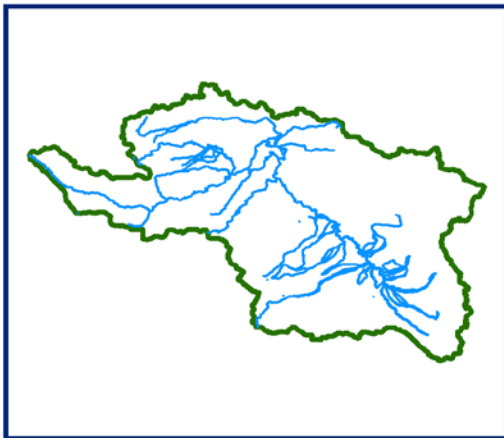
26 MARCH 2013



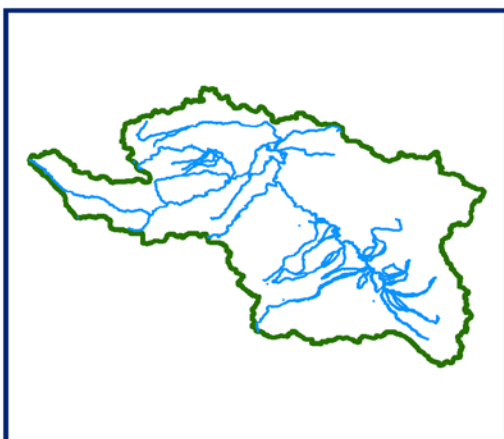
10 DAILY SNOW COVER MAP: JHELUM BASIN



DATA USED
04 MARCH 2013
06 MARCH 2013
08 MARCH 2013

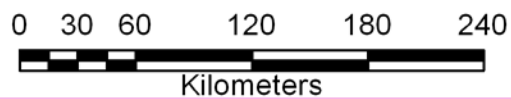


DATA USED
DATA NOT AVAILABLE



DATA USED
DATA NOT AVAILABLE

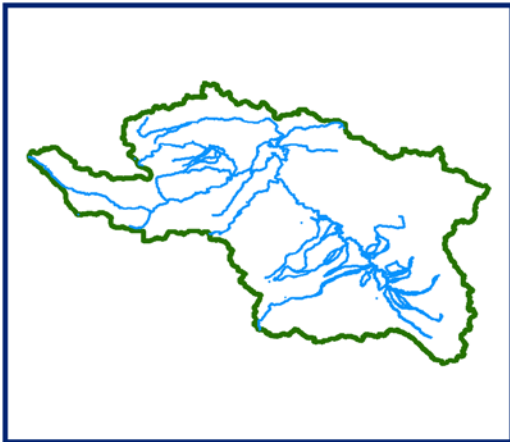
 SNOW



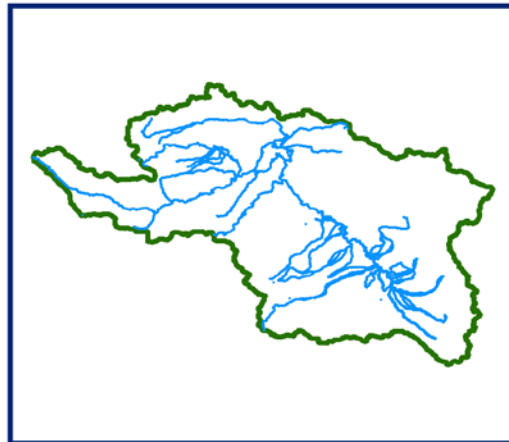
SNOW COVER MAP

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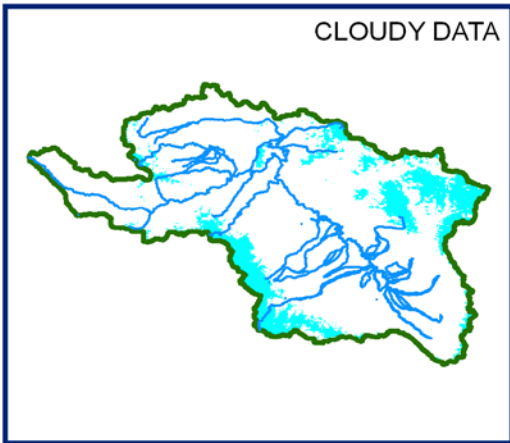
JHELUM BASIN



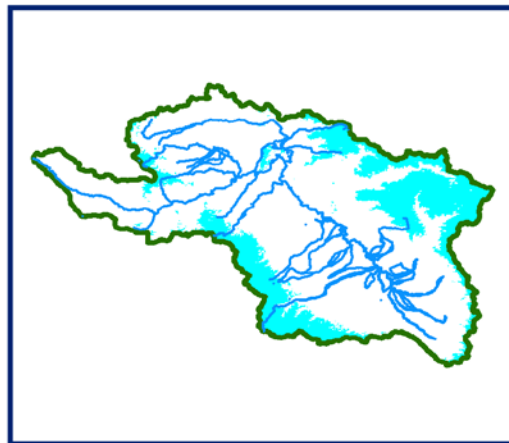
DATA NOT AVAILABLE



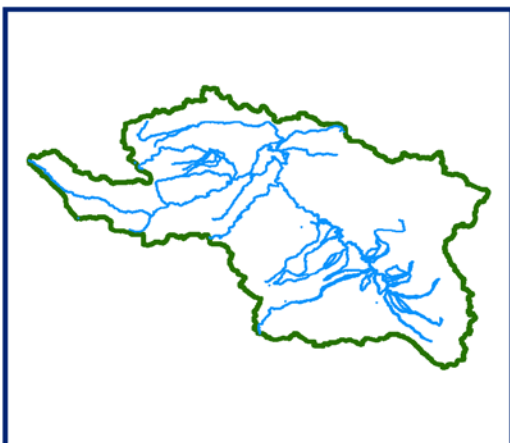
DATA NOT AVAILABLE



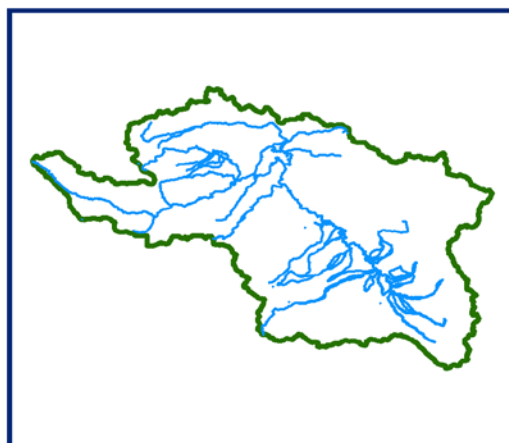
11 APRIL 2013



19 APRIL 2013



DATA NOT AVAILABLE



DATA NOT AVAILABLE



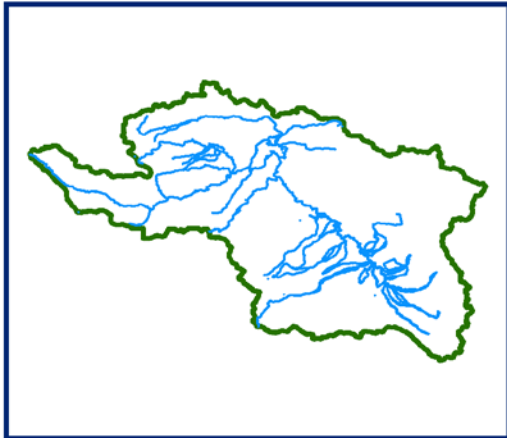
SNOW

0 30 60 120 180 240

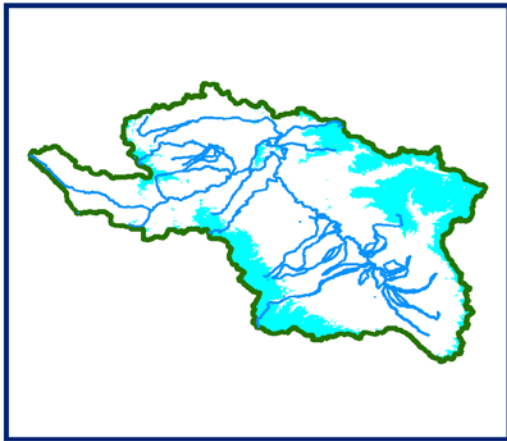


Kilometers

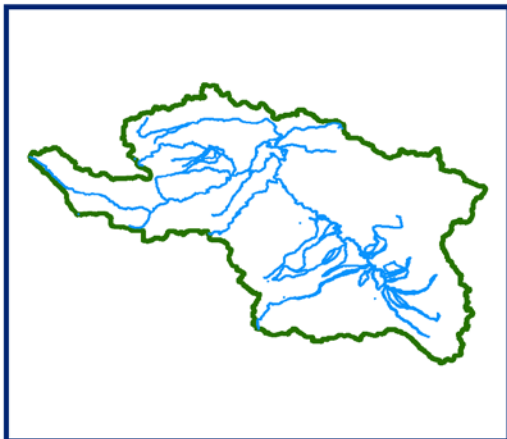
10 DAILY SNOW COVER MAP: JHELUM BASIN



DATA USED
DATA NOT AVAILABLE



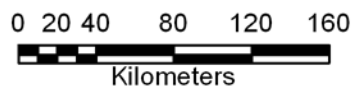
DATA USED
19 APRIL 2013



DATA USED
DATA NOT AVAILABLE



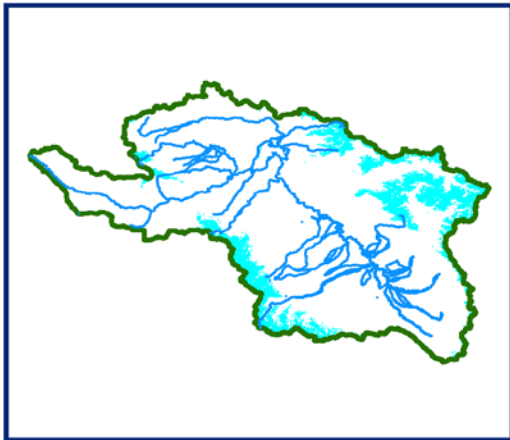
SNOW



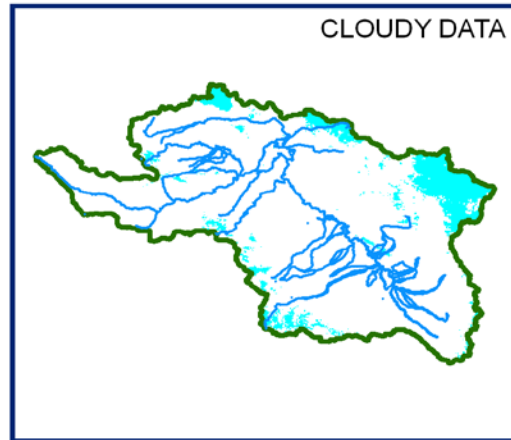
SNOW COVER MAP

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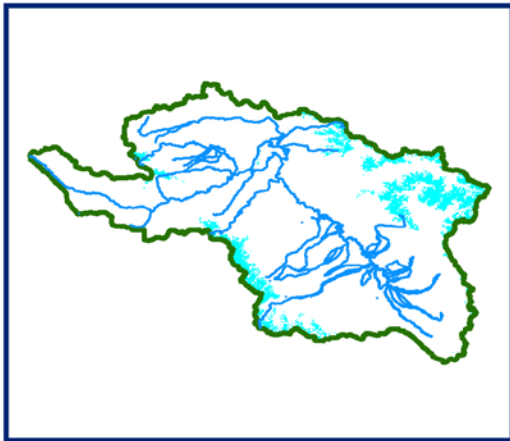
JHELUM BASIN



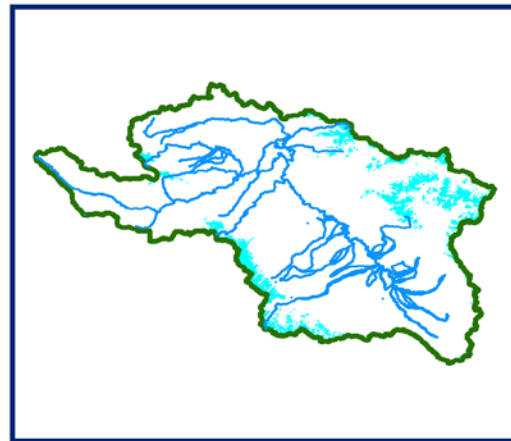
03 MAY 2013



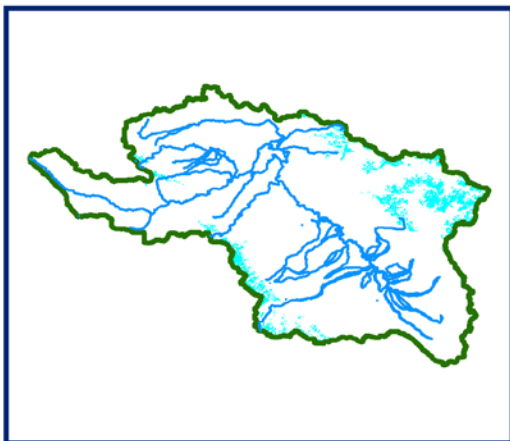
08 MAY 2013



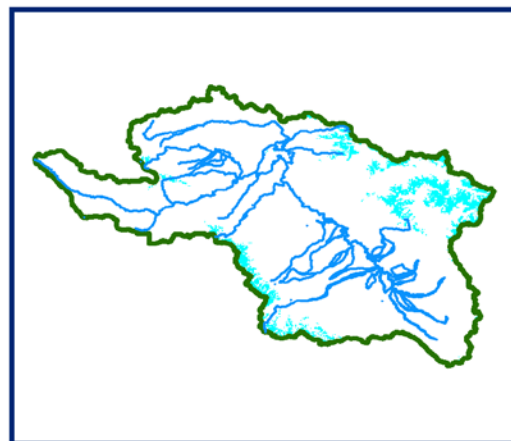
17 MAY 2013



20 MAY 2013



22 MAY 2013



24 MAY 2013

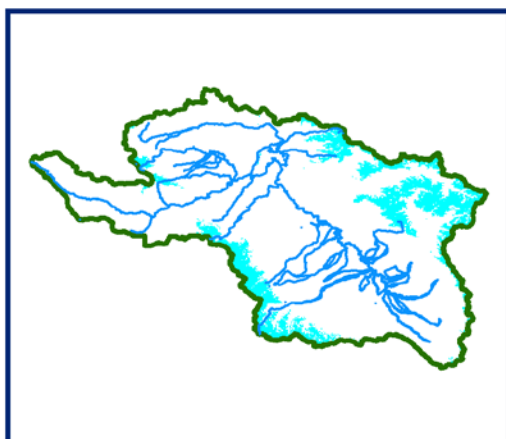


SNOW

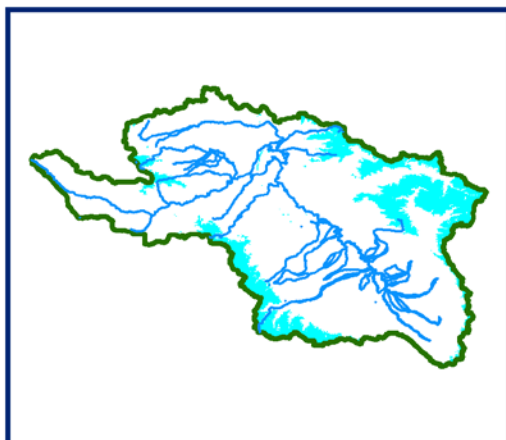
0 30 60 120 180 240

Kilometers

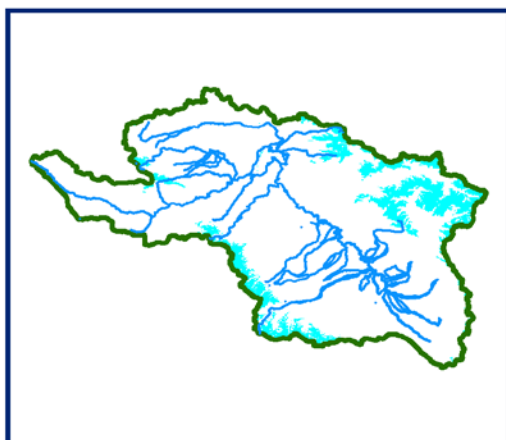
10 DAILY SNOW COVER MAP: JHELUM BASIN



DATA USED
03 MAY 2013

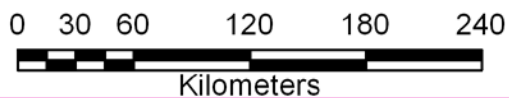


DATA USED
15 MAY 2013
17 MAY 2013
20 MAY 2013



DATA USED
22 MAY 2013
24 MAY 2013

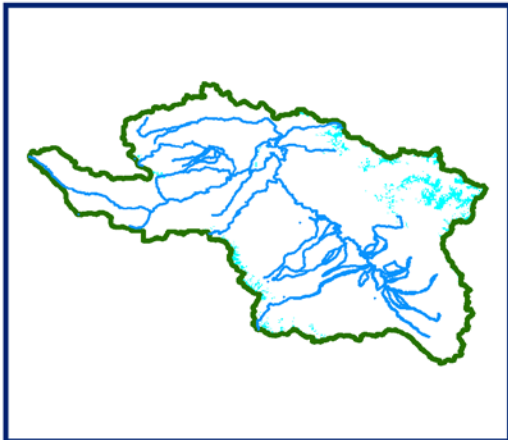
 SNOW



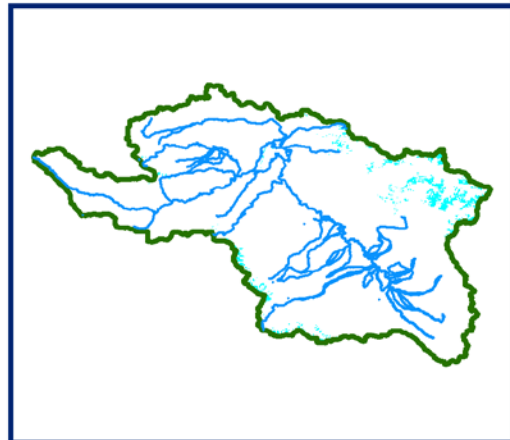
SNOW COVER MAP

:

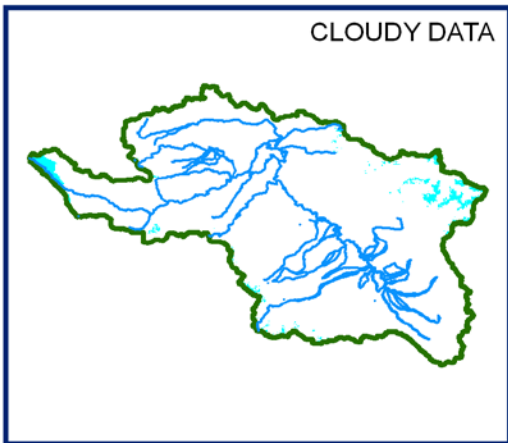
JHELUM BASIN



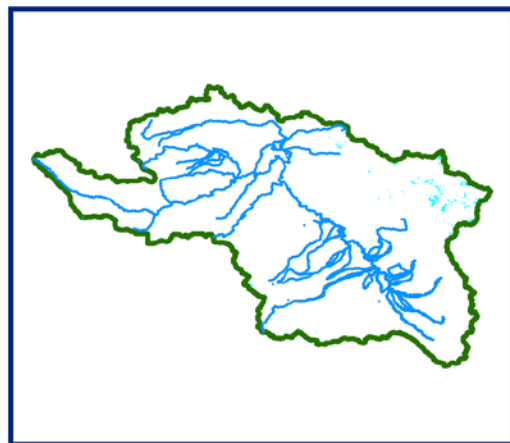
01 JUNE 2013



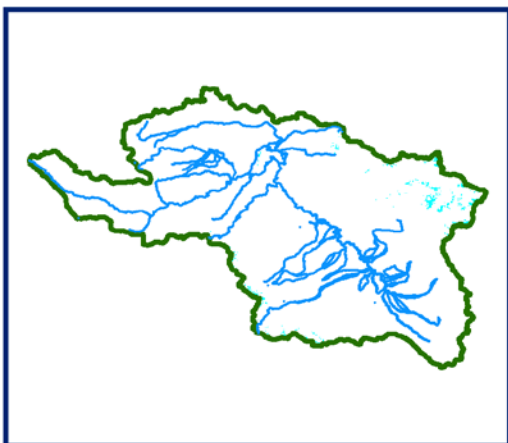
08 JUNE 2013



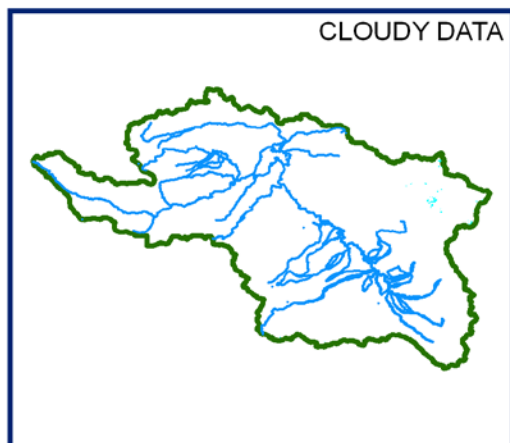
17 JUNE 2013



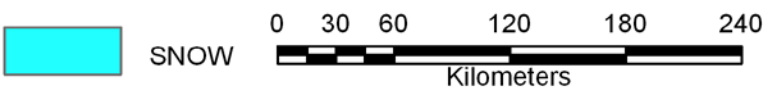
20 JUNE 2013



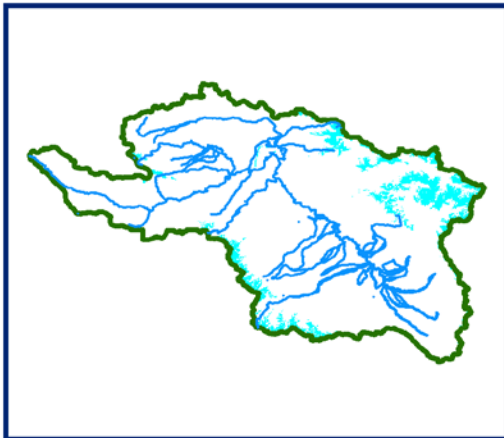
22 JUNE 2013



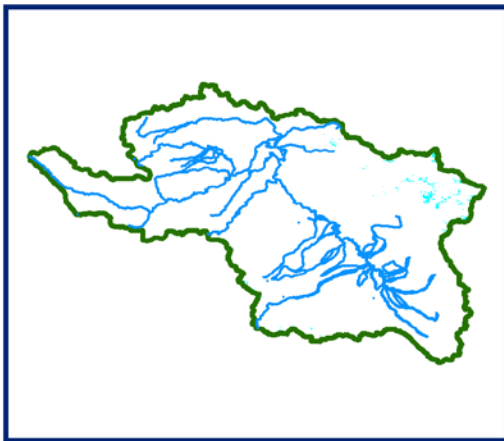
25 JUNE 2013



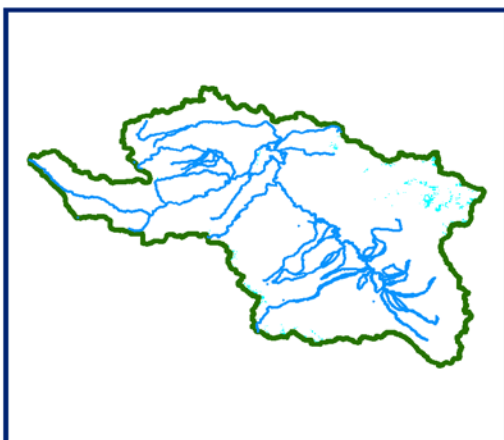
10 DAILY SNOW COVER MAP: JHELUM BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013



DATA USED
20 JUNE 2013



DATA USED
22 JUNE 2013

 SNOW



KISAN GANGA BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: KISANGANGA

BASIN AREA: 7451 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	1-Oct-12	409	5	2	6-Oct-12	373	5
3	27-Oct-12	2976	40	4	28-Oct-12	2770	37
5	30-Oct-12	2136	29				
November 2012							
6	1-Nov-12	2199	30	7	2-Nov-12	2076	28
8	4-Nov-12	1641	22	9	6-Nov-12	1956	26
10	11-Nov-12	1703	23	11	13-Nov-12	1471	20
12	16-Nov-12	1569	21	13	20-Nov-12	5074	68
14	25-Nov-12	5055	68	15	30-Nov-12	6581	88
December 2012							
16	2-Dec-12	5771	77	17	3-Dec-12	5097	68
18	17-Dec-12	6958	93	19	22-Dec-12	6536	88
20	31-Dec-12	6994	94				
January 2013							
21	3-Jan-13	6809	91	22	7-Jan-13	6652	89
23	22-Jan-13	6877	92	24	24-Jan-13	6693	90
February 2013							
25	8-Feb-13	6852	92	26	17-Feb-13	6732	90
March 2013							
27	1-Mar-13	6777	91	28	2-Mar-13	7019	94
29	4-Mar-13	6466	87	30	6-Mar-13	5950	80
31	26-Mar-13	5996	80				
April 2013							
32	19-Apr-13	4598	62				

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
33	3-May-13	3437	46	34	15-May-13	3135	42
35	17-May-13	2973	40	36	20-May-13	2560	34
37	22-May-13	2402	32	38	24-May-13	2397	32
June 2013							
39	1-Jun-13	2238	30	40	8-Jun-13	1736	23
41	10-Jun-13	1434	19	42	20-Jun-13	1152	15
43	22-Jun-13	1120	15				

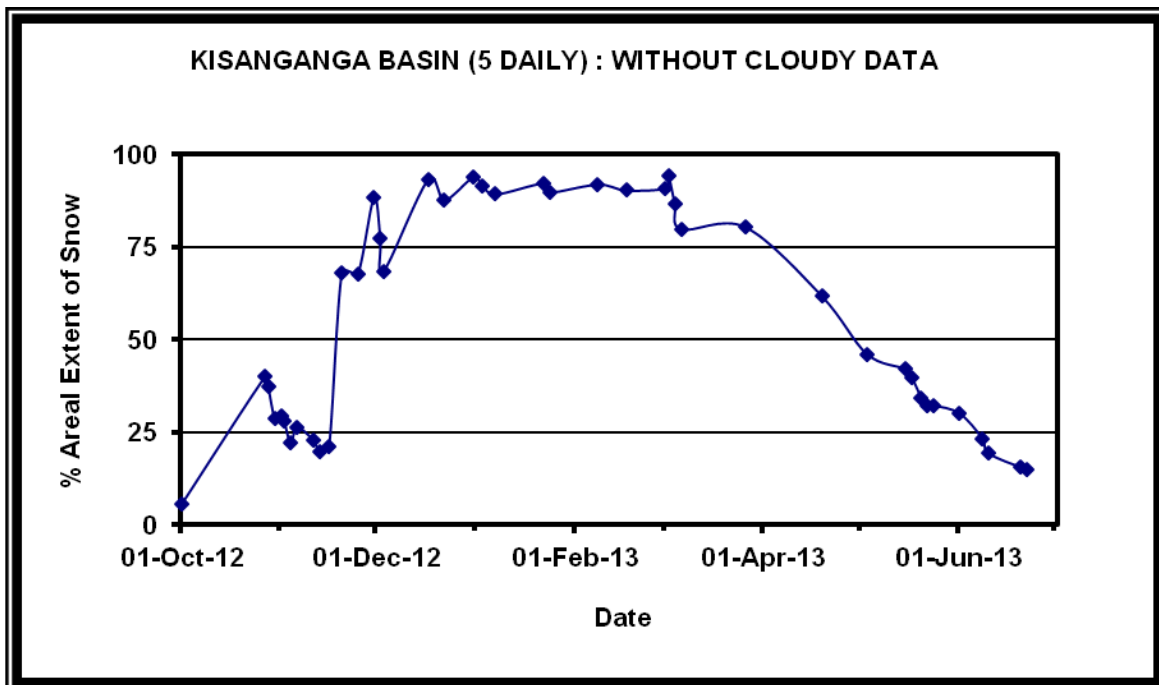
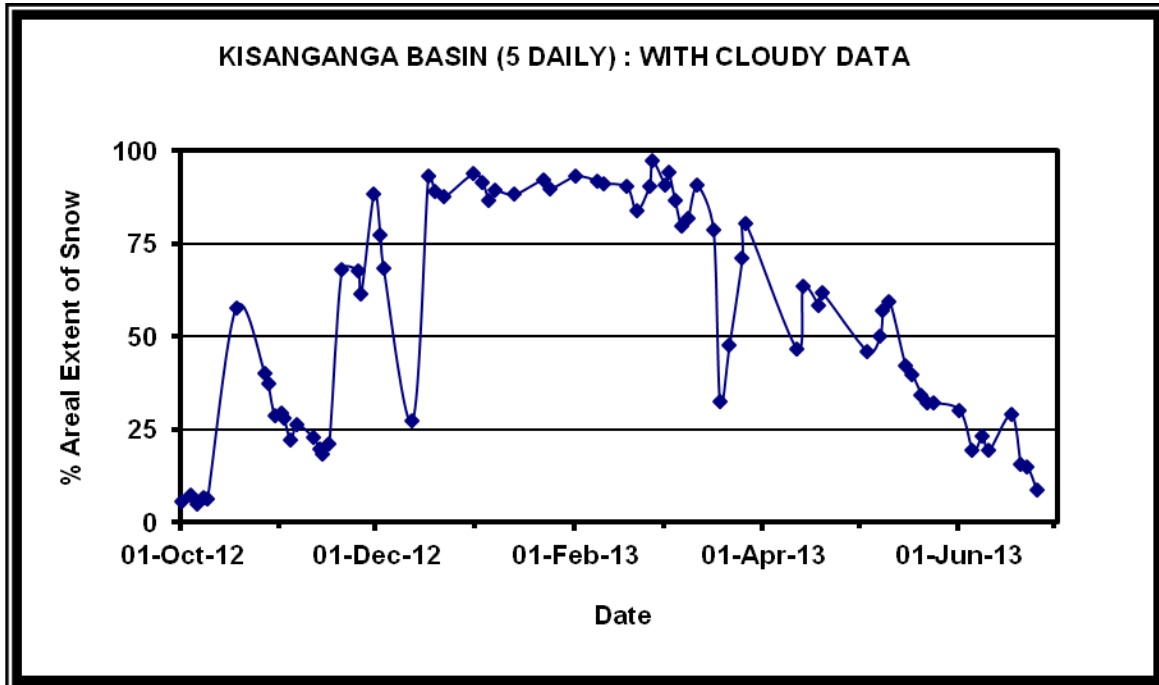
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: KISANGANGA

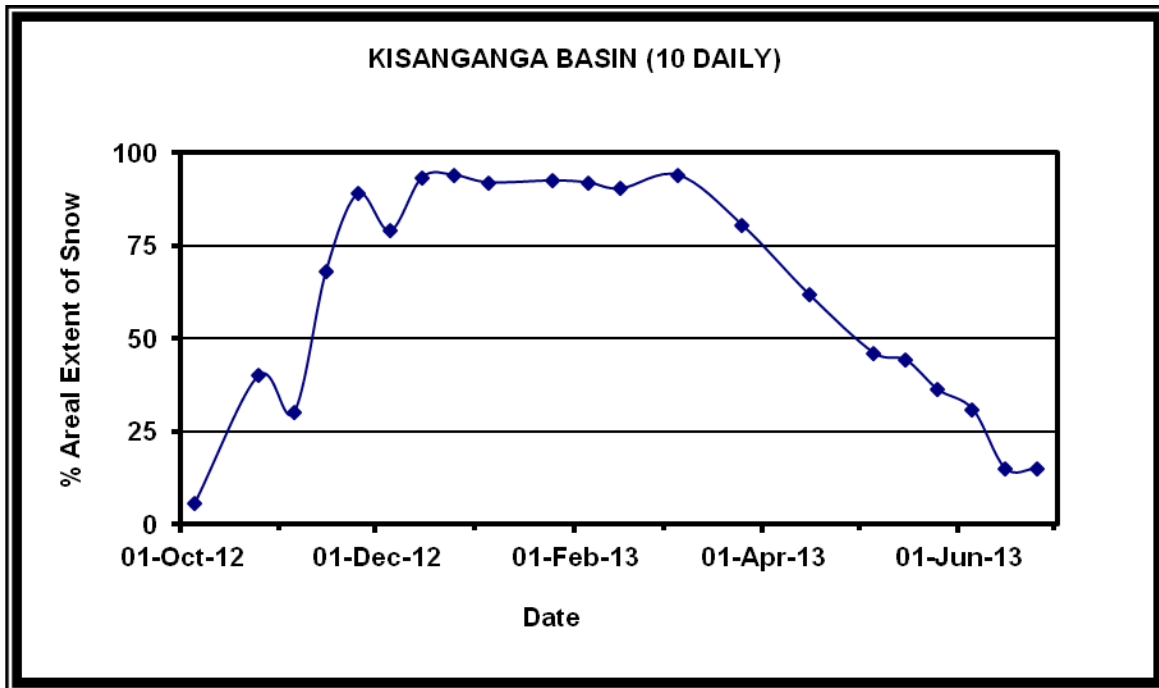
BASIN AREA: 7451 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-13	409	5	2	25-Oct-12	2980	40
November 2012							
3	5-Nov-12	2237	30	4	15-Nov-12	5067	68
5	25-Nov-12	6627	89				
December 2012							
6	5-Dec-12	5884	79	7	15-Dec-12	6958	93
8	25-Dec-12	7004	94				
January 2013							
9	5-Jan-13	6856	92	10	25-Jan-13	6893	93
February 2013							
11	5-Feb-13	6852	92	12	15-Feb-13	6732	90
March 2013							
13	5-Mar-13	7004	94	14	25-Mar-13	5996	80
April 2013							
15	15-Apr-13	4598	62				
May 2013							
16	5-May-13	3437	46	17	15-May-13	3295	44
18	25-May-13	2700	36				
June 2013							
19	5-Jun-13	2295	31	20	15-Jun-13	1118	15
21	25-Jun-13	1118	15				

Snow cover depletion curve



Snow cover depletion curve

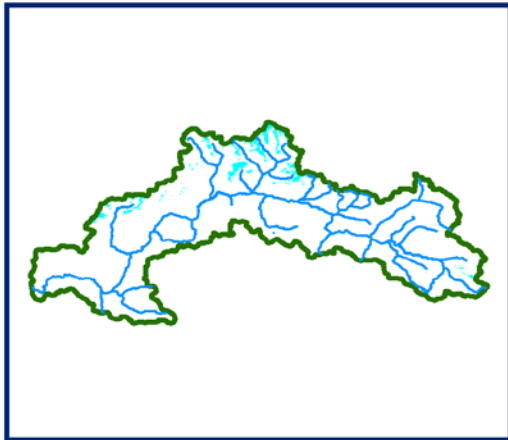


SNOW COVER MAP

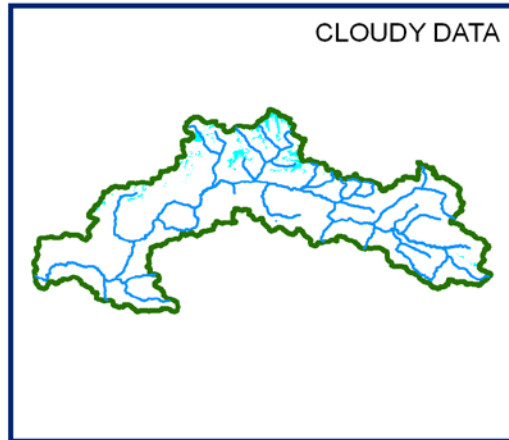
SNOW COVER MAP

:

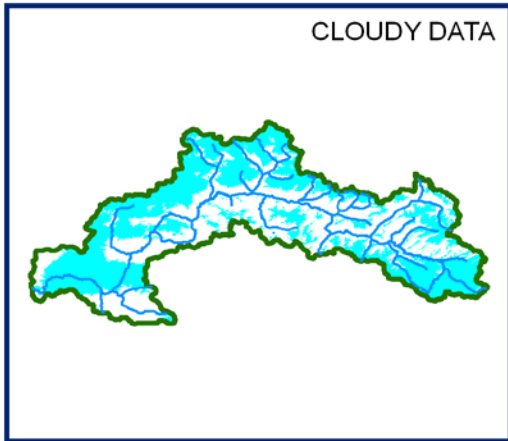
KISANGANGA BASIN



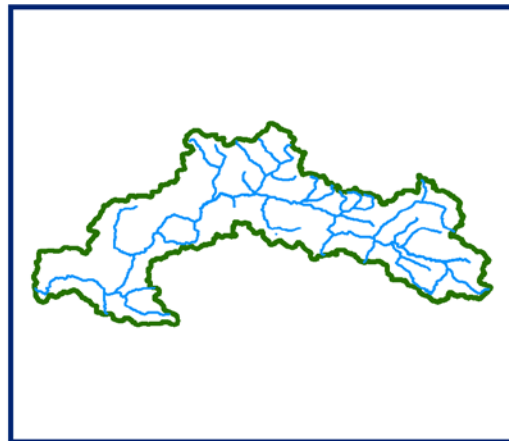
01 OCTOBER 2012



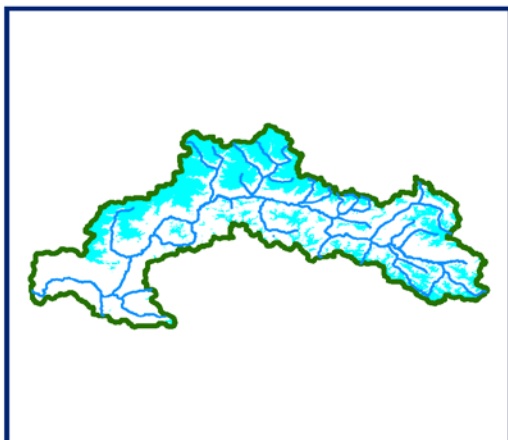
09 OCTOBER 2012



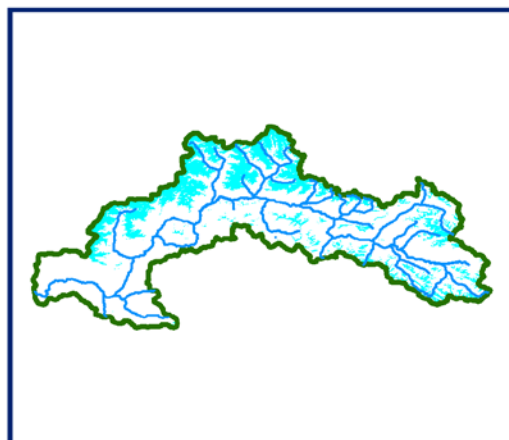
18 OCTOBER 2012



DATA NOT AVAILABLE



27 OCTOBER 2012



30 OCTOBER 2012



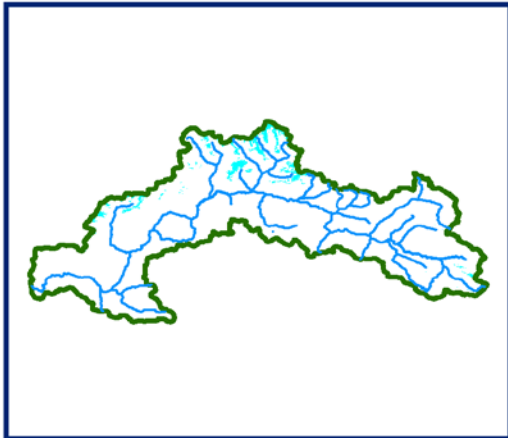
SNOW

0 20 40 80 120 160

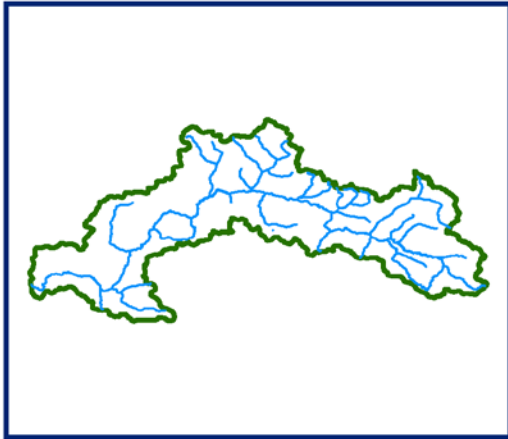


Kilometers

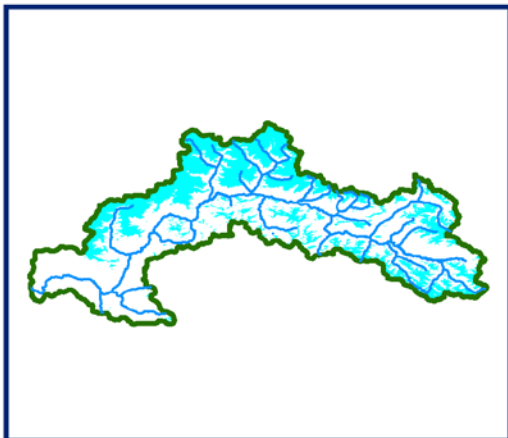
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
01 OCTOBER 2012



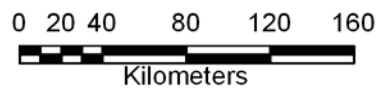
DATA USED
DATA NOT AVAILABLE



DATA USED
30 OCTOBER 2012
27 OCTOBER 2012
28 OCTOBER 2012



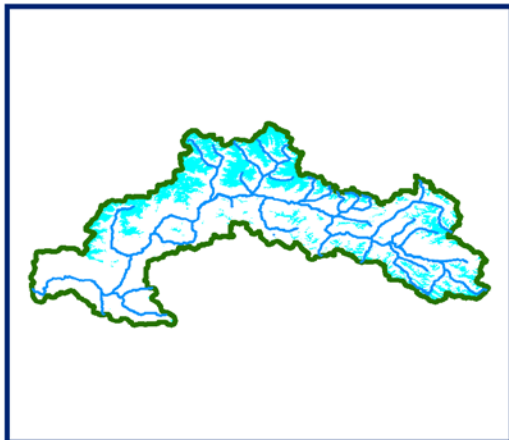
SNOW



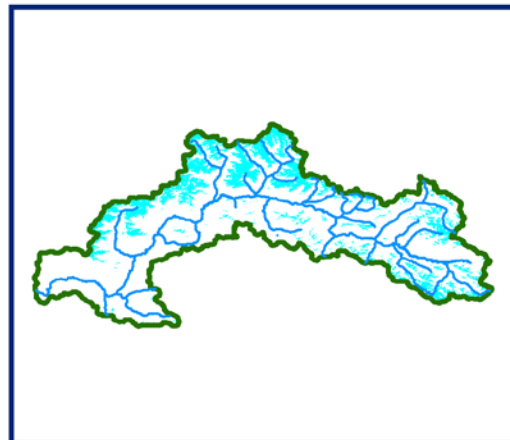
SNOW COVER MAP

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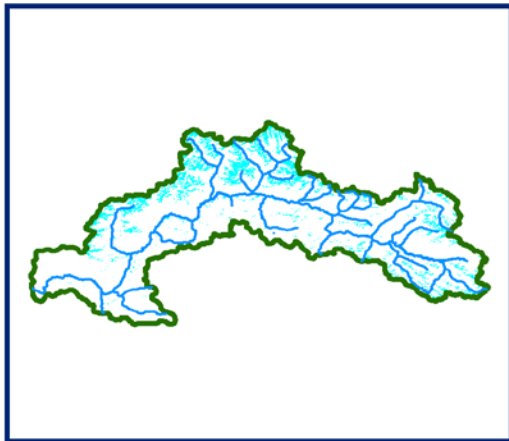
KISANGANGA BASIN



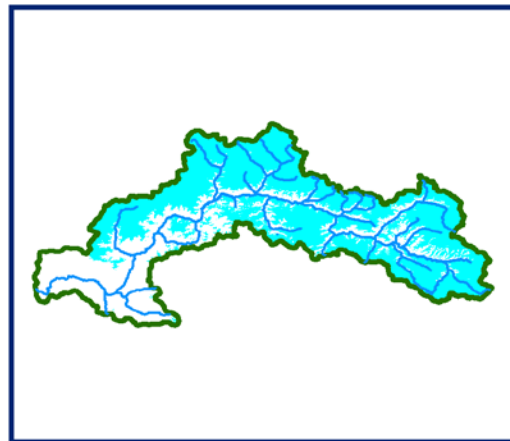
01 NOVEMBER 2012



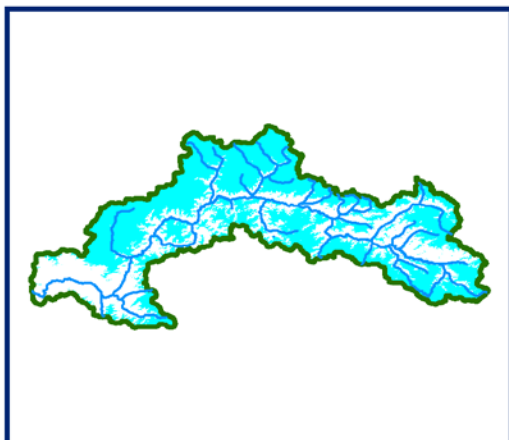
06 NOVEMBER 2012



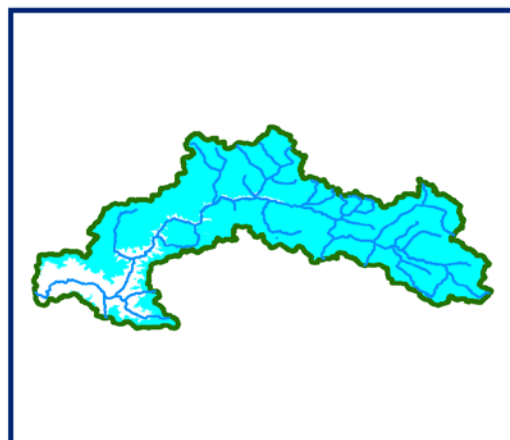
13 NOVEMBER 2012



20 NOVEMBER 2012



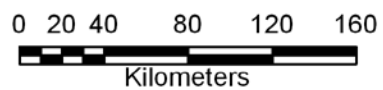
25 NOVEMBER 2012



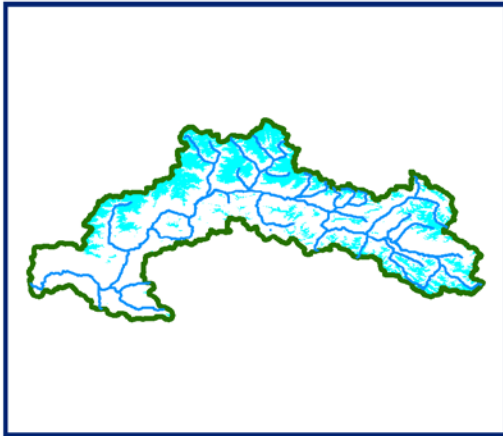
30 NOVEMBER 2012



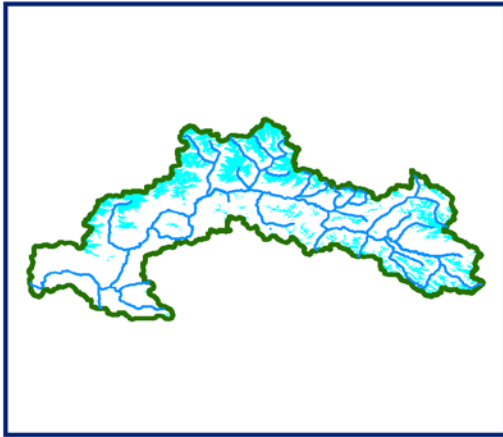
SNOW



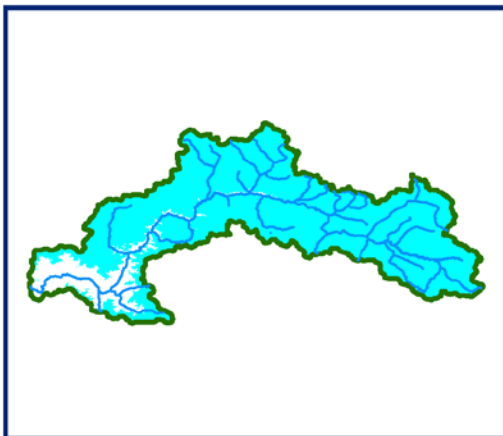
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
01 NOVEMBER 2012
04 NOVEMBER 2012
06 NOVEMBER 2012

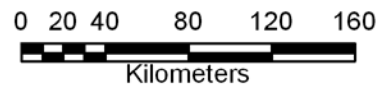


DATA USED
11 NOVEMBER 2012
16 NOVEMBER 2012
20 NOVEMBER 2012



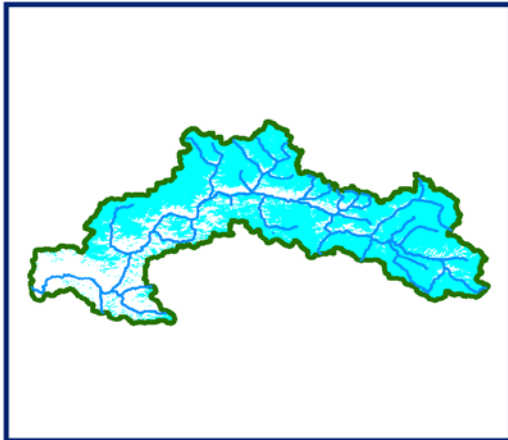
DATA USED
25 NOVEMBER 2012
30 NOVEMBER 2012

 SNOW

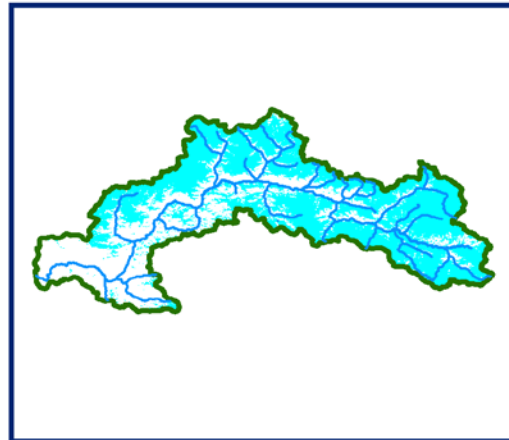


SNOW COVER MAP

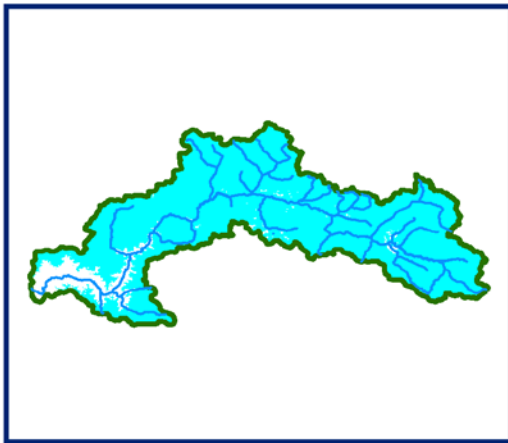
: KISANGANGA BASIN



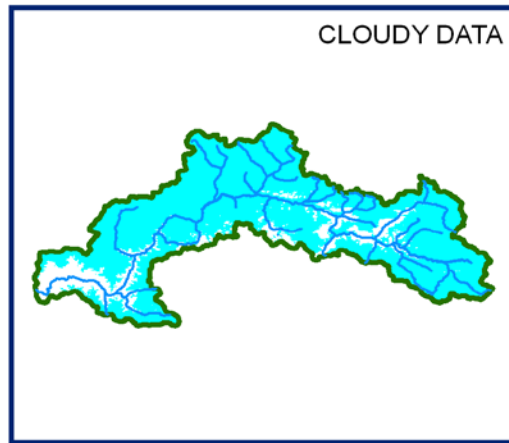
02 DECEMBER 2012



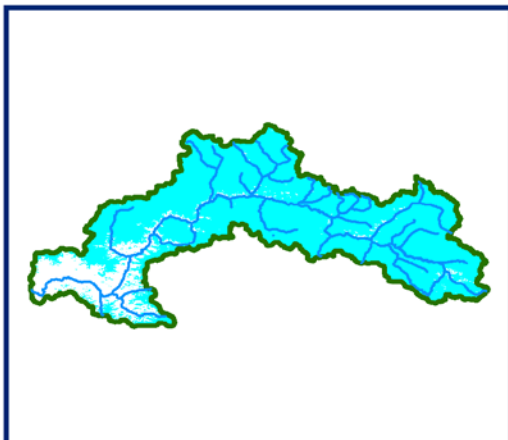
03 DECEMBER 2012



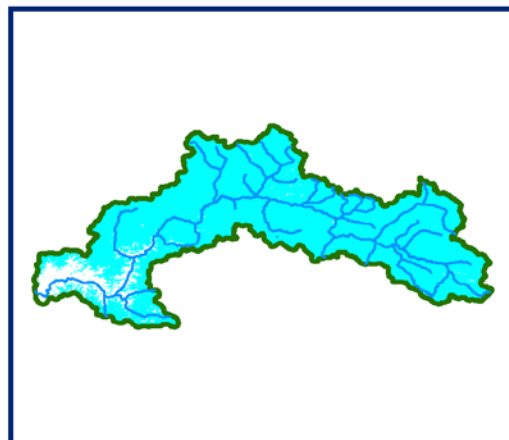
17 DECEMBER 2012



19 DECEMBER 2012



22 DECEMBER 2012



31 DECEMBER 2012



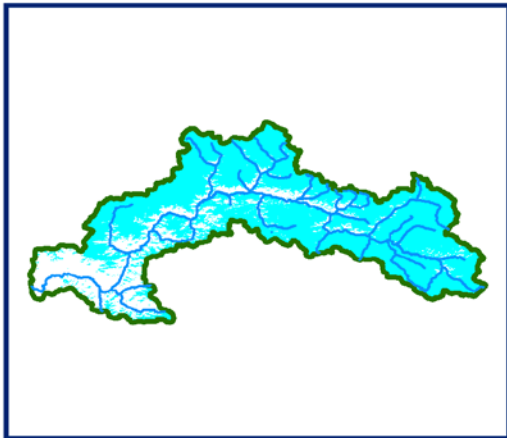
SNOW

0 20 40 80 120 160

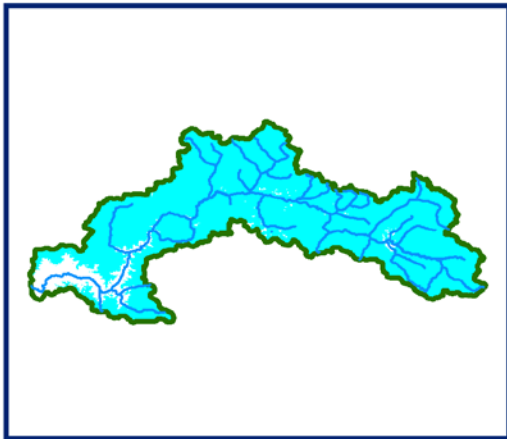


Kilometers

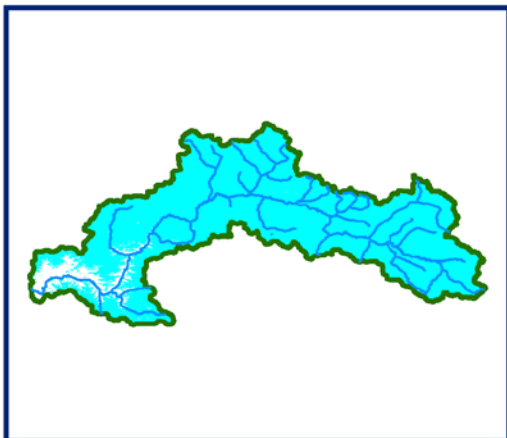
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
02 DECEMBER 2012
03 DECEMBER 2012



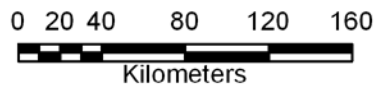
DATA USED
17 DECEMBER 2012



DATA USED
31 DECEMBER 2012
22 DECEMBER 2012



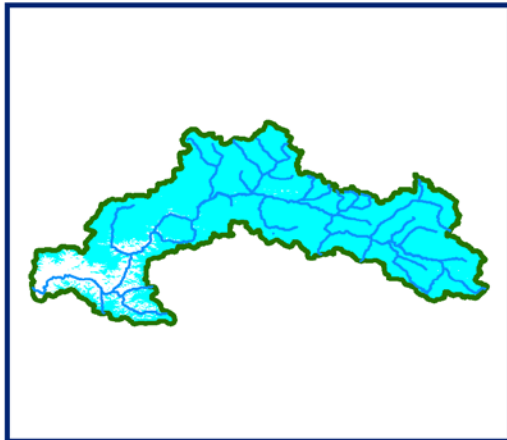
SNOW



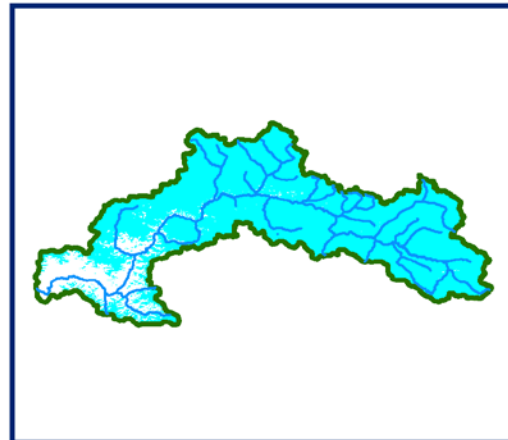
SNOW COVER MAP

:

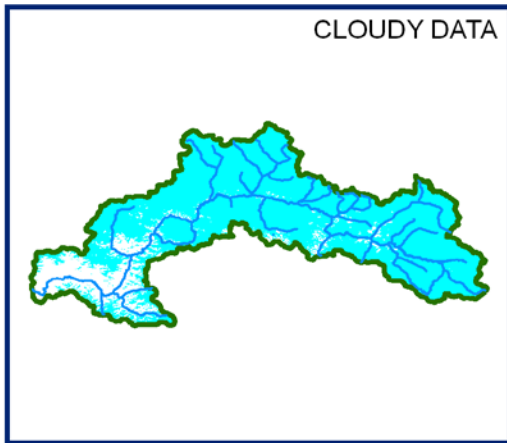
KISANGANGA BASIN



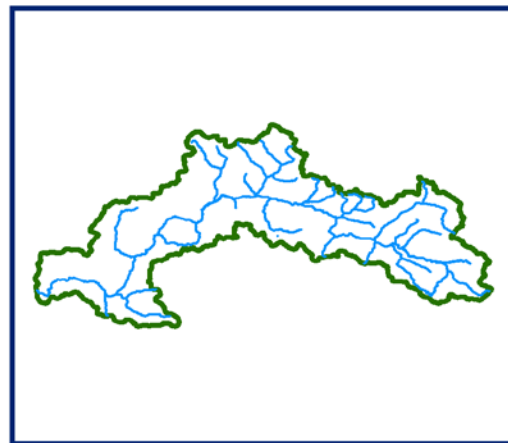
03 JANUARY 2013



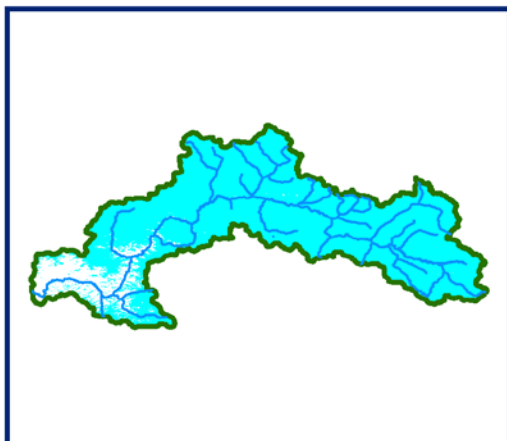
07 JANUARY 2013



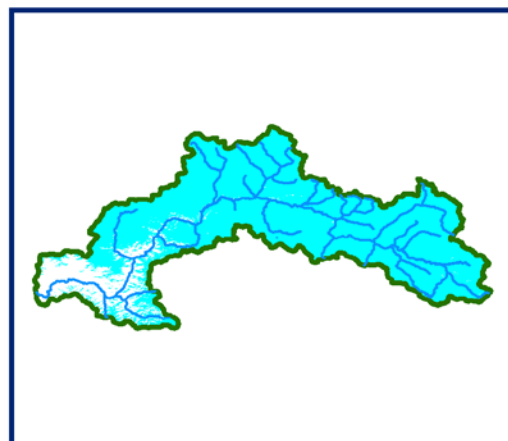
13 JANUARY 2013



NO DATA AVAILABLE



22 JANUARY 2013



24 JANUARY 2013



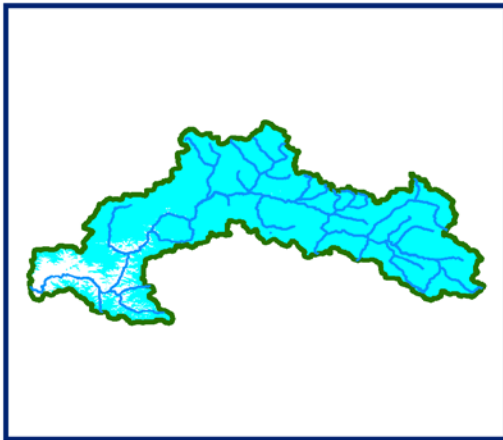
SNOW

0 20 40 80 120 160

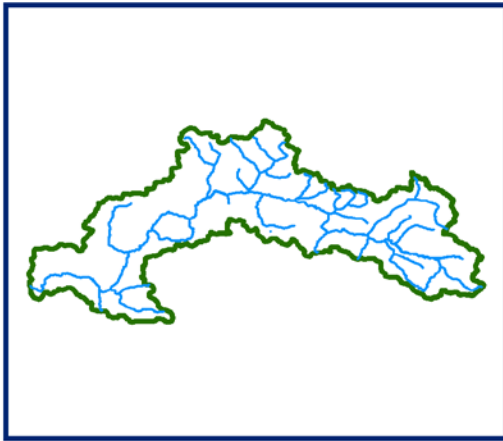


Kilometers

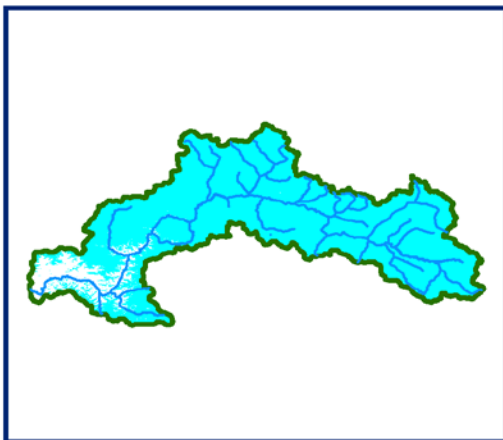
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
03 JANUARY 2013
07 JANUARY 2013

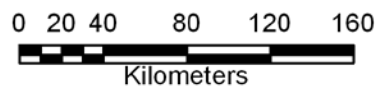


DATA USED
DATA NOT AVAILABLE



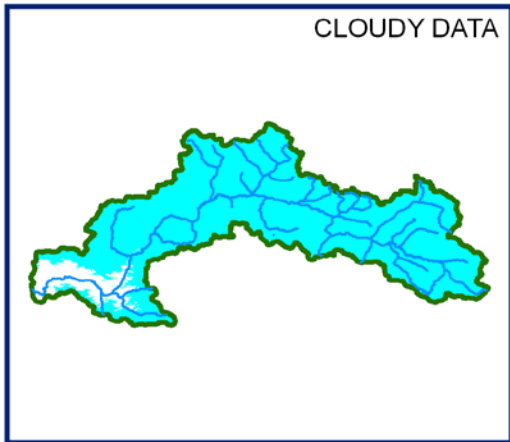
DATA USED
22 JANUARY 2013
24 JANUARY 2013

 SNOW

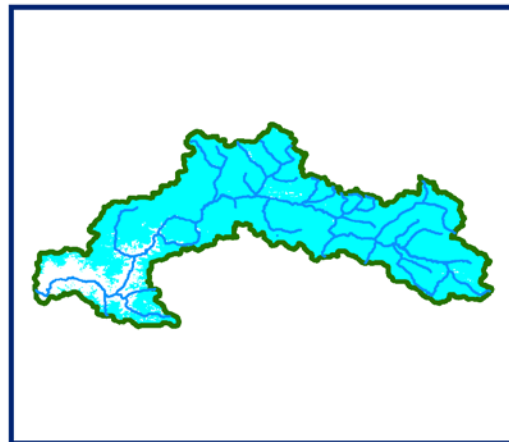


SNOW COVER MAP

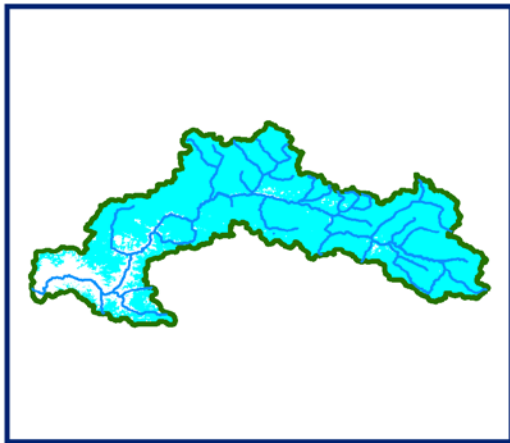
: KISANGANGA BASIN



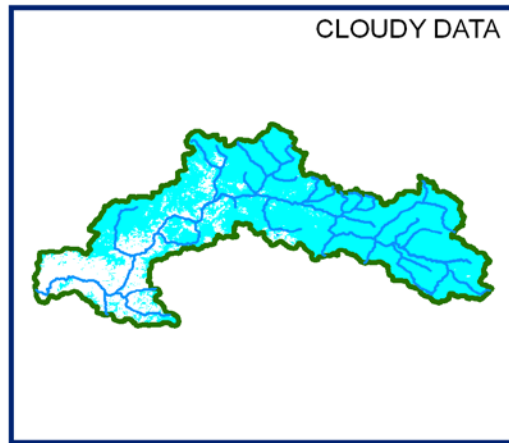
01 FEBRUARY 2013



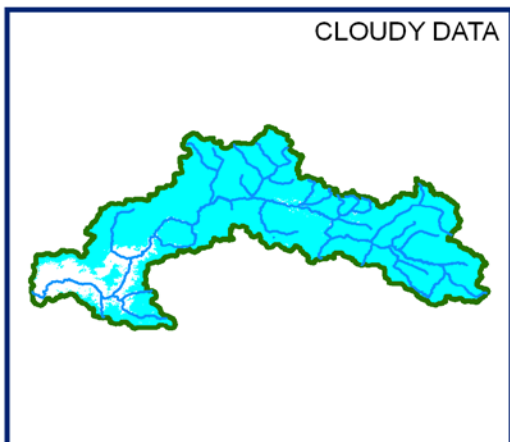
08 FEBRUARY 2013



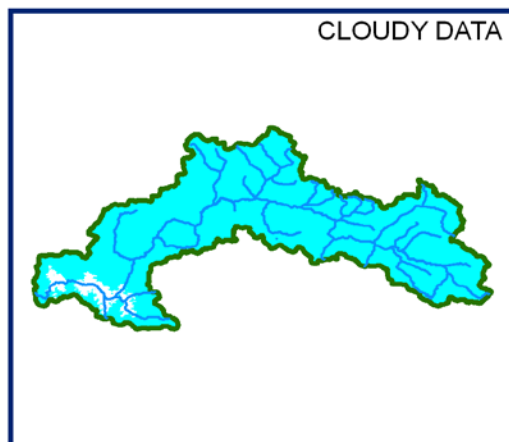
17 FEBRUARY 2013



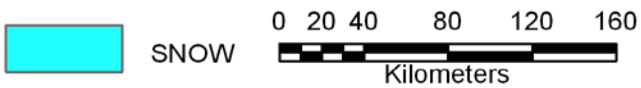
20 FEBRUARY 2013



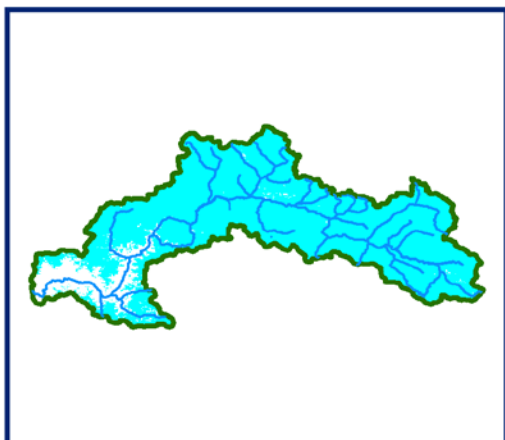
24 FEBRUARY 2013



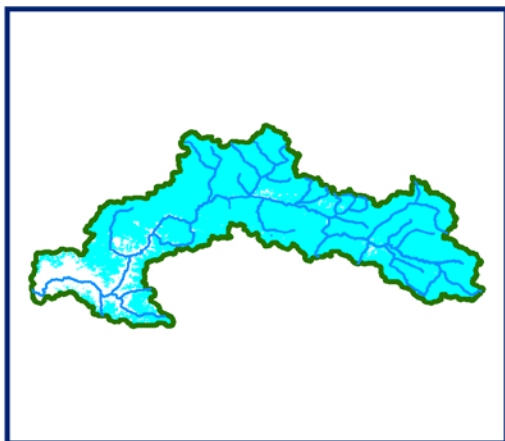
25 FEBRUARY 2013



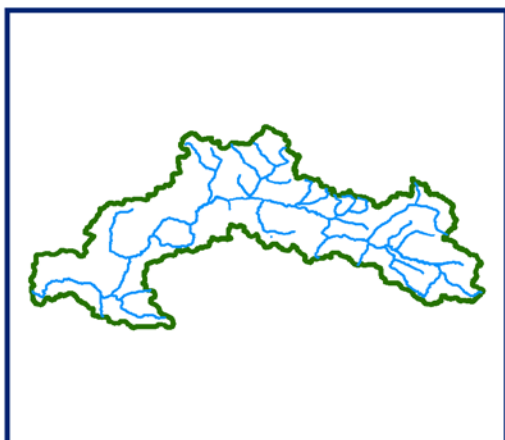
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
08 FEBRUARY 2013

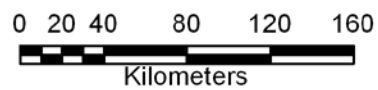


DATA USED
17 FEBRUARY 2013



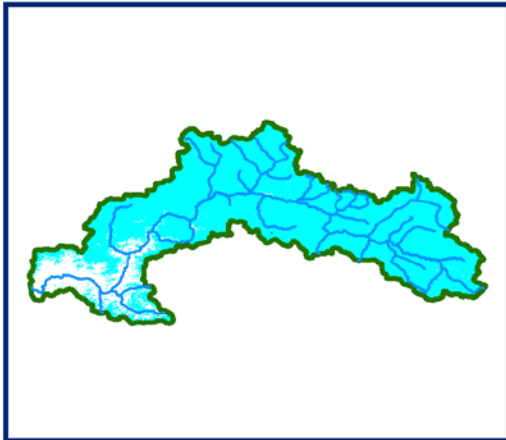
DATA USED
DATA NOT AVAILABLE

 SNOW

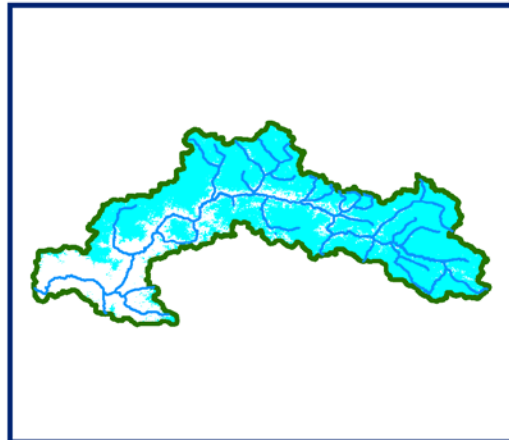


SNOW COVER MAP

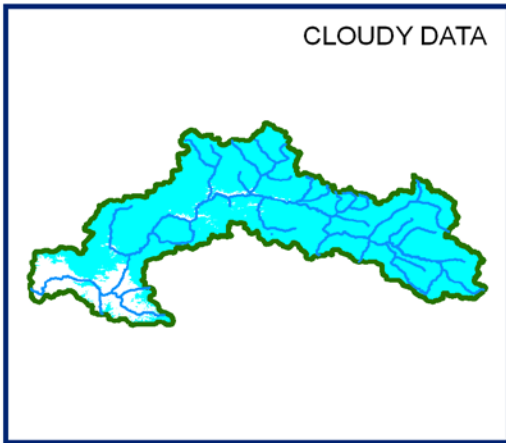
: KISANGANGA BASIN



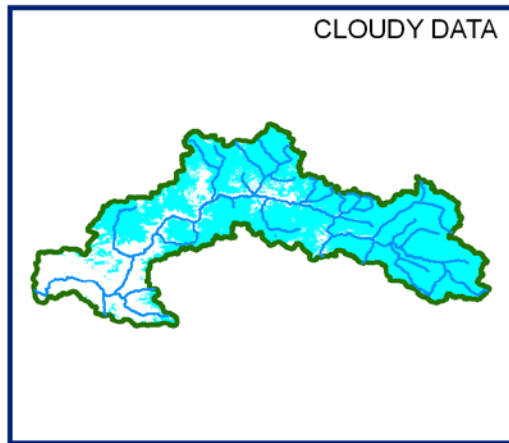
01 MARCH 2013



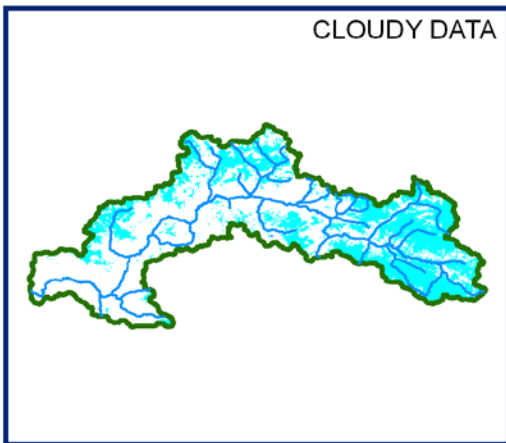
06 MARCH 2013



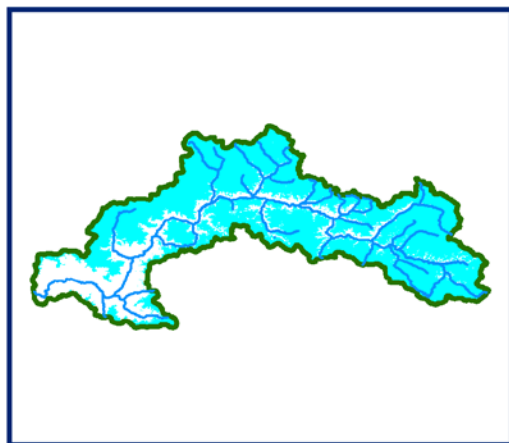
11 MARCH 2013



16 MARCH 2013



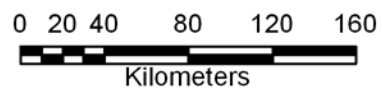
21 MARCH 2013



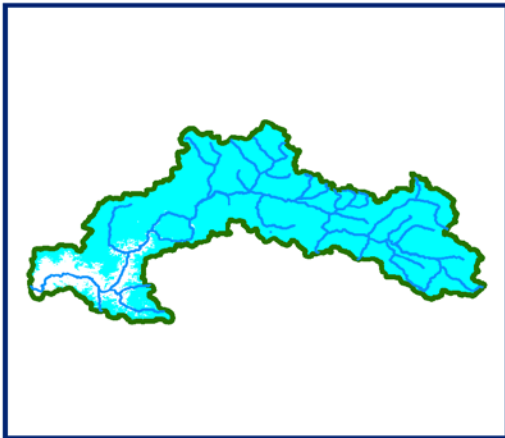
26 MARCH 2013



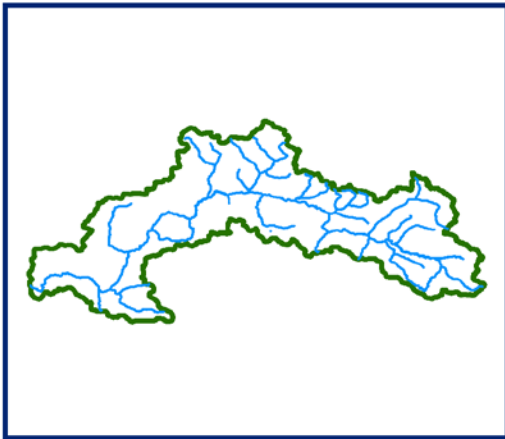
SNOW



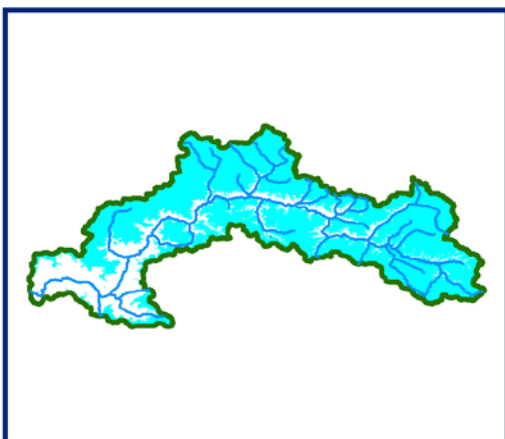
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
01 MARCH 2013
04 MARCH 2013
06 MARCH 2013

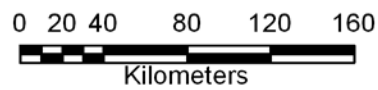


DATA USED
DATA NOT AVAILABLE



DATA USED
26 MARCH 2013

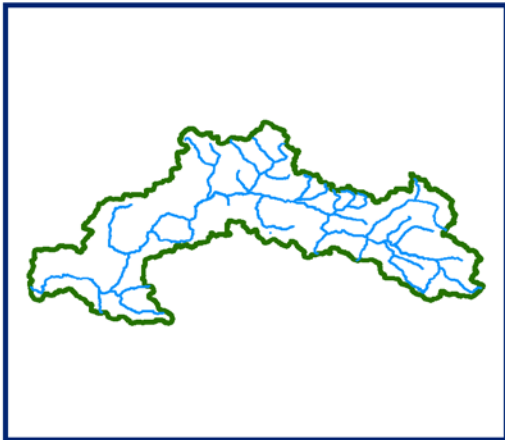
 SNOW



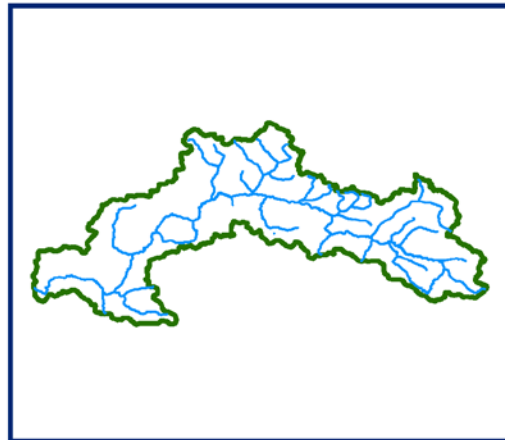
SNOW COVER MAP

:

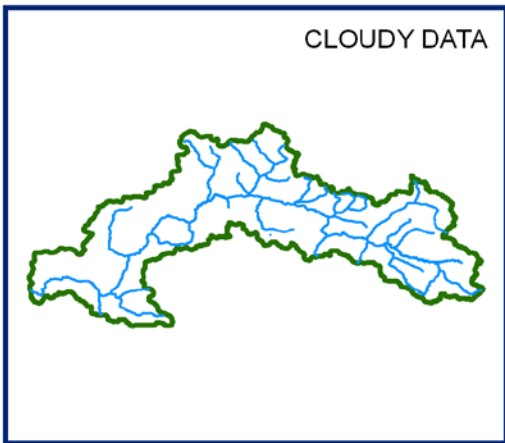
KISANGANGA BASIN



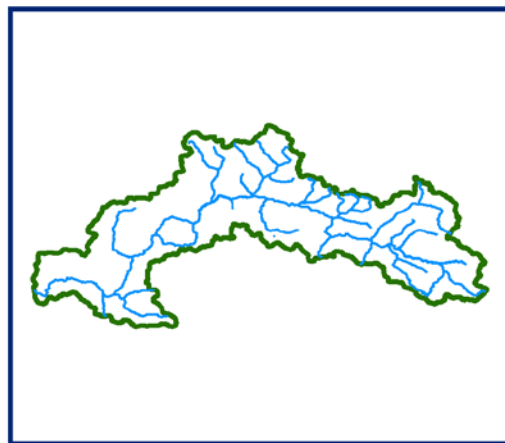
DATA NOT AVAILABLE



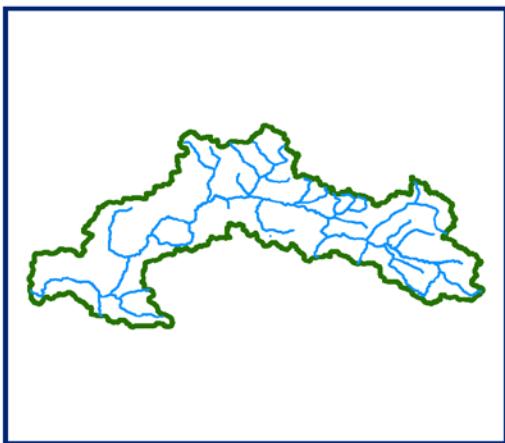
DATA NOT AVAILABLE



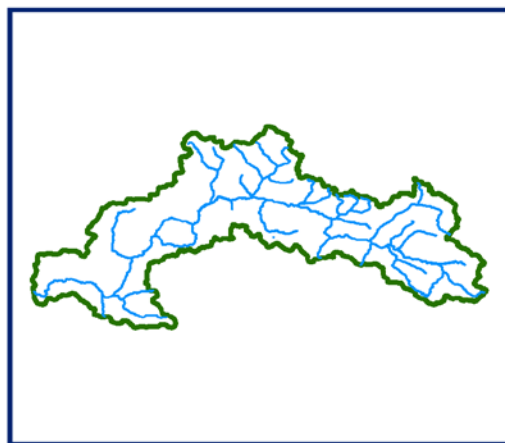
11 APRIL 2013



19 APRIL 2013



DATA NOT AVAILABLE



DATA NOT AVAILABLE



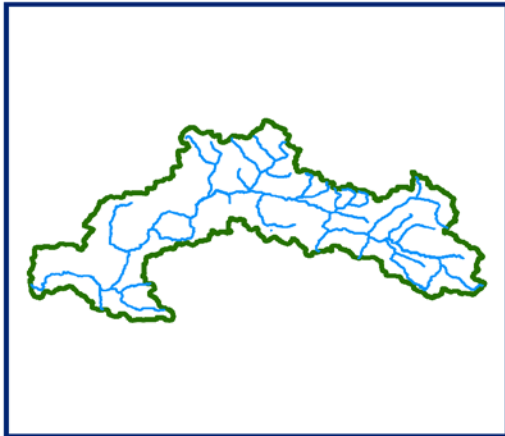
SNOW

0 20 40 80 120 160

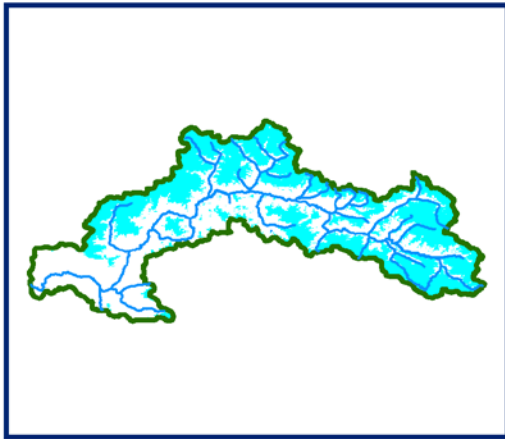


Kilometers

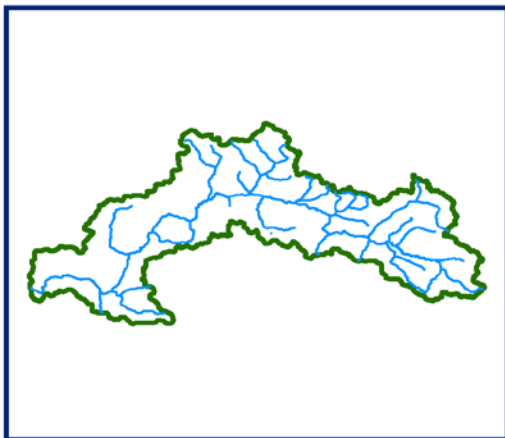
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
DATA NOT AVAILABLE



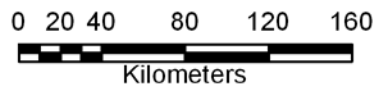
DATA USED
19 APRIL 2013



DATA USED
DATA NOT AVAILABLE



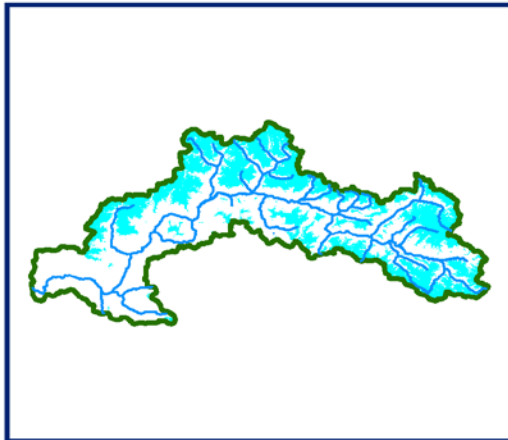
SNOW



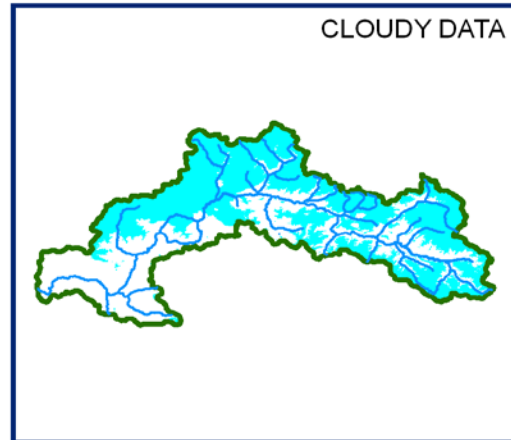
SNOW COVER MAP

:

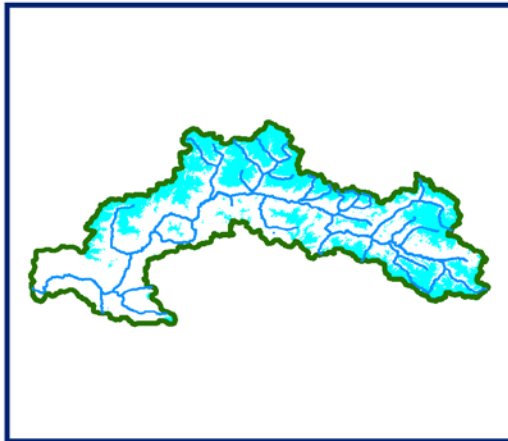
KISANGANGA BASIN



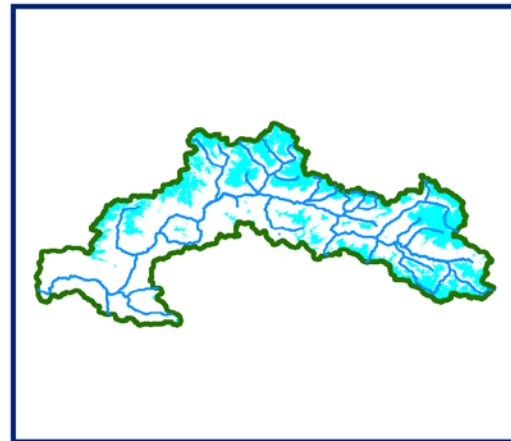
03 MAY 2013



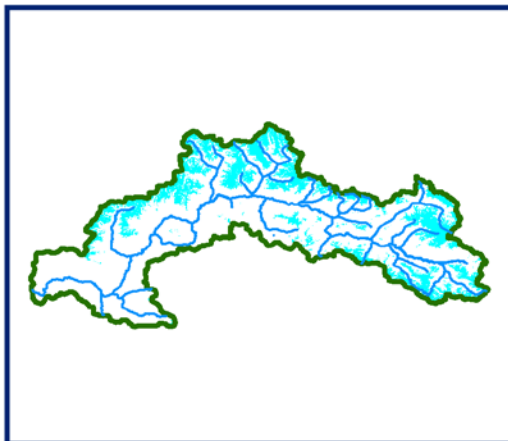
10 MAY 2013



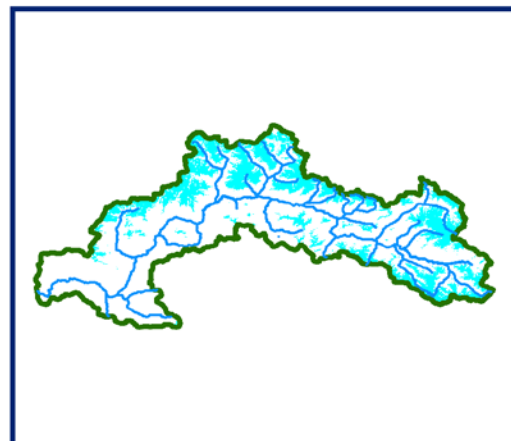
15 MAY 2013



20 MAY 2013



22 MAY 2013



24 MAY 2013



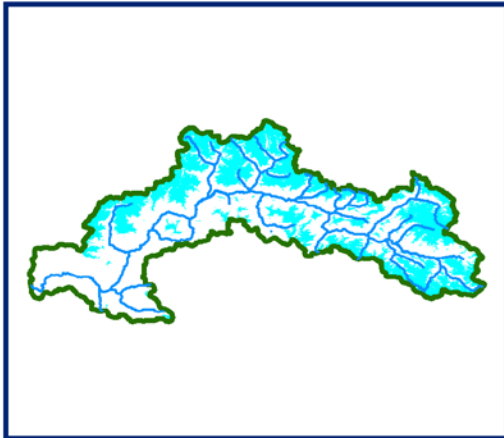
SNOW

0 20 40 80 120 160

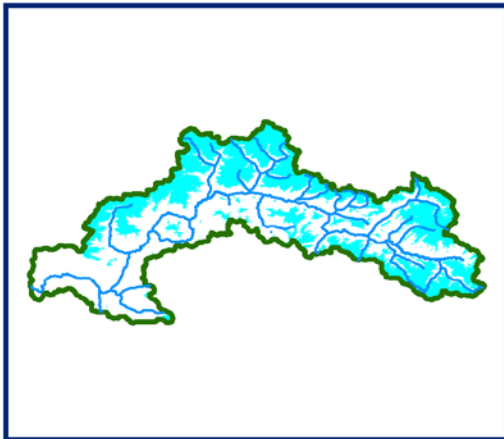


Kilometers

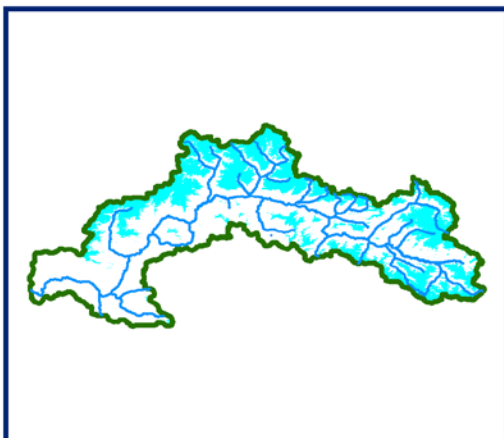
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
03 MAY 2013

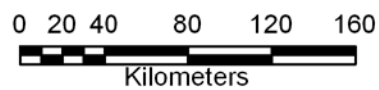


DATA USED
15 MAY 2013
17 MAY 2013
20 MAY 2013



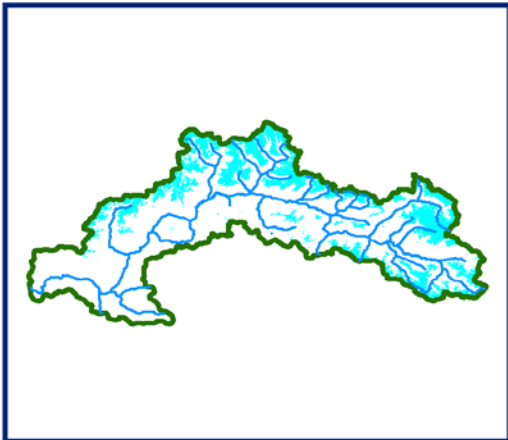
DATA USED
22 MAY 2013
24 MAY 2013

 SNOW

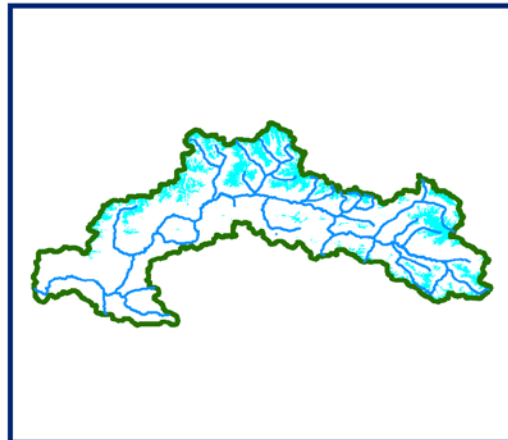


SNOW COVER MAP

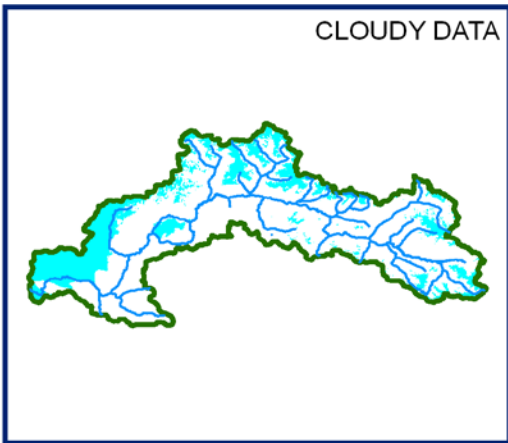
: KISANGANGA BASIN



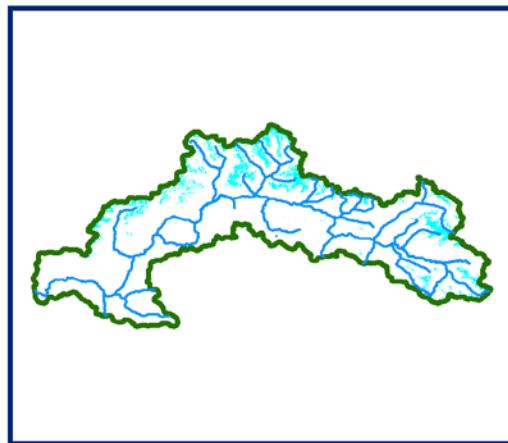
01 JUNE 2013



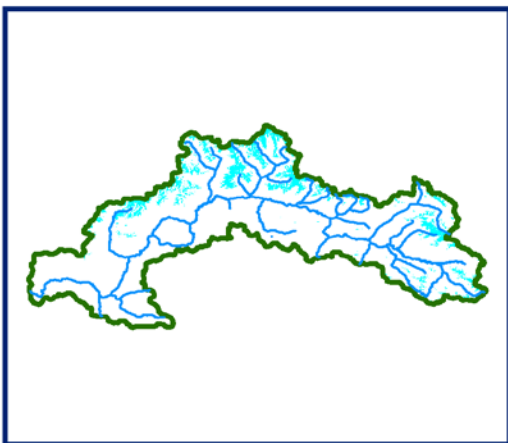
08 JUNE 2013



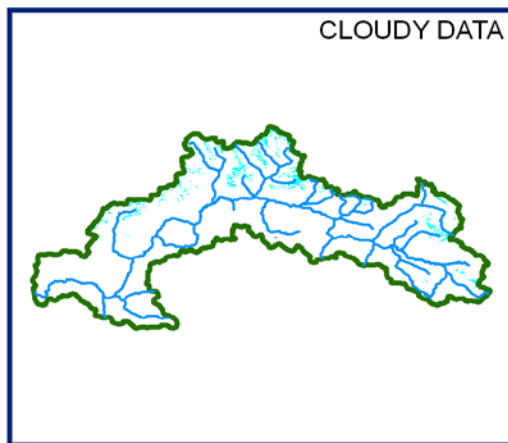
17 JUNE 2013



20 JUNE 2013



22 JUNE 2013



25 JUNE 2013



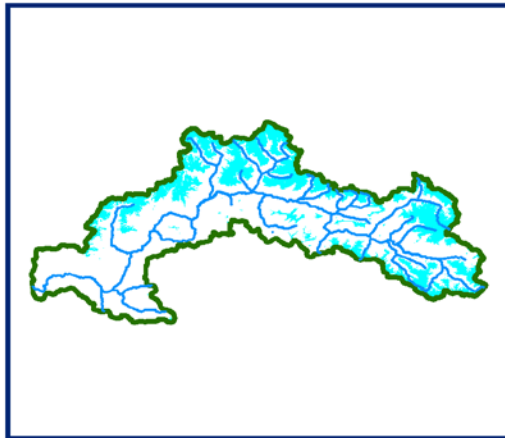
SNOW

0 20 40 80 120 160

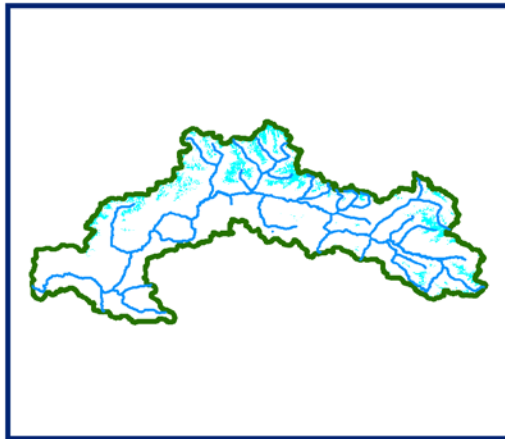


Kilometers

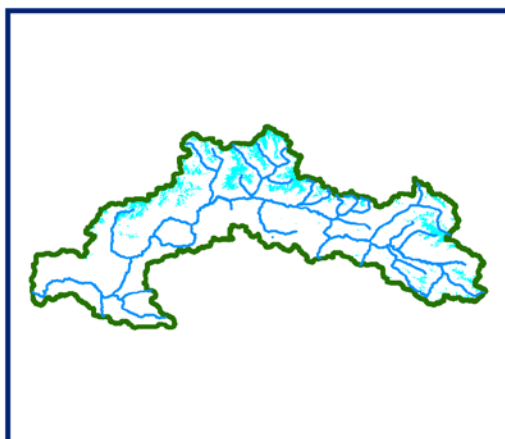
10 DAILY SNOW COVER MAP: KISANGANGA BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013

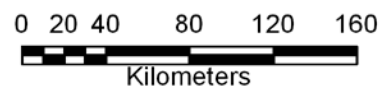


DATA USED
20 JUNE 2013



DATA USED
22 JUNE 2013

 SNOW



ASTOR BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: ASTOR

BASIN AREA: 4008 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	1-Oct-12	652	16	2	9-Oct-12	912	23
3	27-Oct-12	2543	63	4	28-Oct-12	2387	60
5	30-Oct-12	2023	50				
November 2012							
6	1-Nov-12	2138	53	7	2-Nov-12	2028	51
8	4-Nov-12	1685	42	9	6-Nov-12	1919	48
10	11-Nov-12	1810	45	11	13-Nov-12	1436	36
12	14-Nov-12	1322	33	13	16-Nov-12	1604	40
14	20-Nov-12	3589	90	15	25-Nov-12	3378	84
16	26-Nov-12	3520	88	17	30-Nov-12	3683	92
December 2012							
18	2-Dec-12	3371	84	19	19-Dec-12	3885	97
20	22-Dec-12	3695	92	21	31-Dec-12	3885	97
January 2013							
22	3-Jan-13	3859	96	23	7-Jan-13	3828	96
24	24-Jan-13	3939	98				
February 2013							
25	8-Feb-13	3878	97	26	17-Feb-13	3775	94
27	20-Feb-13	3819					
March 2013							
28	1-Mar-13	3788	95	29	2-Mar-13	3832	96
30	4-Mar-13	3393	85	31	6-Mar-13	3666	91
32	26-Mar-13	3557	89				
April 2013							
33	6-Apr-13	3312	83	34	14-Apr-13	3363	84
35	18-Apr-13	3254	81	36	19-Apr-13	3132	78

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
37	3-May-13	2789	70	38	10-May-13	2933	73
39	15-May-13	2691	67	40	17-May-13	2606	65
41	24-May-13	2117	53				
June 2013							
42	1-Jun-13	2416	60	43	8-Jun-13	1887	47
44	10-Jun-13	1669	42	45	20-Jun-13	1345	34
46	22-Jun-13	1321	33	47	25-Jun-13	899	21

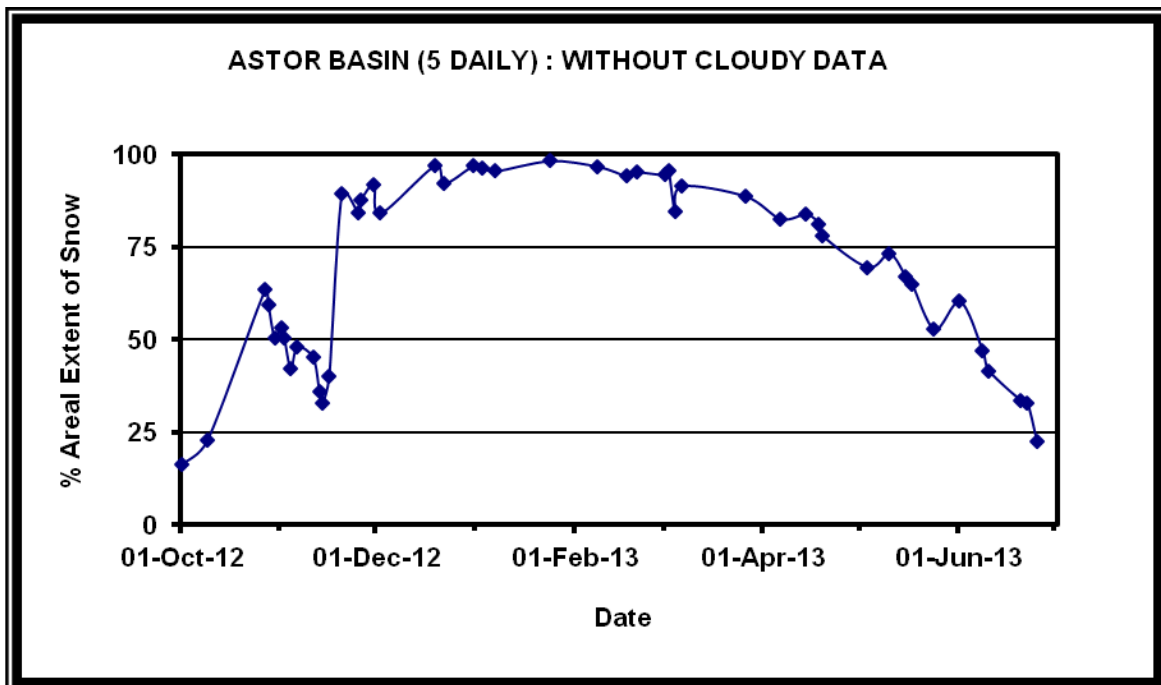
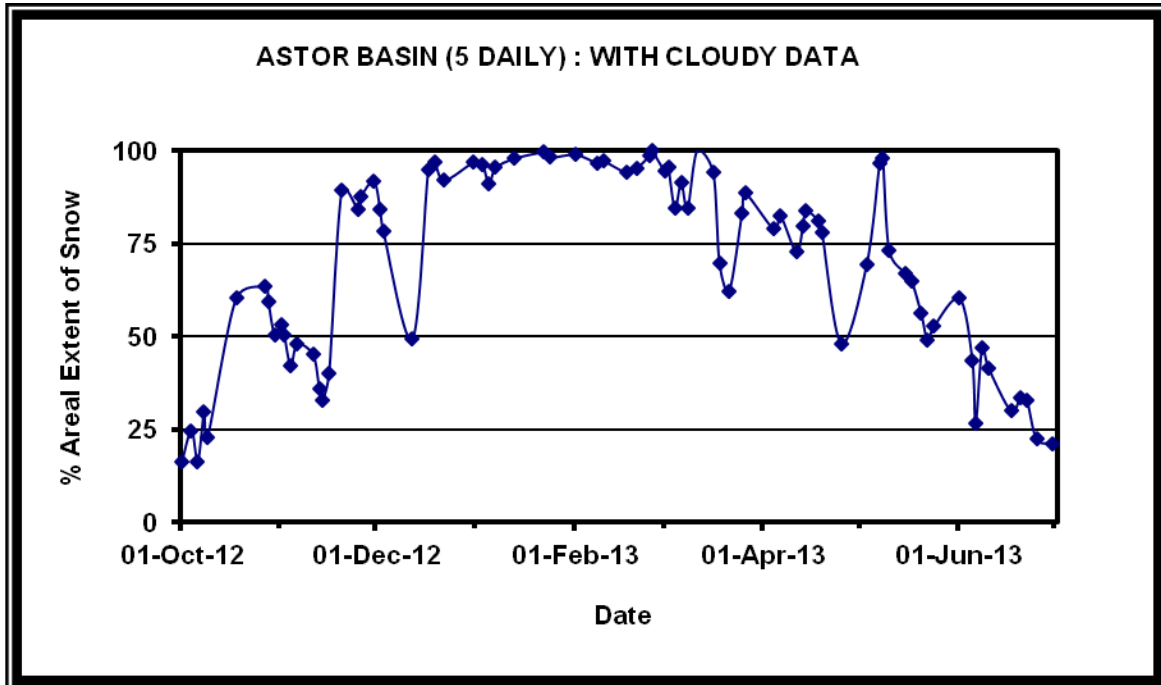
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: ASTOR

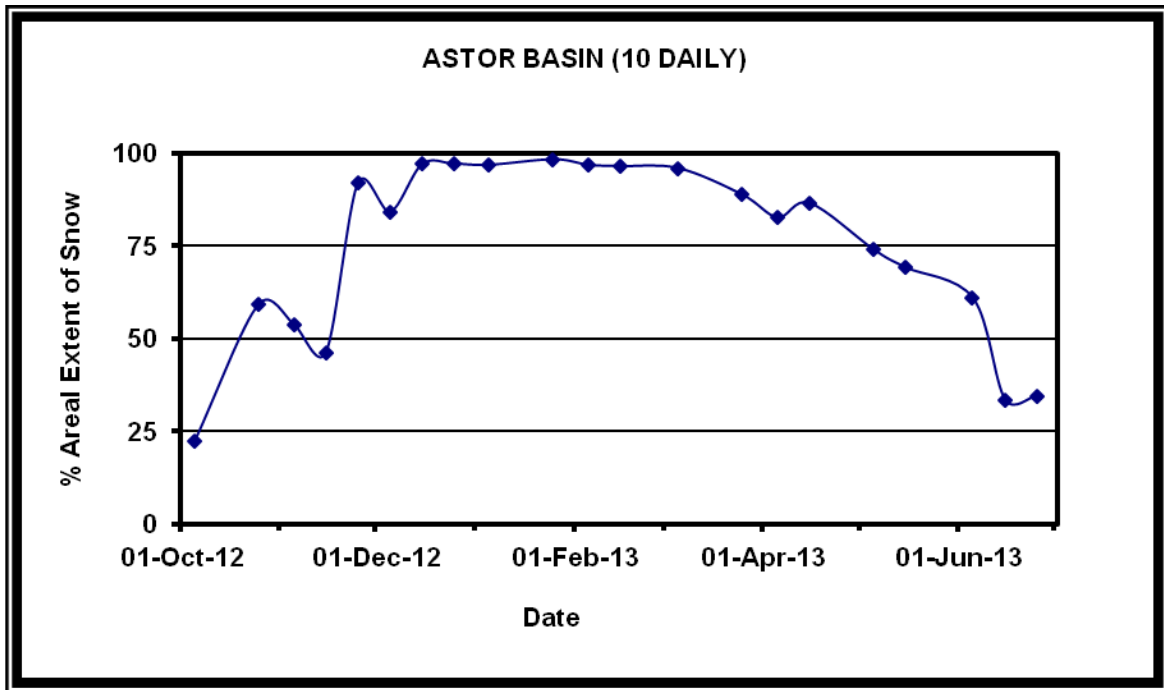
BASIN AREA: 4008 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	892	22	2	25-Oct-12	2373	59
November 2012							
3	5-Nov-12	2155	54	4	15-Nov-12	1855	46
5	25-Nov-12	3684	92				
December 2012							
6	5-Dec-12	3371	84	7	15-Dec-12	3885	97
8	25-Dec-12	3890	97				
January 2012							
9	5-Jan-13	3878	97	10	25-Jan-13	3939	98
February 2012							
11	5-Feb-13	3878	97	12	15-Feb-13	3864	96
March 2012							
13	5-Mar-13	3843	96	14	25-Mar-13	3557	89
April 2012							
15	5-Apr-13	3312	83	16	15-Apr-13	3466	86
May 2012							
17	5-May-13	2964	74	18	15-May-13	2770	69
17	25-May-13	2117	53				
June 2012							
19	5-Jun-13	2439	61	20	15-Jun-13	1345	34
21	25-Jun-13	1386	35				

Snow cover depletion curve



Snow cover depletion curve

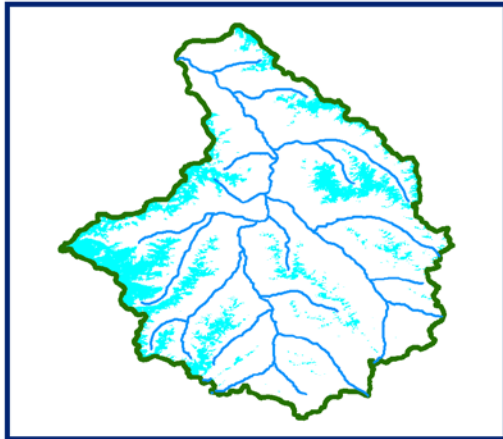


SNOW COVER MAP

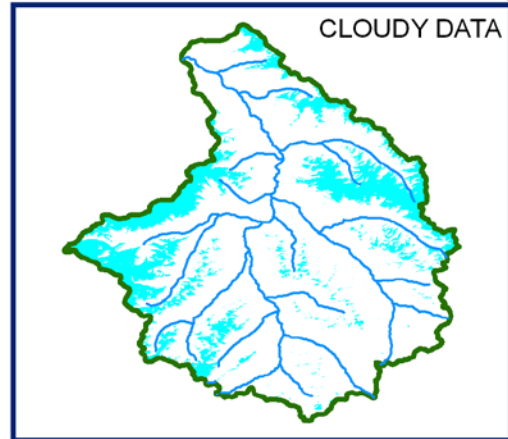
SNOW COVER MAP

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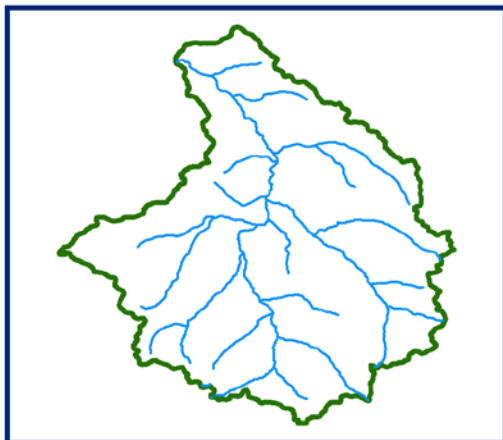
ASTOR BASIN



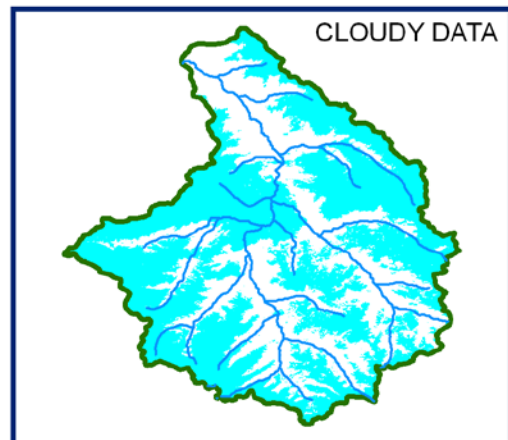
01 OCTOBER 2012



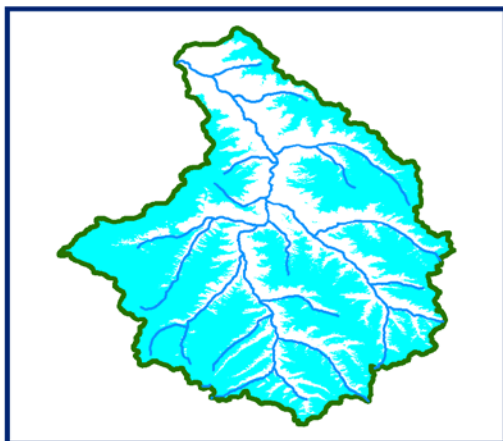
09 OCTOBER 2012



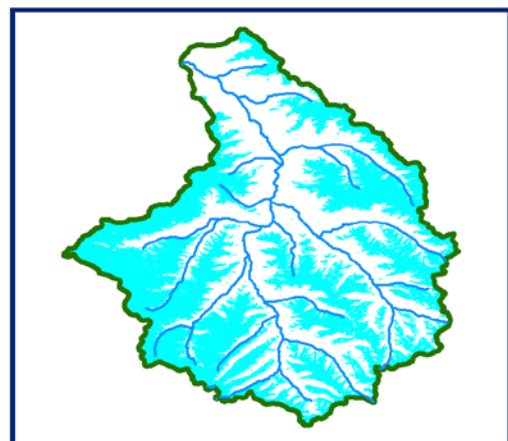
DATA NOT AVAILABLE



18 OCTOBER 2012



27 OCTOBER 2012



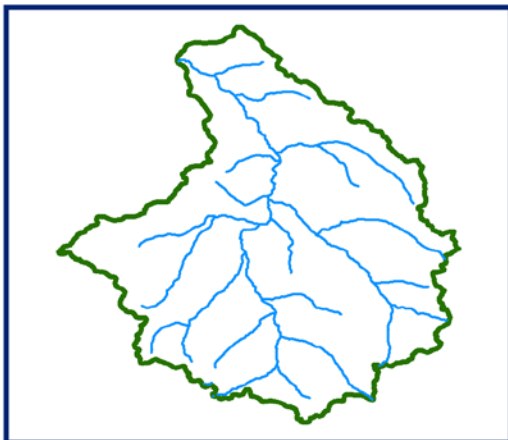
30 OCTOBER 2012



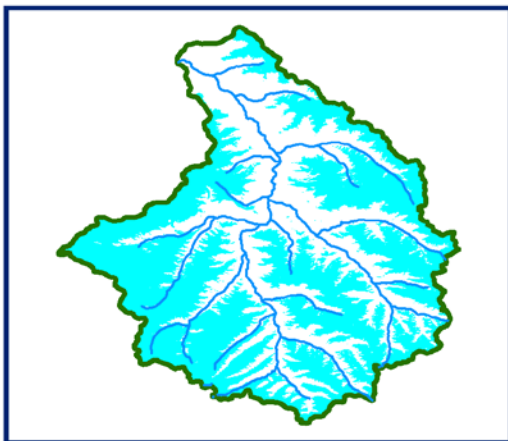
10 DAILY SNOW COVER MAP: ASTOR BASIN



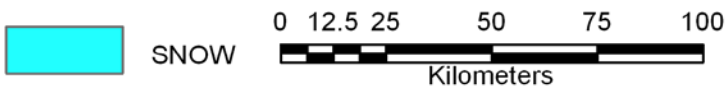
DATA USED
01 OCTOBER 2012
09 OCTOBER 2012



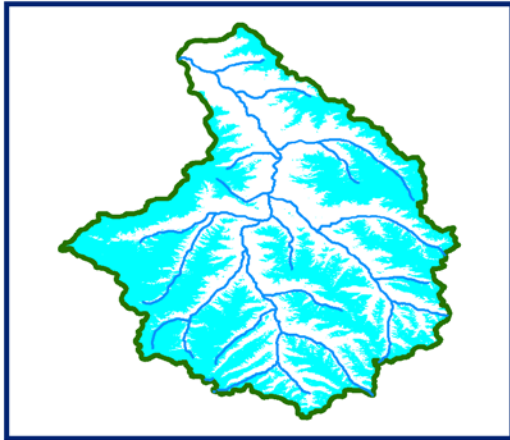
DATA USED
DATA NOT AVAILABLE



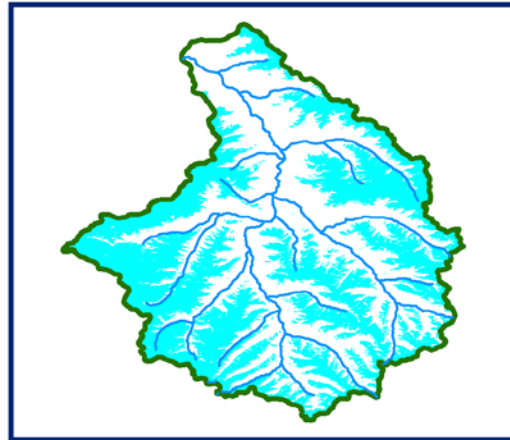
DATA USED
30 OCTOBER 2012
27 OCTOBER 2012
28 OCTOBER 2012



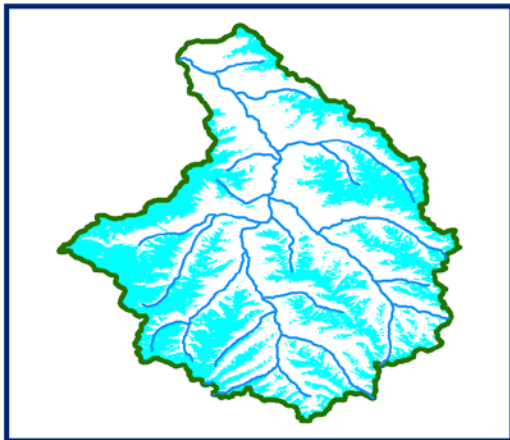
SNOW COVER MAP : ASTOR BASIN



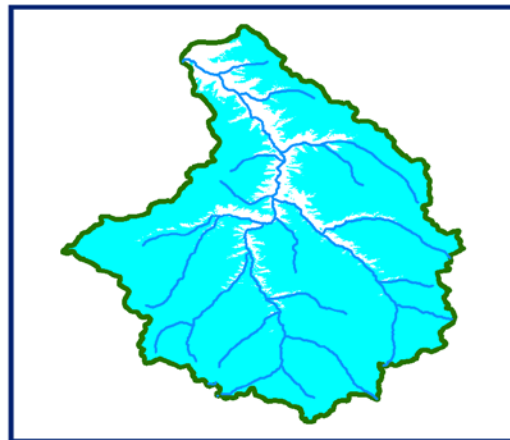
01 NOVEMBER 2012



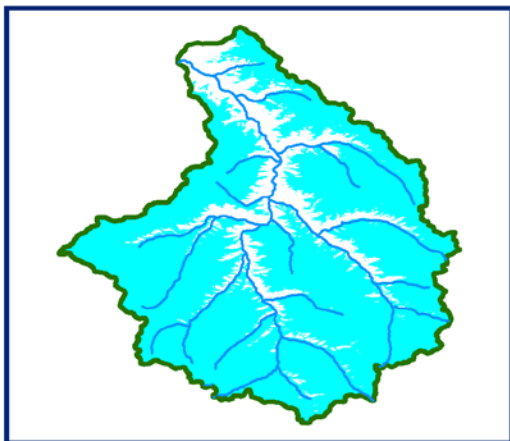
06 NOVEMBER 2012



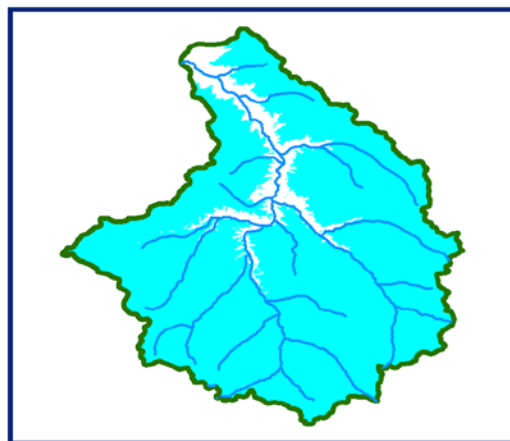
11 NOVEMBER 2012



20 NOVEMBER 2012



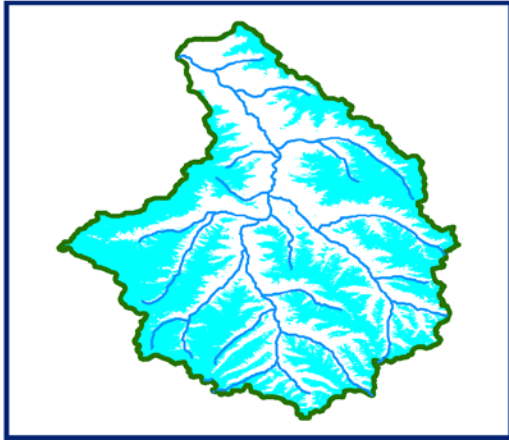
25 NOVEMBER 2012



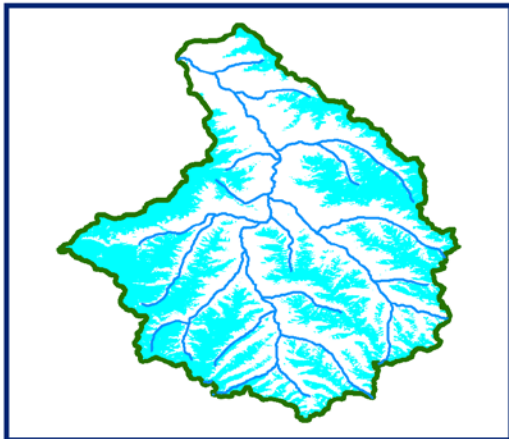
30 NOVEMBER 2012



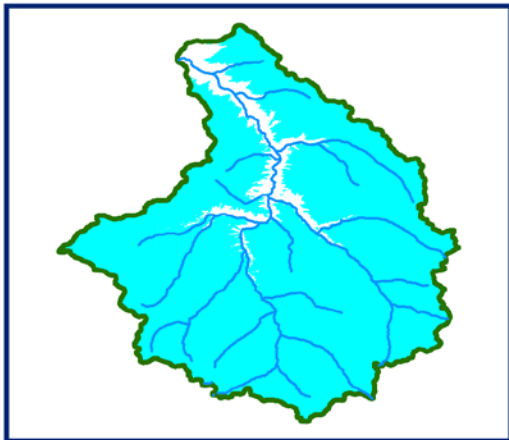
10 DAILY SNOW COVER MAP: ASTOR BASIN



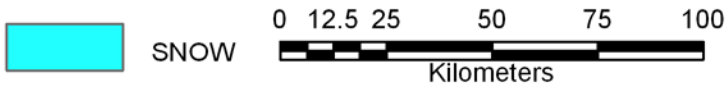
DATA USED
01 NOVEMBER 2012
04 NOVEMBER 2012
06 NOVEMBER 2012



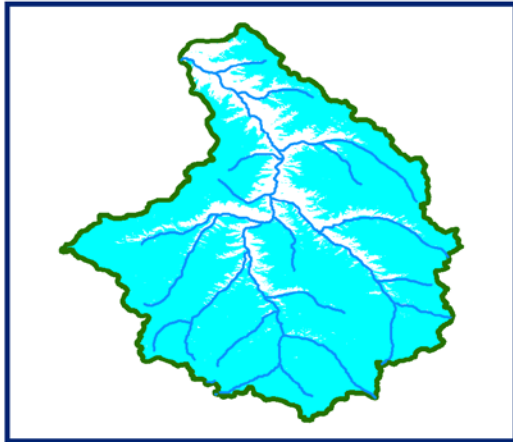
DATA USED
11 NOVEMBER 2012
13 NOVEMBER 2012
20 NOVEMBER 2012



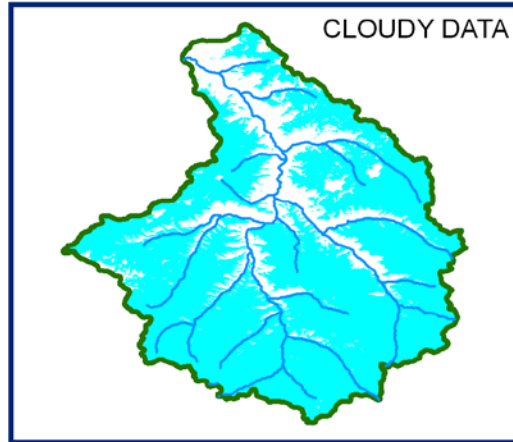
DATA USED
25 NOVEMBER 2012
30 NOVEMBER 2012



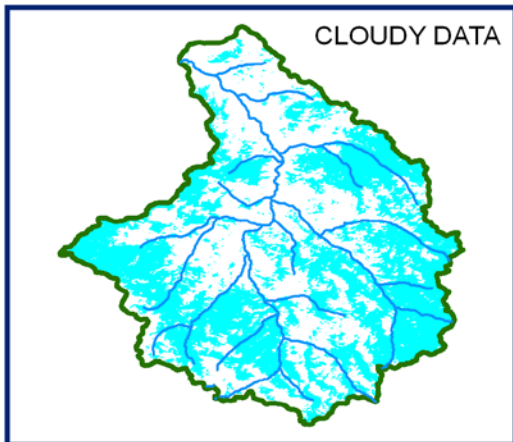
SNOW COVER MAP : ASTOR BASIN



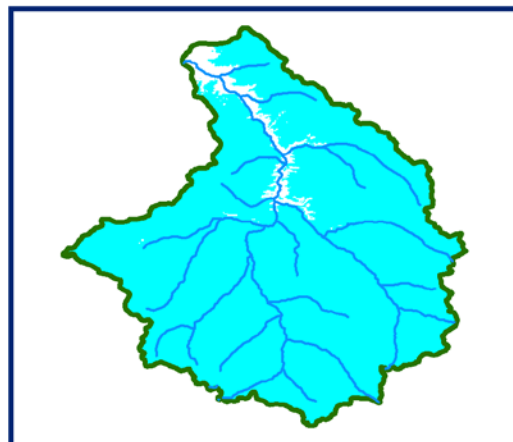
02 DECEMBER 2012



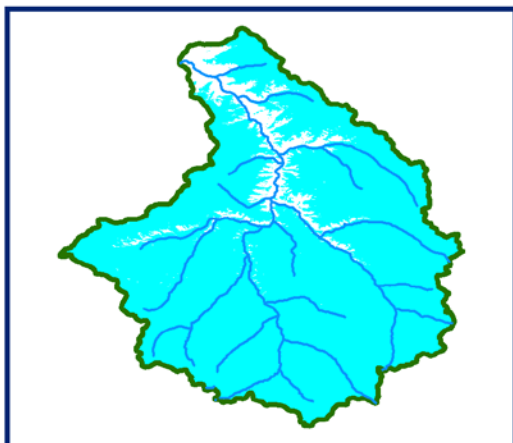
03 DECEMBER 2012



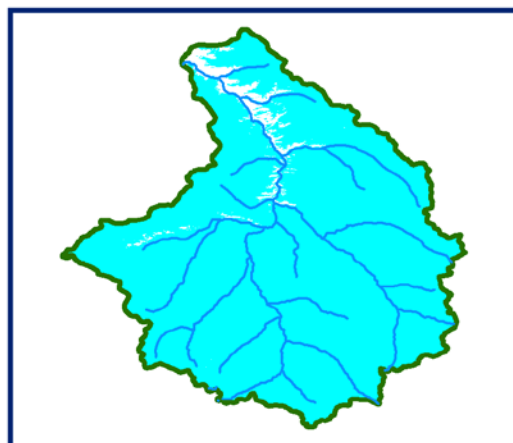
12 DECEMBER 2012



19 DECEMBER 2012



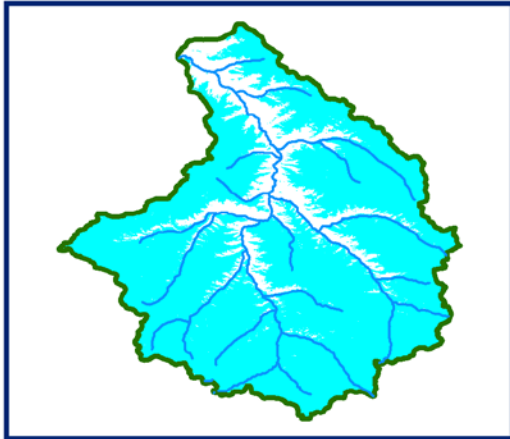
22 DECEMBER 2012



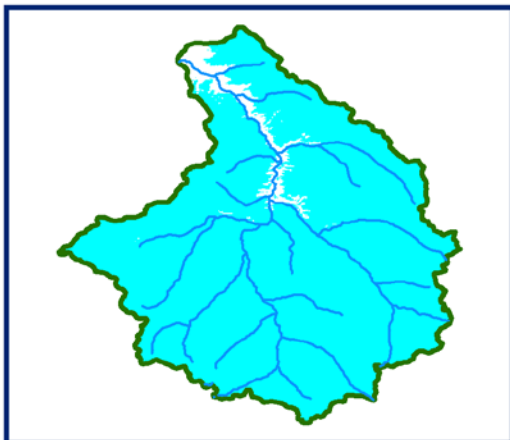
31 DECEMBER 2012



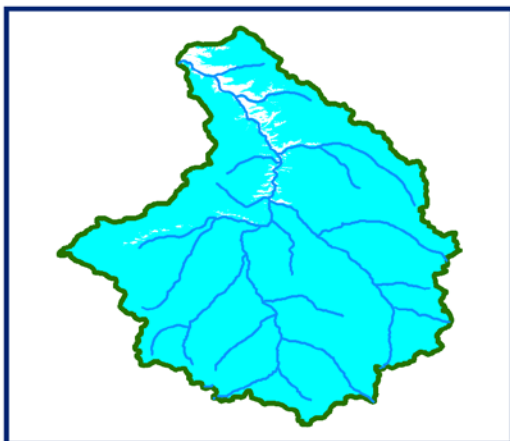
10 DAILY SNOW COVER MAP: ASTOR BASIN



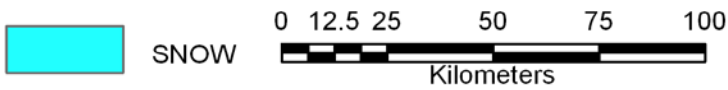
DATA USED
02 DECEMBER 2012



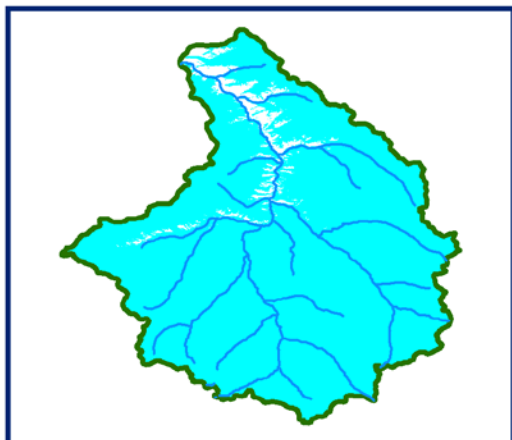
DATA USED
19 DECEMBER 2012



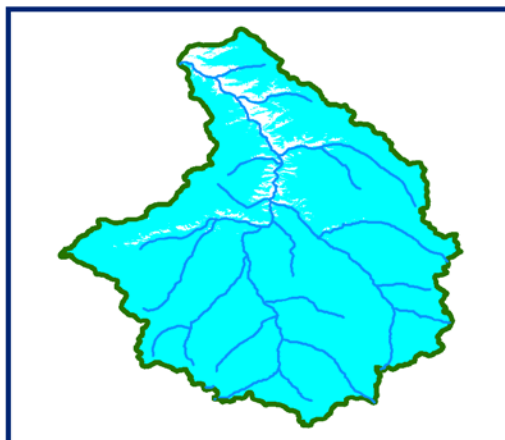
DATA USED
31 DECEMBER 2012



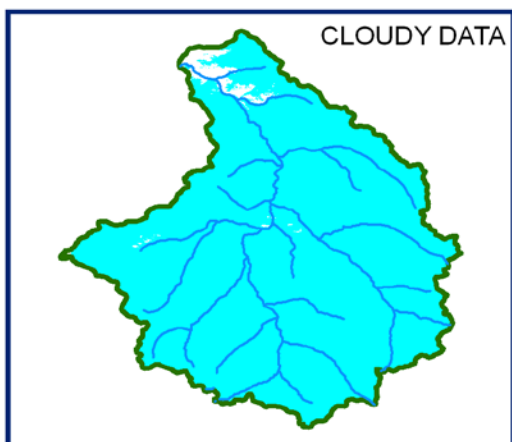
SNOW COVER MAP : ASTOR BASIN



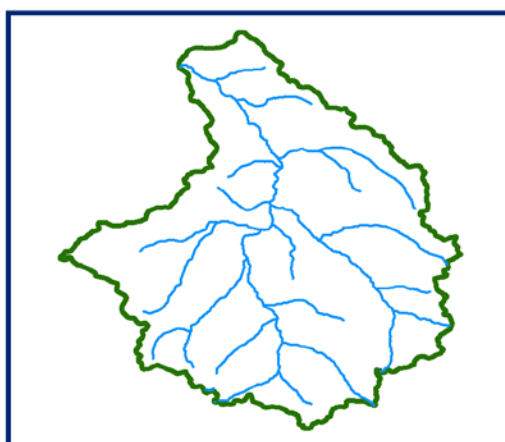
03 JANUARY 2013



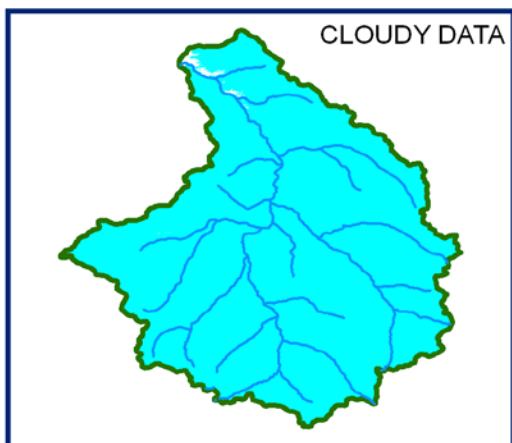
07 JANUARY 2013



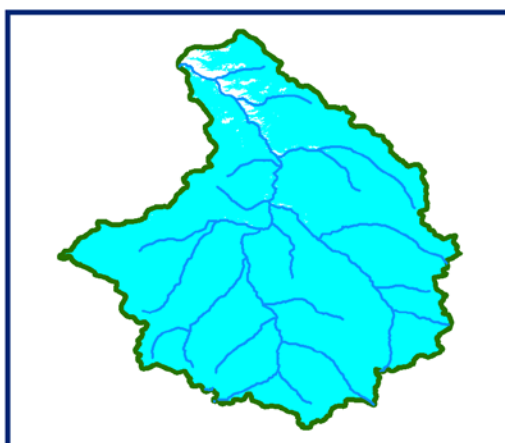
13 JANUARY 2013



NO DATA AVAILABLE



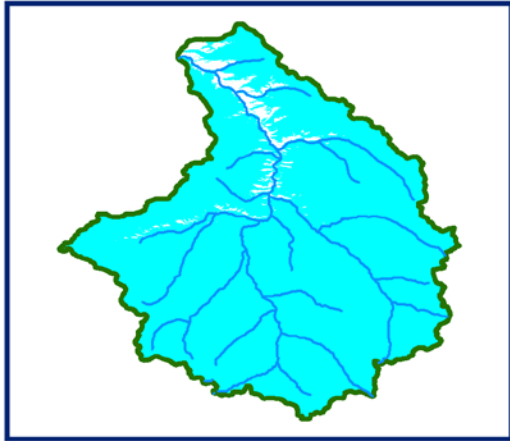
22 JANUARY 2013



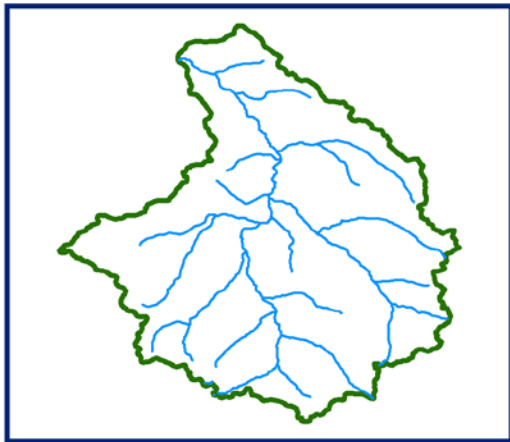
24 JANUARY 2013



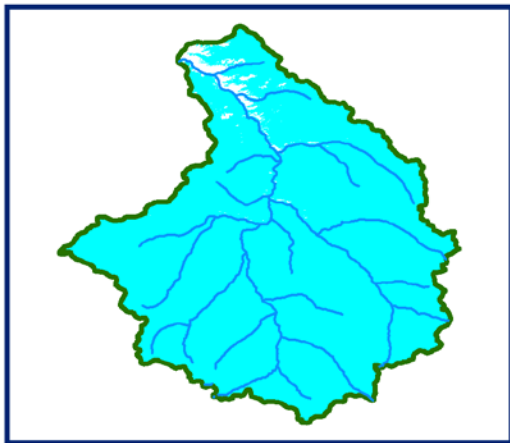
10 DAILY SNOW COVER MAP: ASTOR BASIN



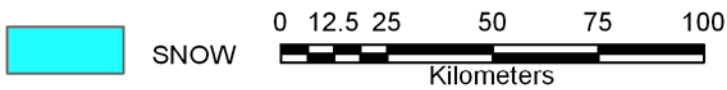
DATA USED
03 JANUARY 2013



DATA USED
DATA NOT AVAILABLE



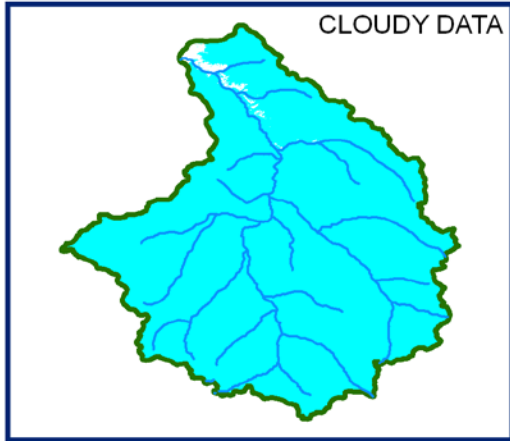
DATA USED
24 JANUARY 2013



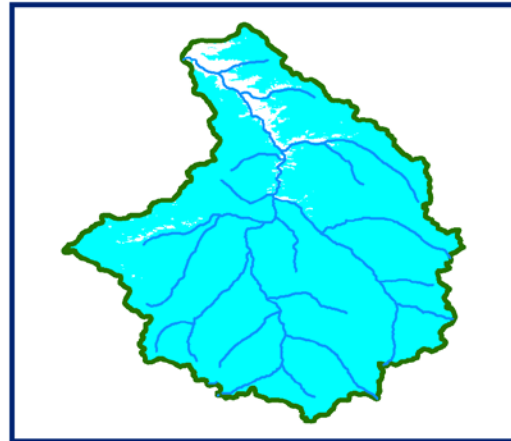
SNOW COVER MAP

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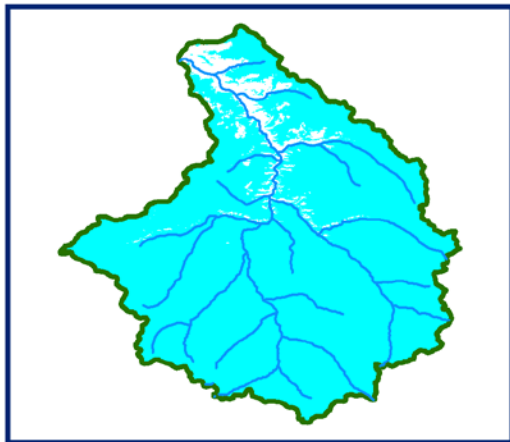
ASTOR BASIN



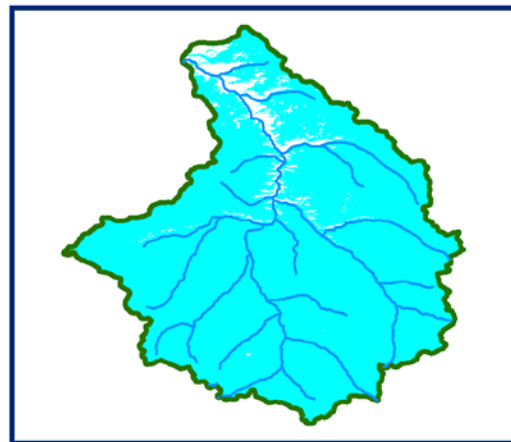
01 FEBRUARY 2013



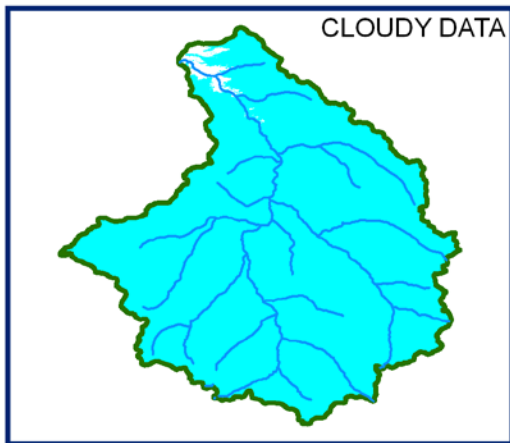
08 FEBRUARY 2013



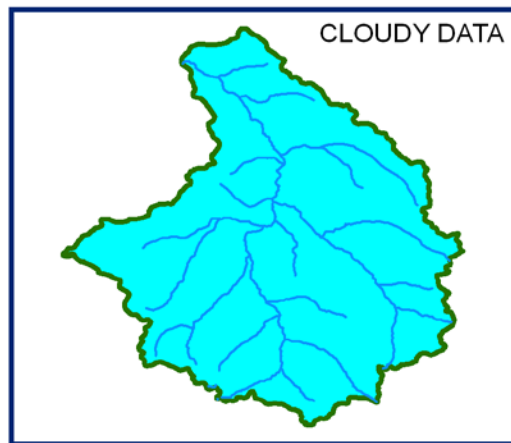
17 FEBRUARY 2013



20 FEBRUARY 2013



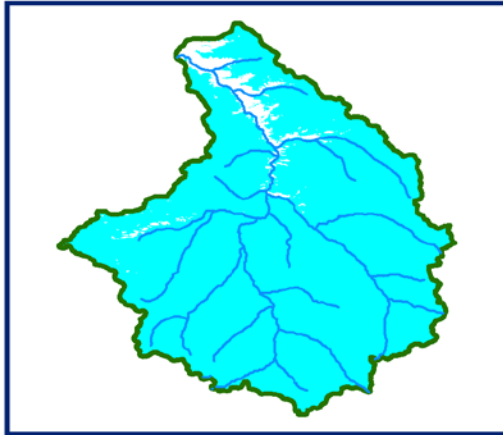
24 FEBRUARY 2013



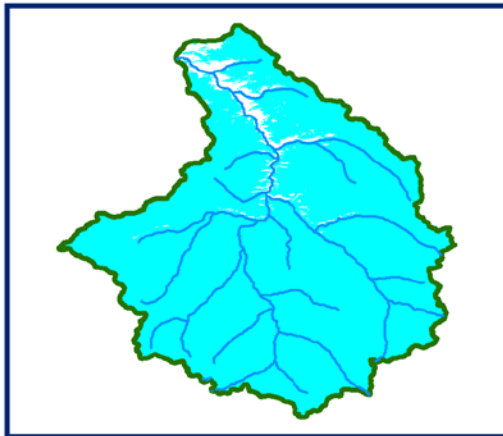
25 FEBRUARY 2013



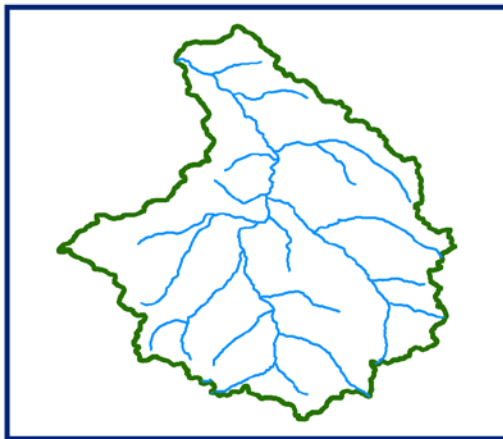
10 DAILY SNOW COVER MAP: ASTOR BASIN



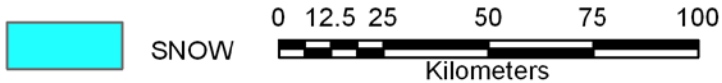
DATA USED
08 FEBRUARY 2013



DATA USED
17 FEBRUARY 2013
20 FEBRUARY 2013



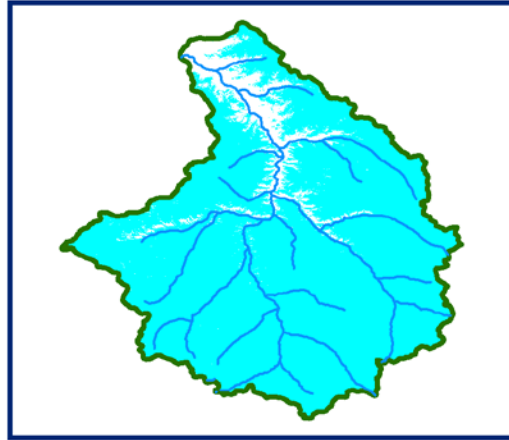
DATA USED
DATA NOT AVAILABLE



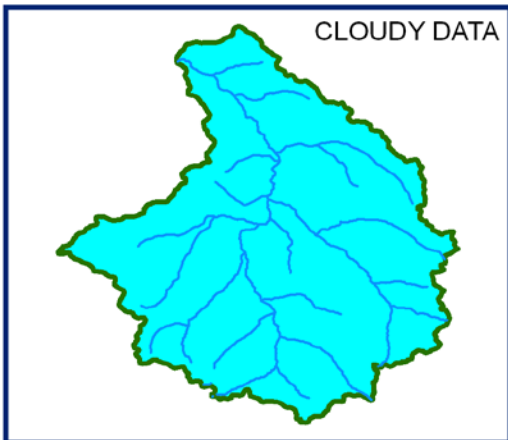
SNOW COVER MAP : ASTOR BASIN



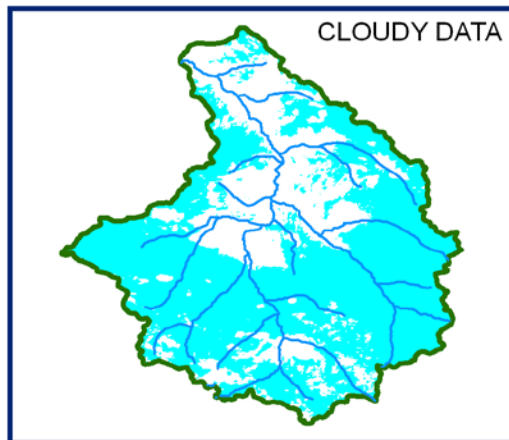
01 MARCH 2013



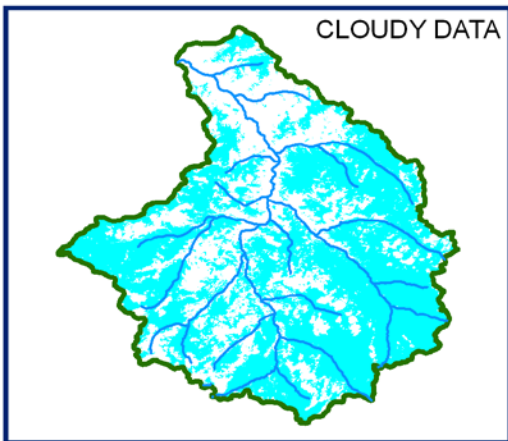
06 MARCH 2013



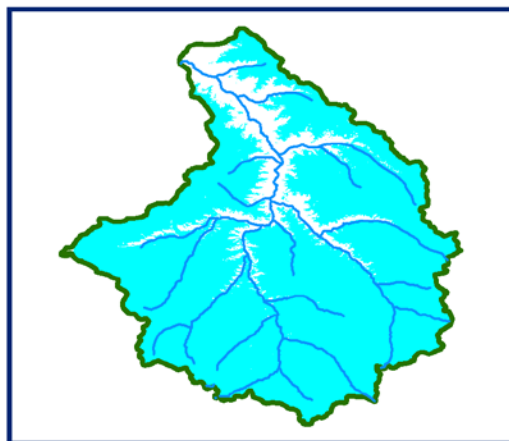
11 MARCH 2013



18 MARCH 2013



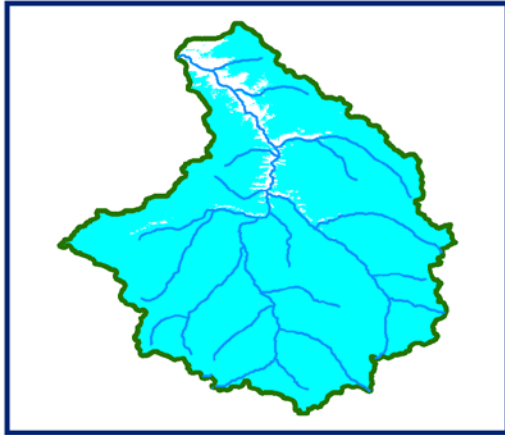
21 MARCH 2013



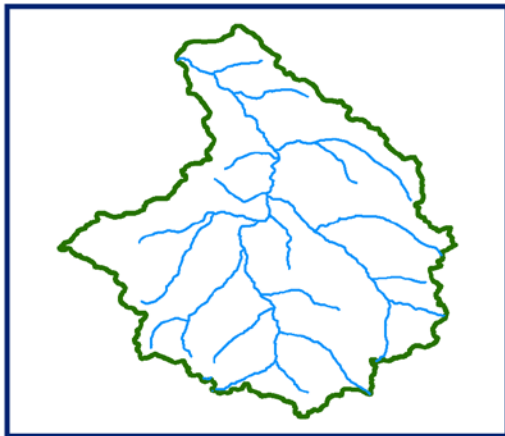
26 MARCH 2013



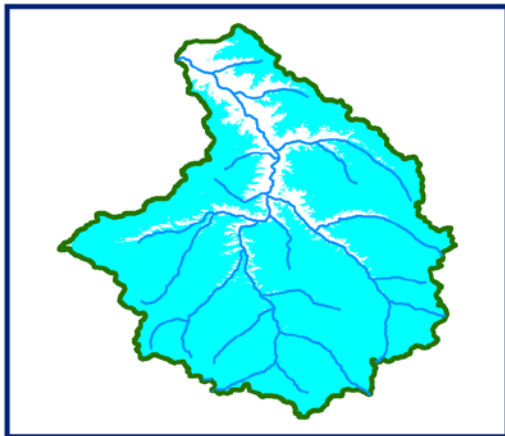
10 DAILY SNOW COVER MAP: ASTOR BASIN



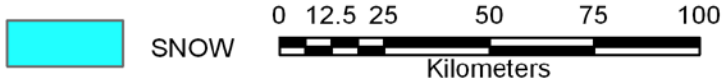
DATA USED
02 MARCH 2013
04 MARCH 2013
06 MARCH 2013



DATA USED
DATA NOT AVAILABLE



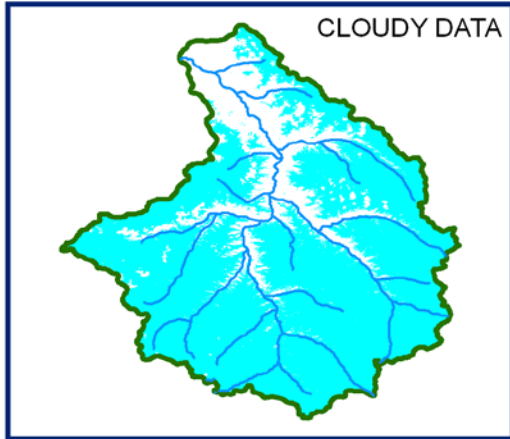
DATA USED
26 MARCH 2013



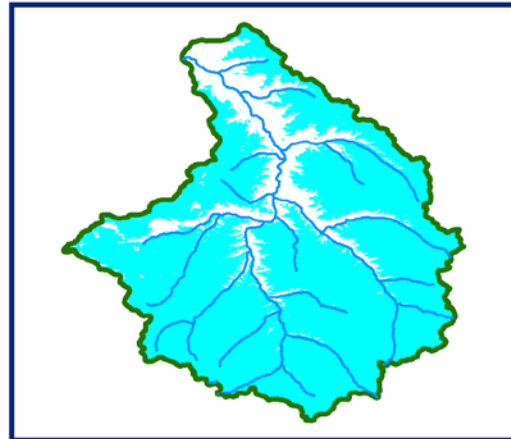
SNOW COVER MAP

:

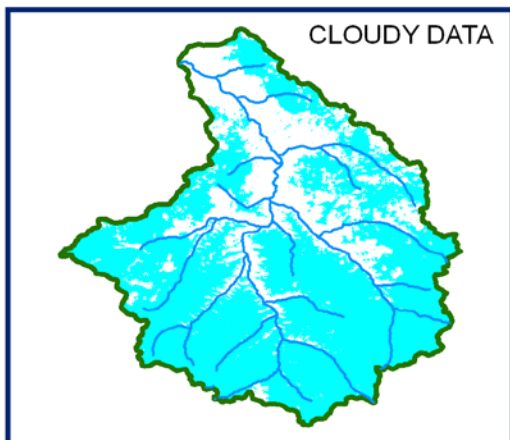
ASTOR BASIN



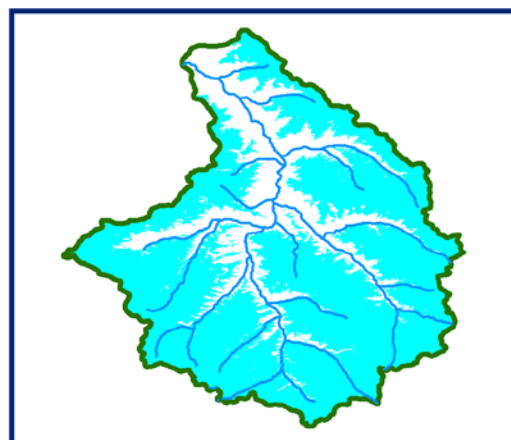
04 APRIL 2013



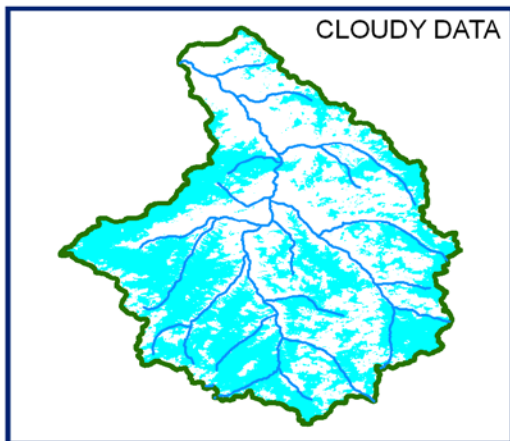
06 APRIL 2013



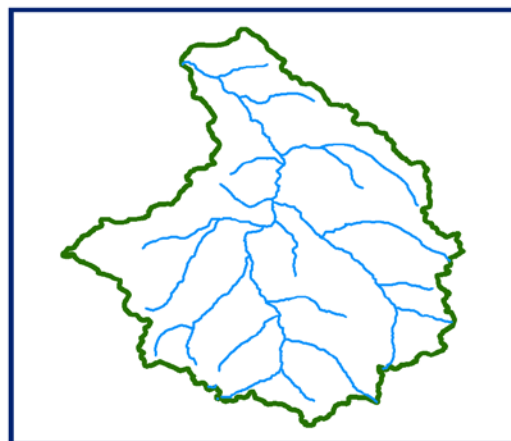
11 APRIL 2013



19 APRIL 2013



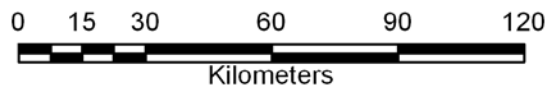
25 APRIL 2013



DATA NOT AVAILABLE

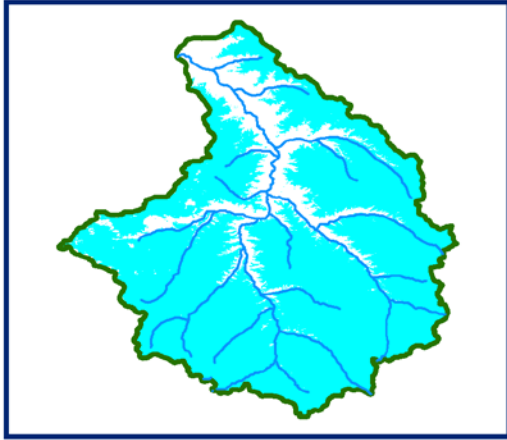


SNOW

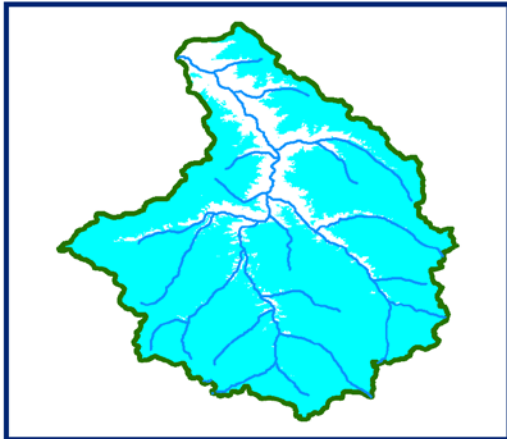


Kilometers

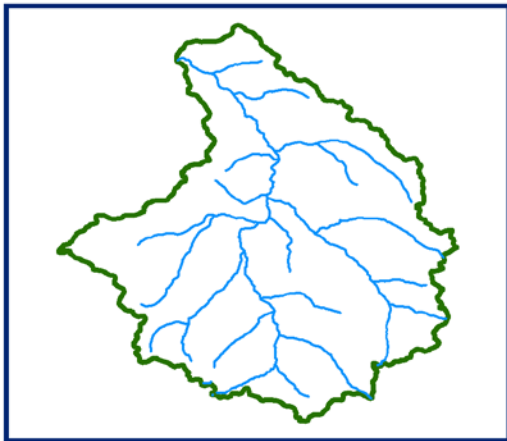
10 DAILY SNOW COVER MAP: ASTOR BASIN



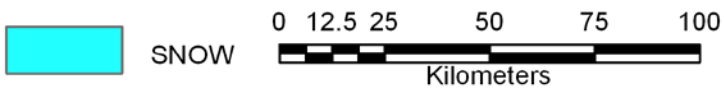
**DATA USED
06 APRIL 2013**



**DATA USED
14 APRIL 2013
18 APRIL 2013
19 APRIL 2013**



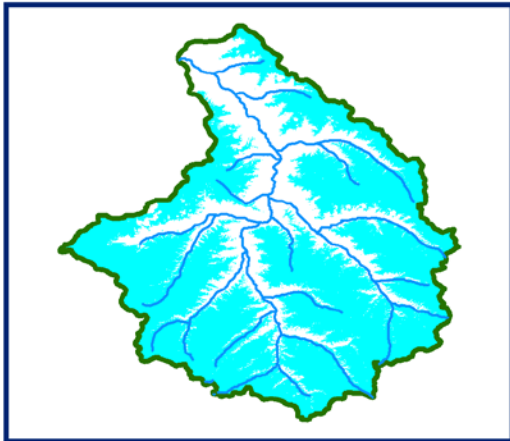
**DATA USED
DATA NOT AVAILABLE**



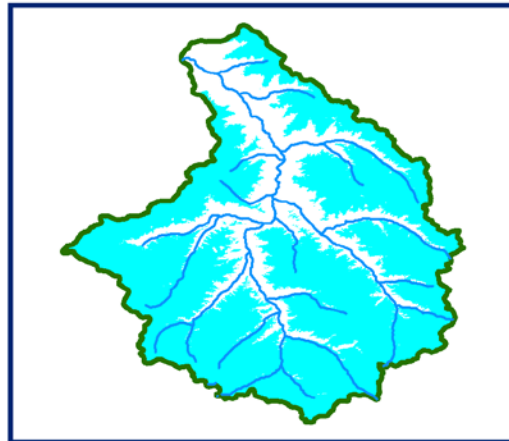
SNOW COVER MAP

:

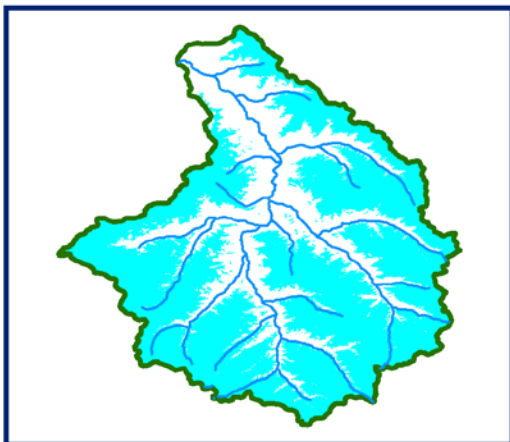
ASTOR BASIN



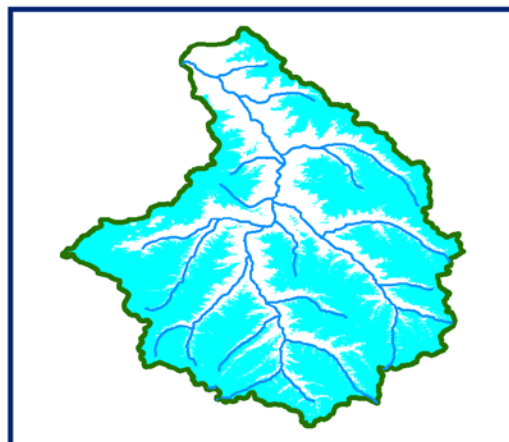
03 MAY 2013



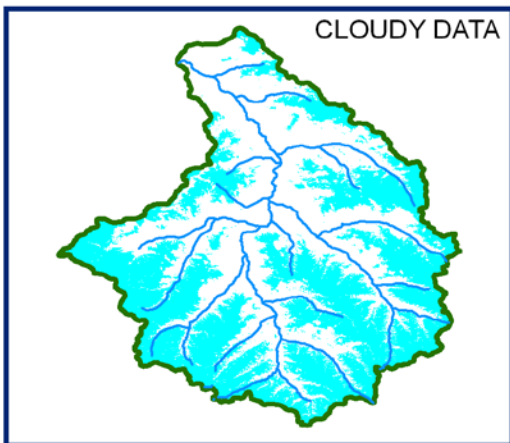
10 MAY 2013



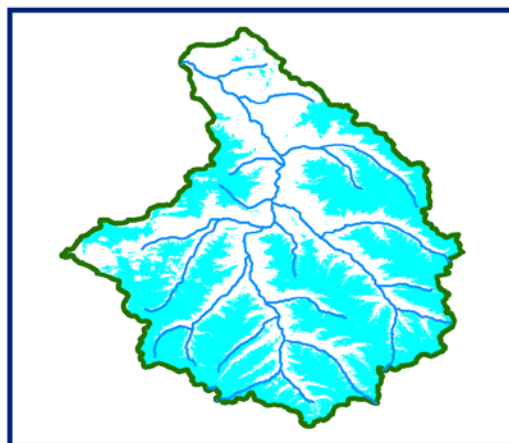
15 MAY 2013



17 MAY 2013



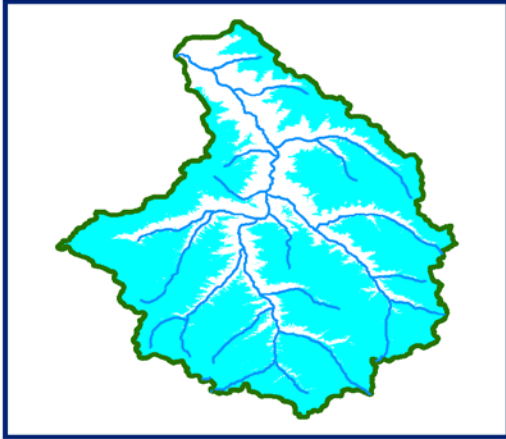
22 MAY 2013



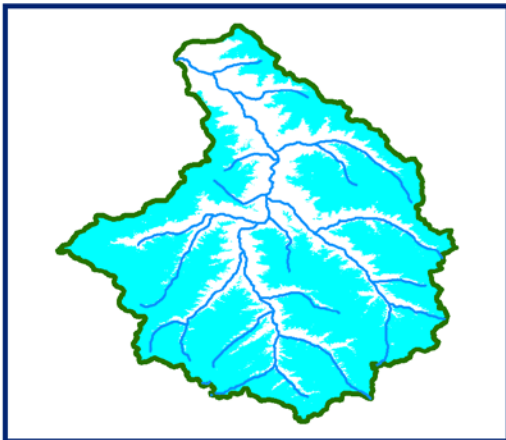
24 MAY 2013



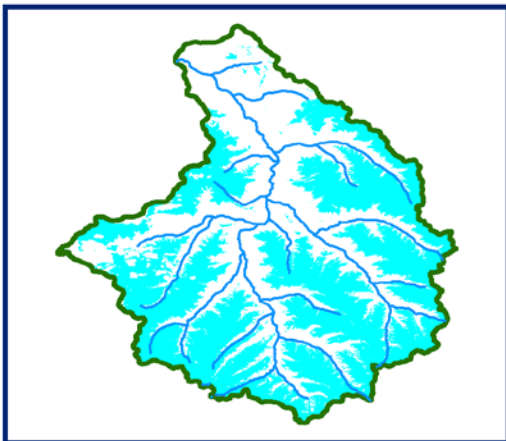
10 DAILY SNOW COVER MAP: ASTOR BASIN



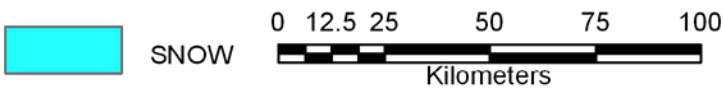
DATA USED
03 MAY 2013
10 MAY 2013



DATA USED
15 MAY 2013
17 MAY 2013



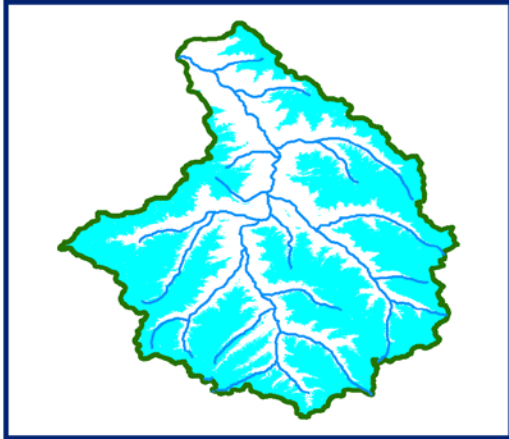
DATA USED
24 MAY 2013



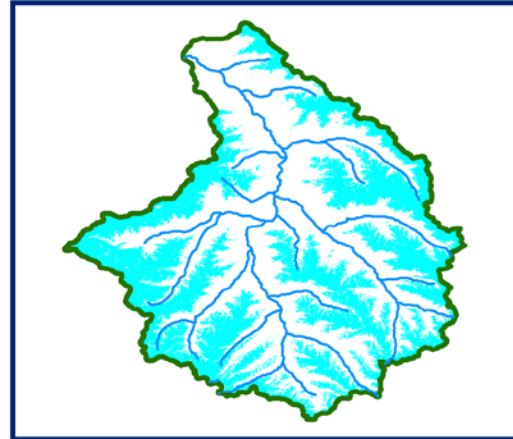
SNOW COVER MAP

:

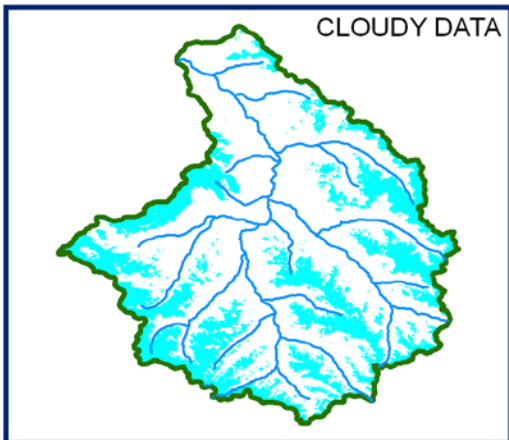
ASTOR BASIN



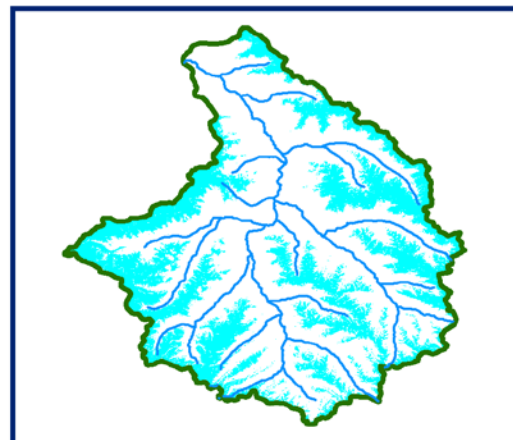
01 JUNE 2013



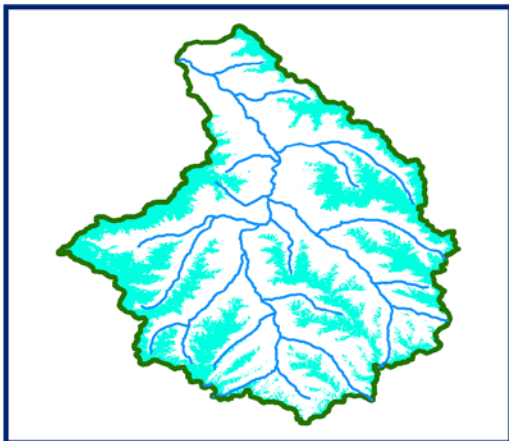
10 JUNE 2013



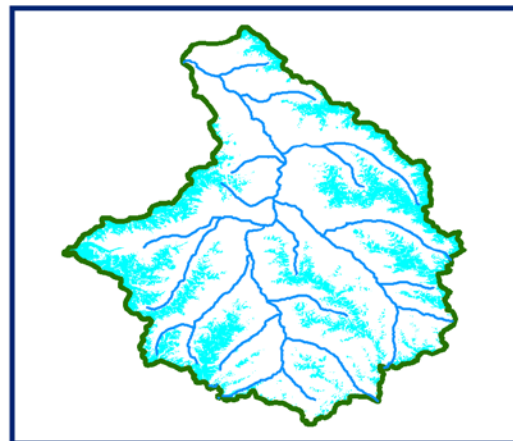
17 JUNE 2013



20 JUNE 2013



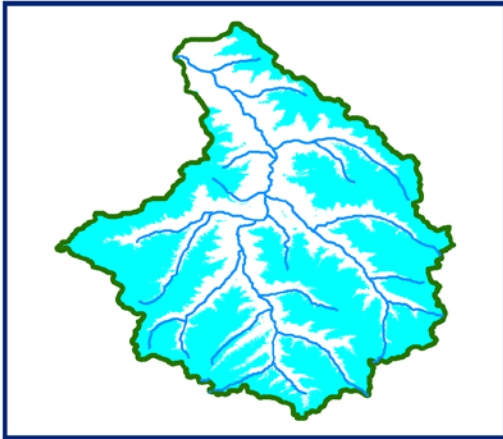
22 JUNE 2013



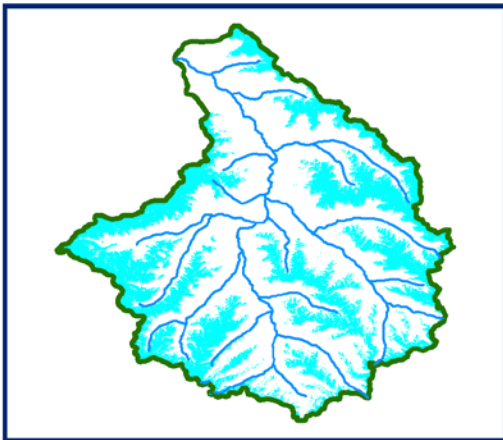
25 JUNE 2013



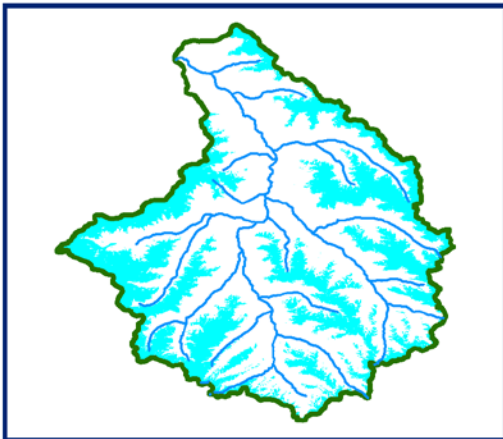
10 DAILY SNOW COVER MAP: ASTOR BASIN



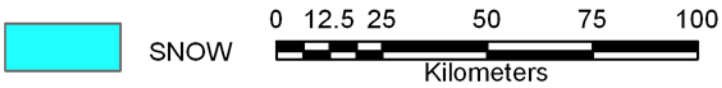
DATA USED
01 JUNE 2013
08 JUNE 2013
10 JUNE 2013



DATA USED
20 JUNE 2013



DATA USED
22 JUNE 2013
25 JUNE 2013



SHIGO BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SHIGO

BASIN AREA: 5539 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	2-Oct-12	235	4	2	26-Oct-12	1930	35
3	27-Oct-12	2278	41	4	28-Oct-12	2174	39
5	30-Oct-12	1614	29				
November 2012							
6	1-Nov-12	1859	34	7	2-Nov-12	1676	30
8	4-Nov-12	1333	24	9	6-Nov-12	1597	29
10	7-Nov-12	1520	27	11	11-Nov-12	1439	26
12	13-Nov-12	1113	20	13	14-Nov-12	989	18
14	16-Nov-12	1507	27	15	19-Nov-12	4139	75
16	20-Nov-12	3980	72	17	25-Nov-12	3835	69
18	26-Nov-12	4025	73	19	30-Nov-12	5066	91
December 2012							
20	1-Dec-12	4910	89	21	2-Dec-12	4885	88
22	12-Dec-12	4262	77	23	19-Dec-12	5421	98
24	22-Dec-12	5242	95	25	31-Dec-12	5444	98
January 2013							
26	13-Jan-13	5515	100	27	22-Jan-13	5498	99
28	24-Jan-13	5458	99	29	17-Feb-13	5305	96
February 2013							
30	1-Feb-13	5414	98	31	8-Feb-13	5529	100
32	11-Feb-13	5466	99	33			
March 2013							
34	1-Mar-13	5436	98	35	2-Mar-13	5436	98
36	6-Mar-13	5274	95	37	7-Mar-13	5355	97
38	8-Mar-13	5403	98	39	26-Mar-13	4946	89
40	31-Mar-13	4499	81				
April 2013							
41	18-Apr-13	4358	79	42	19-Apr-13	4251	77

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
43	3-May-13	3728	67	44	10-May-13	3880	70
45	15-May-13	3448	62	46	17-May-13	3454	62
47	18-May-13	3351	60	48	22-May-13	3161	57
49	24-May-13	3228	58				
June 2013							
50	1-Jun-13	3496	63	51	5-Jun-13	2652	48
52	8-Jun-13	2473	45	53	10-Jun-13	2003	36
54	11-Jun-13	1714	31	55	20-Jun-13	1261	23
56	22-Jun-13	1166	21	57	25-Jun-13	594	11

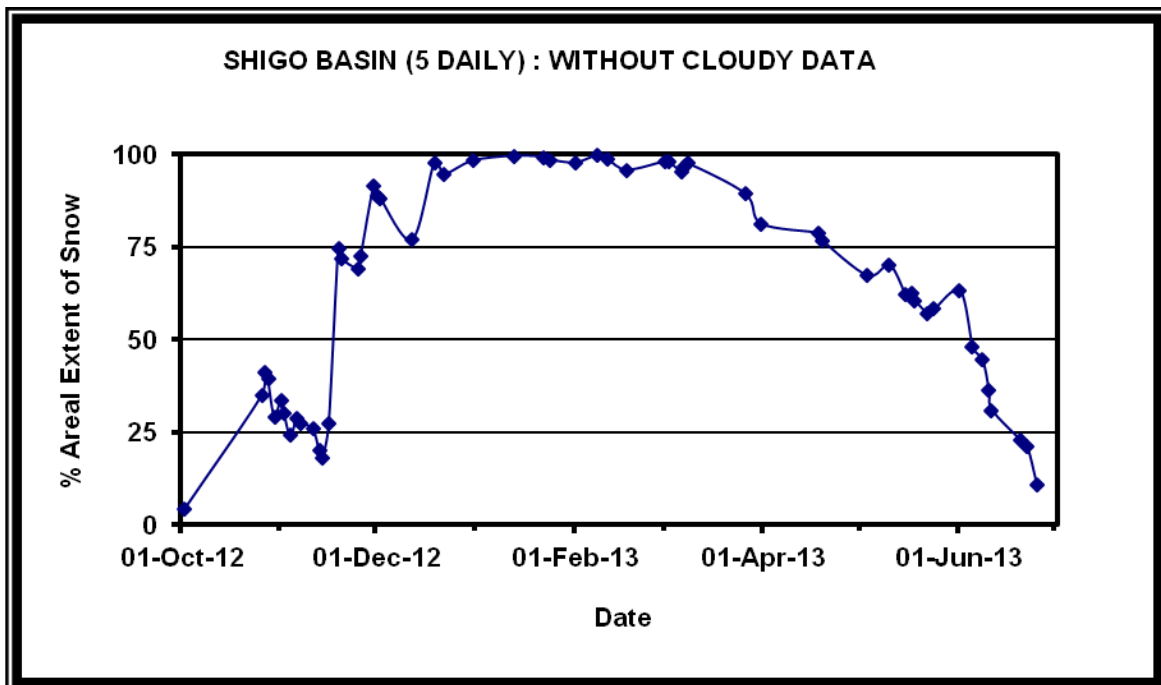
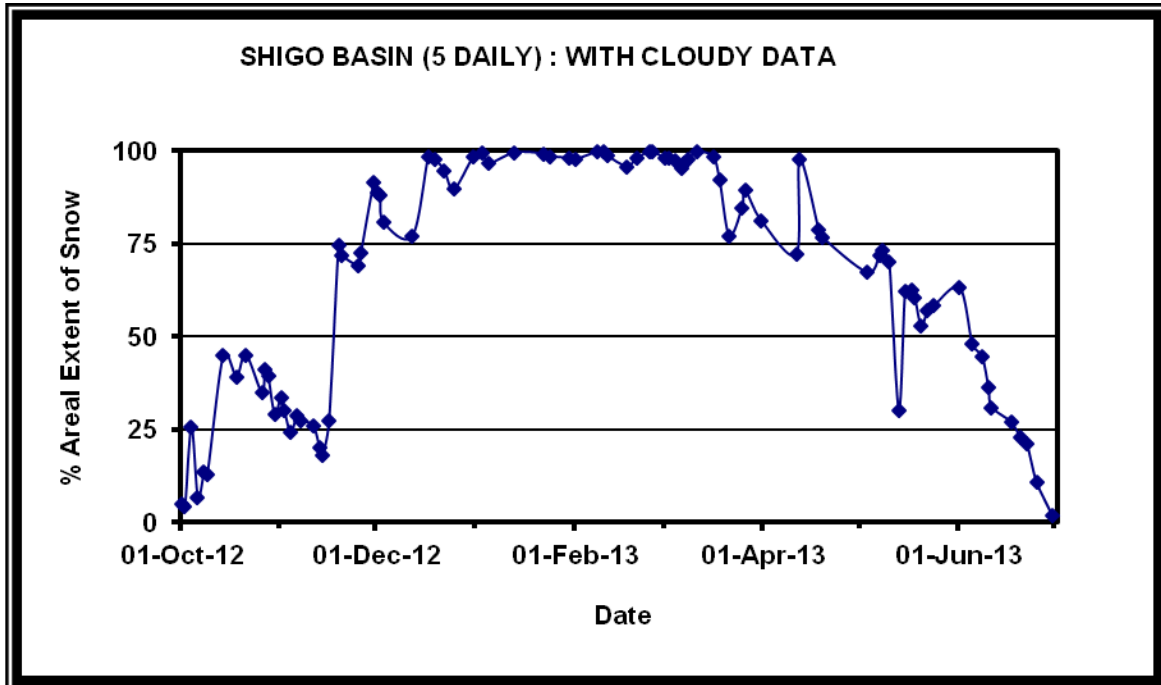
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: SHIGO

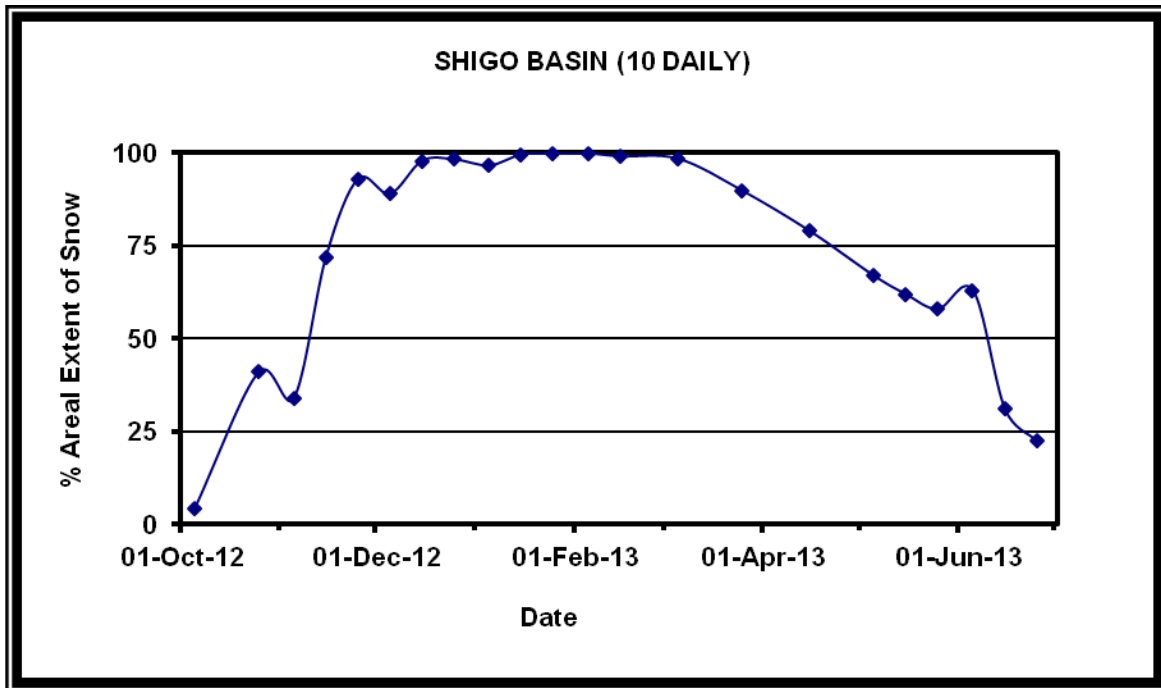
BASIN AREA: 5539 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	235	4	2	25-Oct-12	2271	41
November 2012							
3	5-Nov-12	1883	34	4	15-Nov-12	3988	72
5	25-Nov-12	5151	93				
December 2012							
6	5-Dec-12	4930	89	7	15-Dec-12	5422	98
8	25-Dec-12	5444	98				
January 2013							
9	15-Jan-13	5515	100	10	25-Jan-13	5526	100
February 2013							
11	5-Feb-13	5530	100	12	15-Feb-13	5488	99
March 2013							
13	5-Mar-13	5452	98	14	25-Mar-13	4976	90
April 2013							
15	15-Apr-13	4376	79				
May 2013							
16	5-May-13	3711	67	17	15-May-13	3434	62
18	25-May-13	3213	58				
June 2013							
19	5-Jun-13	3490	63	20	15-Jun-13	1717	31
21	25-Jun-13	1242	22				

Snow cover depletion curve



Snow cover depletion curve



SNOW COVER MAP

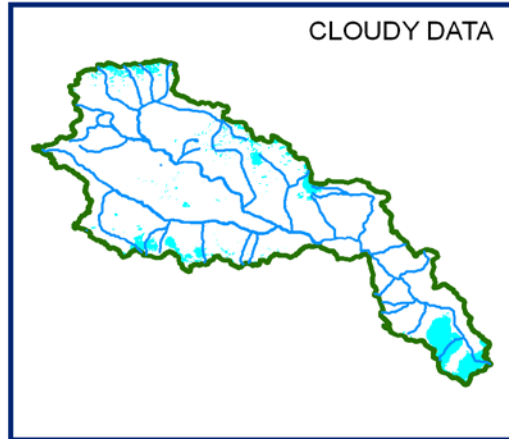
SNOW COVER MAP

:

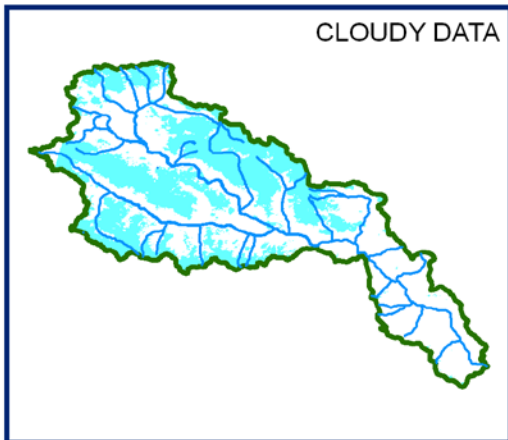
SHIGO BASIN



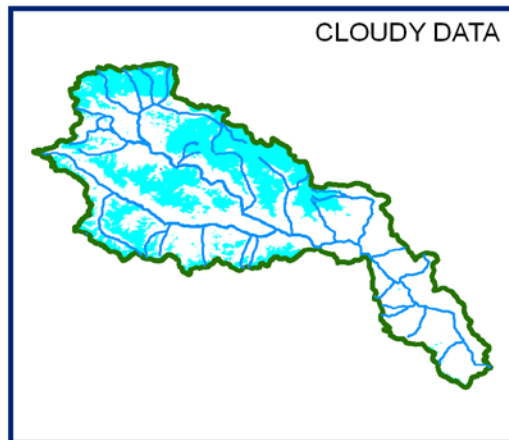
02 OCTOBER 2012



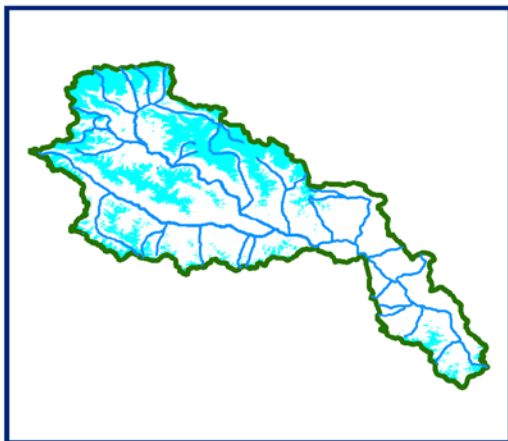
09 OCTOBER 2012



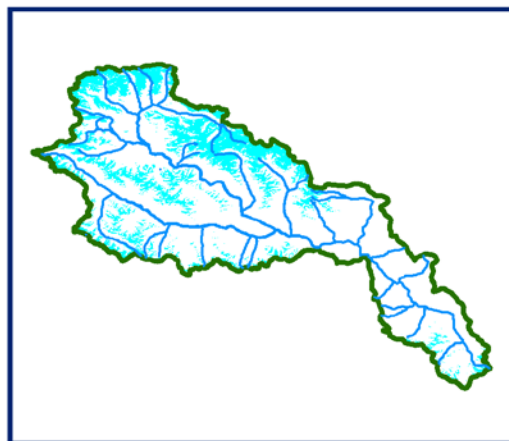
14 OCTOBER 2012



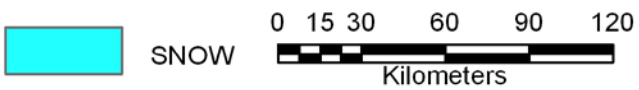
18 OCTOBER 2012



26 OCTOBER 2012



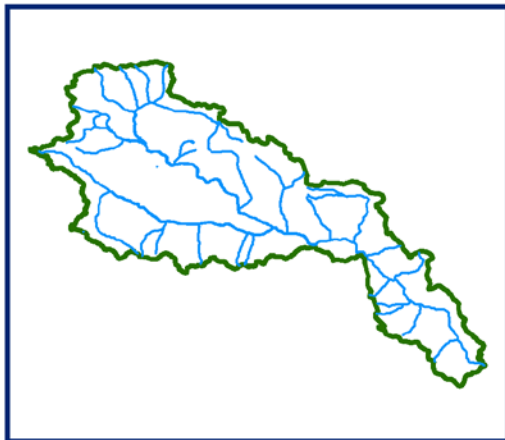
30 OCTOBER 2012



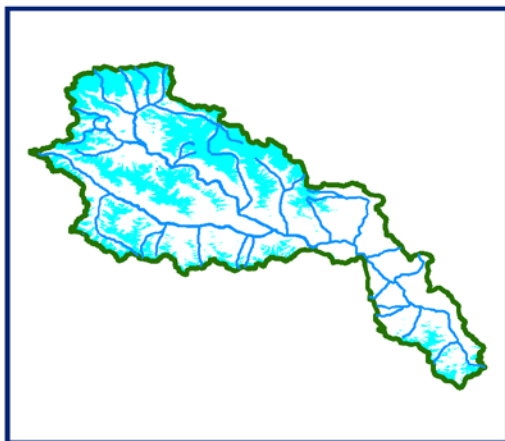
10 DAILY SNOW COVER MAP: SHIGO BASIN



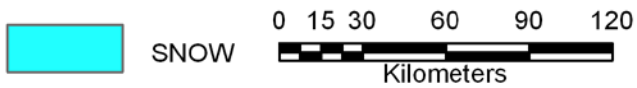
DATA USED
02 OCTOBER 2012



DATA USED
DATA NOT AVAILABLE



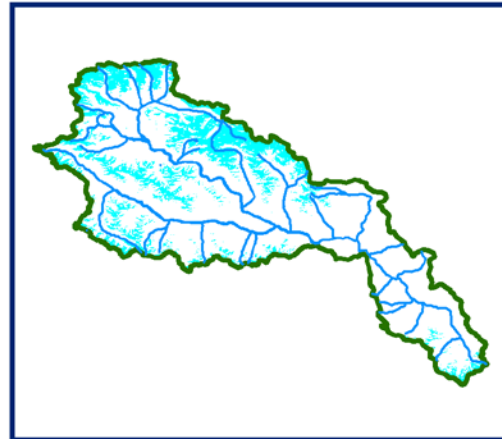
DATA USED
30 OCTOBER 2012
26 OCTOBER 2012
28 OCTOBER 2012



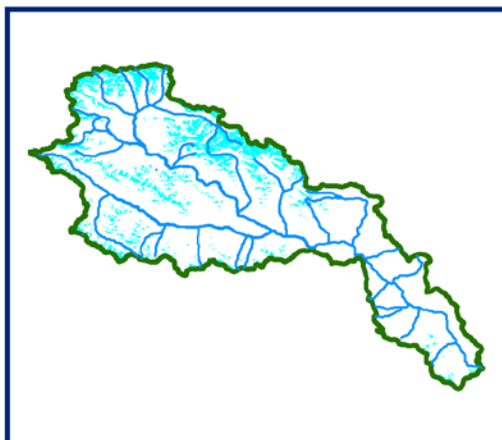
SNOW COVER MAP : SHIGO BASIN



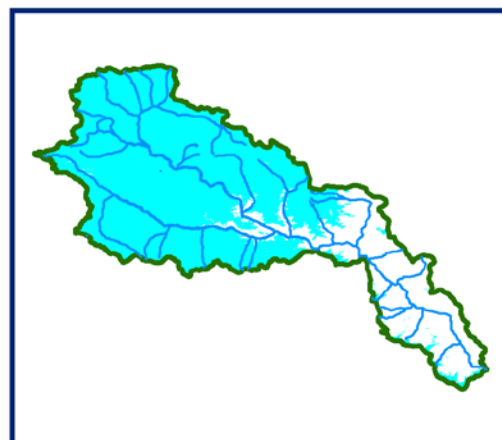
02 NOVEMBER 2012



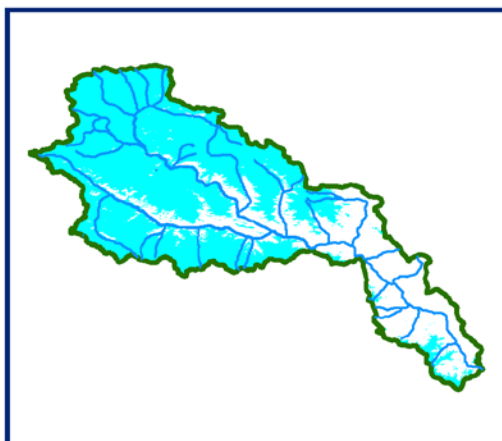
07 NOVEMBER 2012



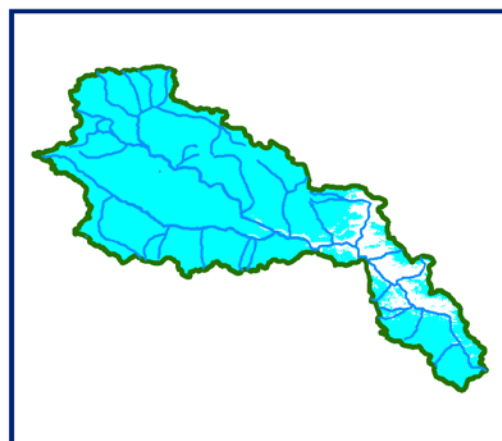
13 NOVEMBER 2012



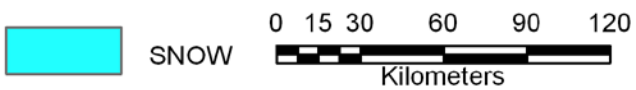
19 NOVEMBER 2012



25 NOVEMBER 2012



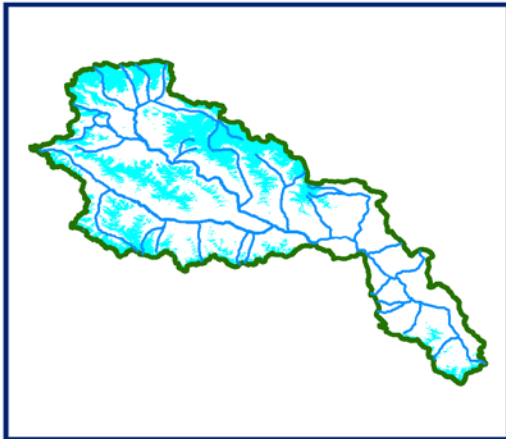
30 NOVEMBER 2012



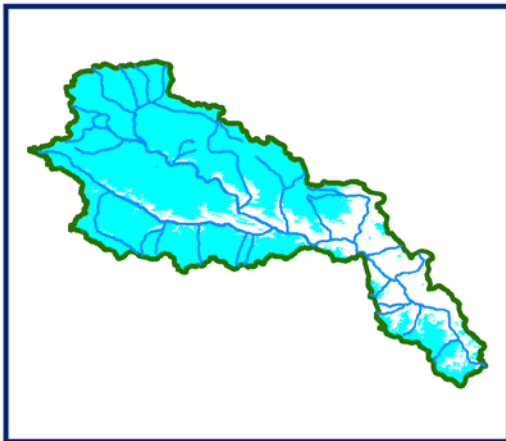
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
01 NOVEMBER 2012
04 NOVEMBER 2012
07 NOVEMBER 2012

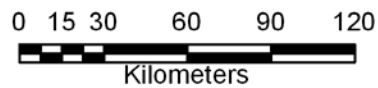


DATA USED
11 NOVEMBER 2012
16 NOVEMBER 2012
20 NOVEMBER 2012



DATA USED
25 NOVEMBER 2012
26 NOVEMBER 2012
30 NOVEMBER 2012

 SNOW



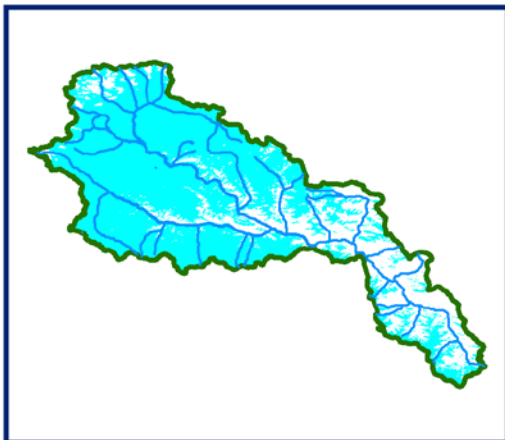
SNOW COVER MAP : SHIGO BASIN



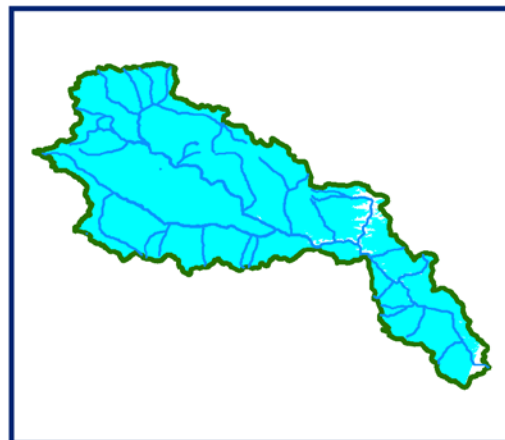
01 DECEMBER 2012



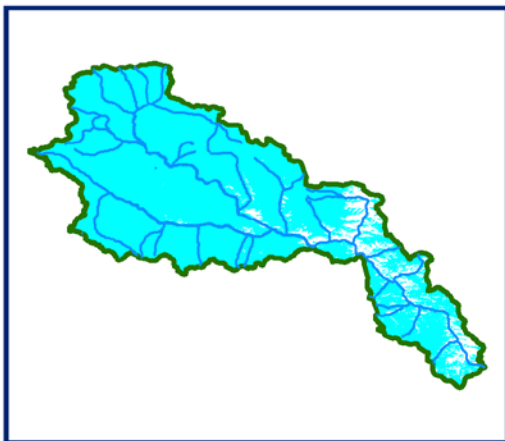
02 DECEMBER 2012



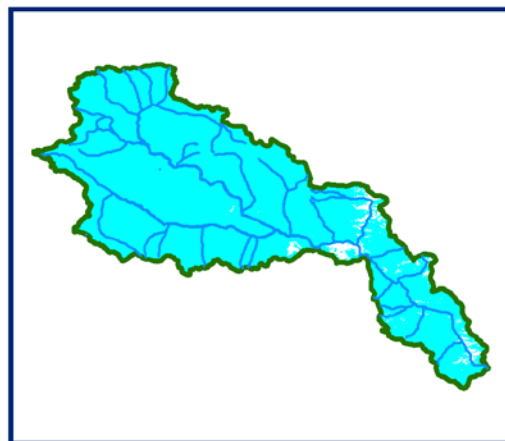
12 DECEMBER 2012



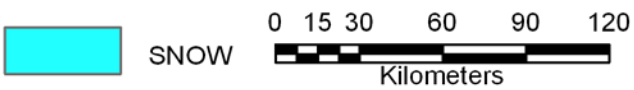
19 DECEMBER 2012



22 DECEMBER 2012



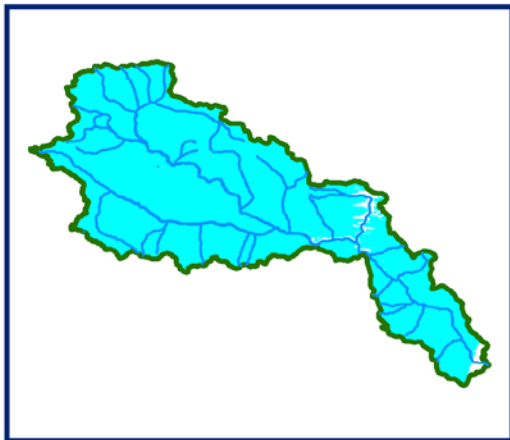
31 DECEMBER 2012



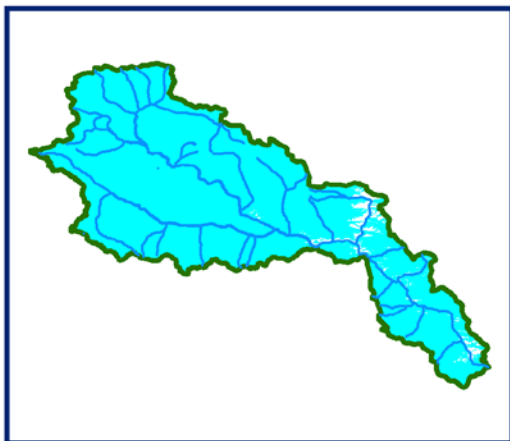
10 DAILY SNOW COVER MAP: SHIGO BASIN



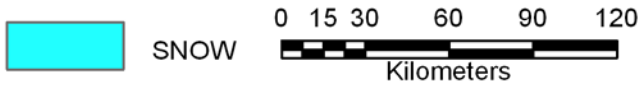
DATA USED
01 DECEMBER 2012
02 DECEMBER 2012



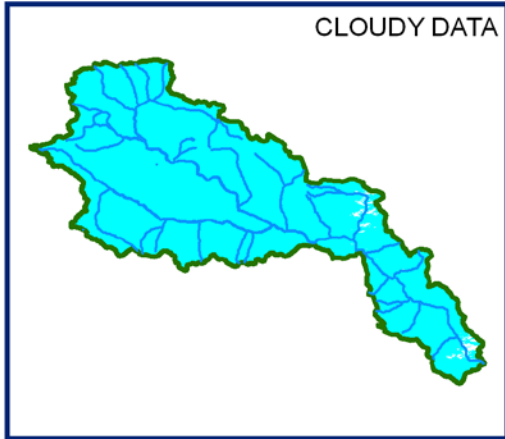
DATA USED
19 DECEMBER 2012
12 DECEMBER 2012



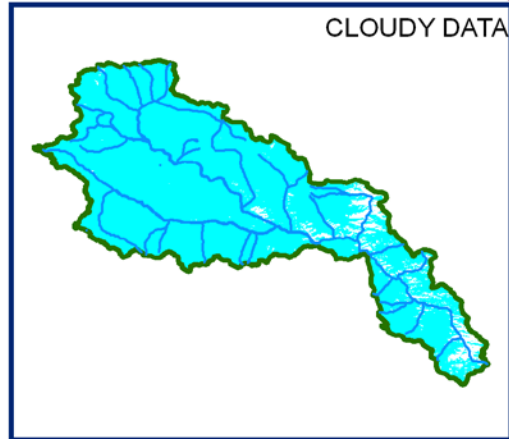
DATA USED
22 DECEMBER 2012
31 DECEMBER 2012



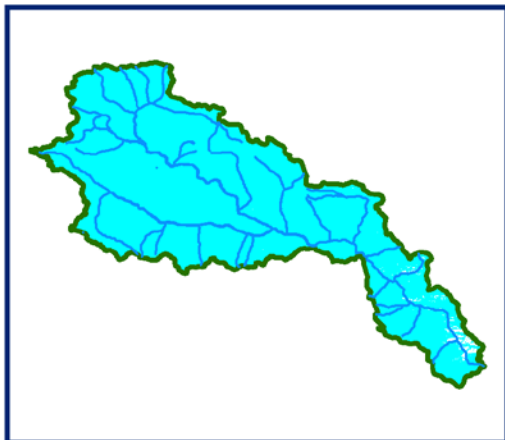
SNOW COVER MAP : SHIGO BASIN



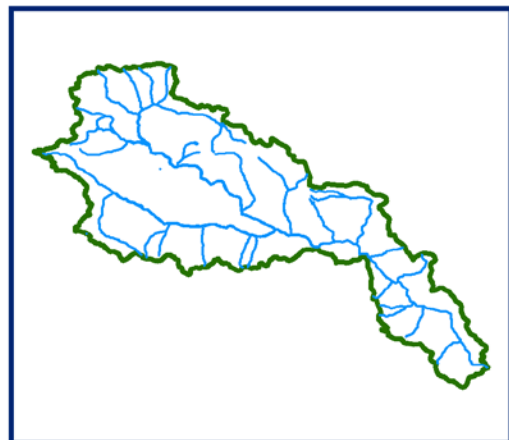
03 JANUARY 2013



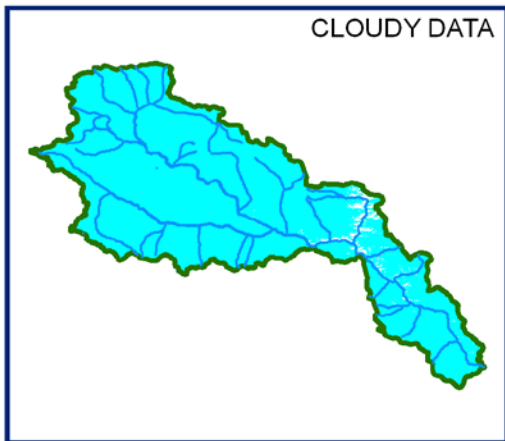
05 JANUARY 2013



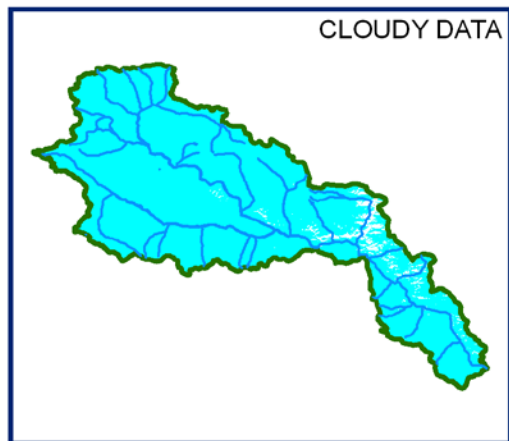
13 JANUARY 2013



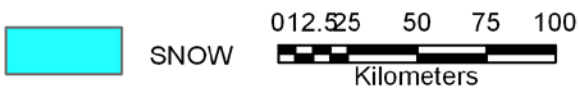
NO DATA AVAILABLE



22 JANUARY 2013



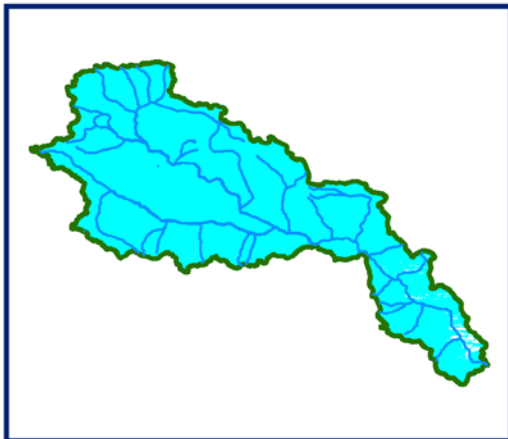
24 JANUARY 2013



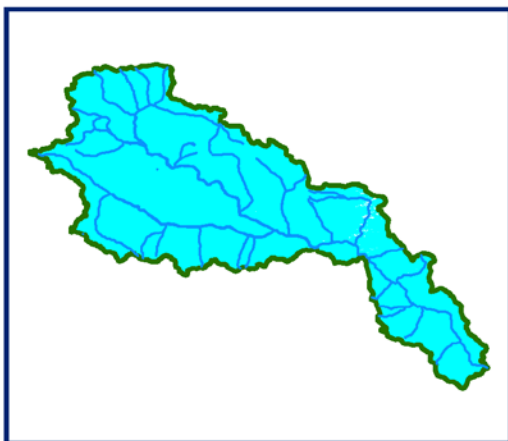
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
DATA NOT AVAILABLE

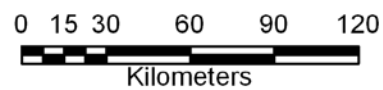


DATA USED
13 JANUARY 2013



DATA USED
22 JANUARY 2013
24 JANUARY 2013

 SNOW



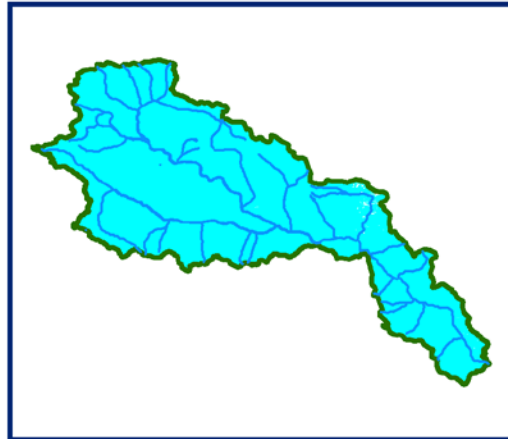
SNOW COVER MAP

:

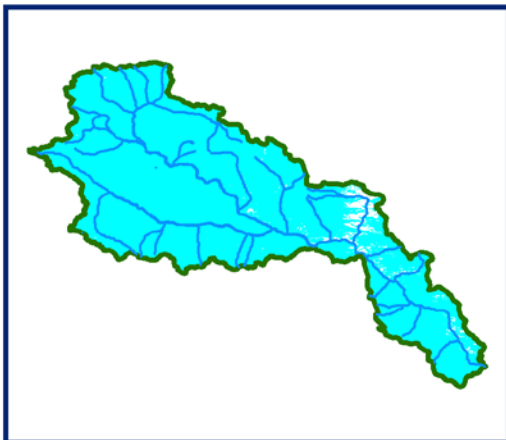
SHIGO BASIN



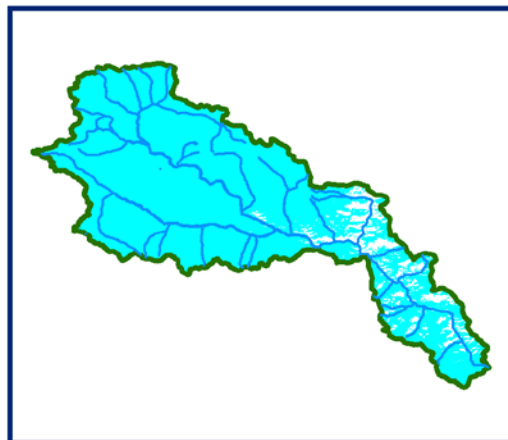
01 FEBRUARY 2013



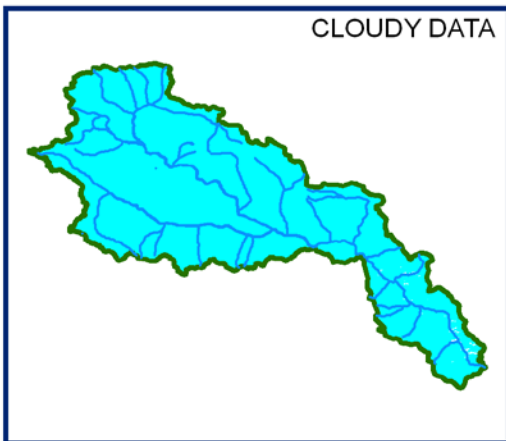
08 FEBRUARY 2013



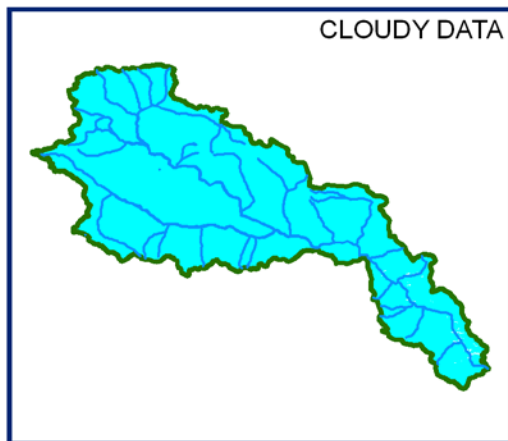
11 FEBRUARY 2013



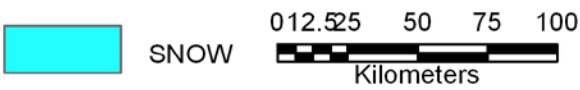
17 FEBRUARY 2013



24 FEBRUARY 2013



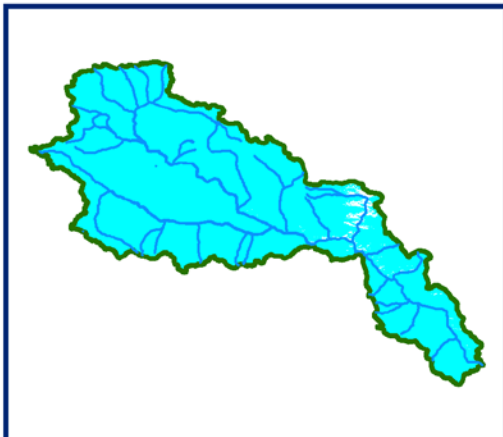
25 FEBRUARY 2013



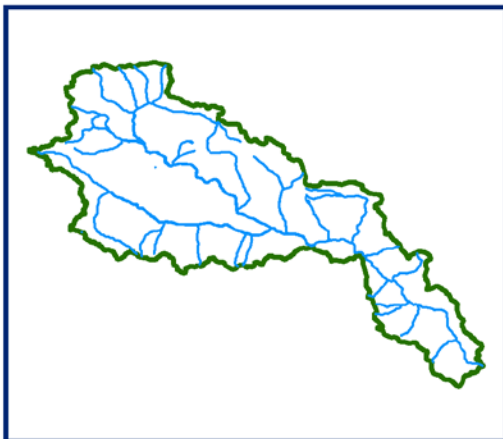
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
01 FEBRUARY 2013
08 FEBRUARY 2013

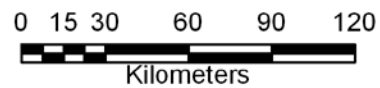


DATA USED
11 FEBRUARY 2013
17 FEBRUARY 2013



DATA USED
DATA NOT AVAILABLE

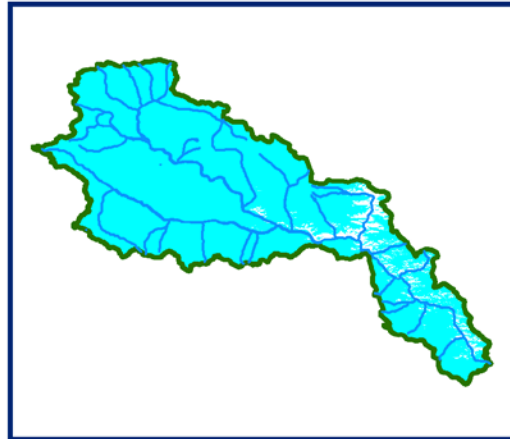
 SNOW



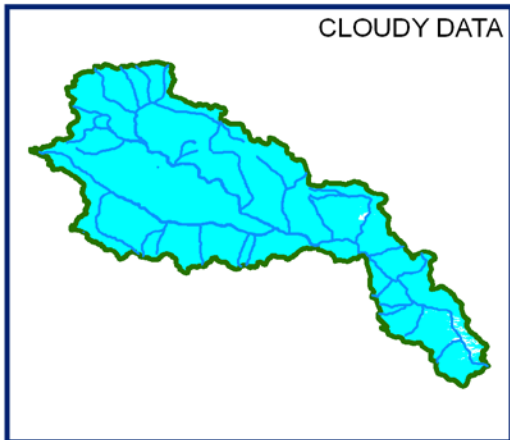
SNOW COVER MAP : SHIGO BASIN



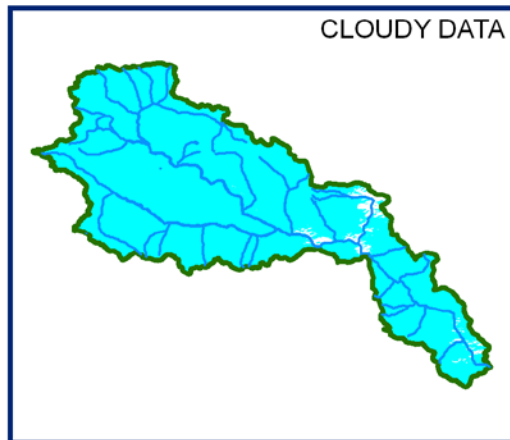
02 MARCH 2013



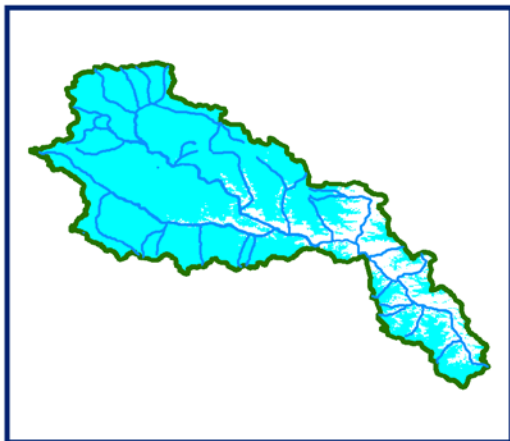
08 MARCH 2013



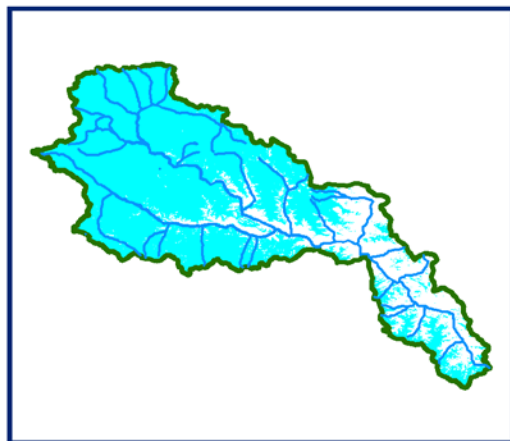
11 MARCH 2013



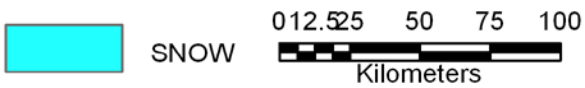
16 MARCH 2013



26 MARCH 2013



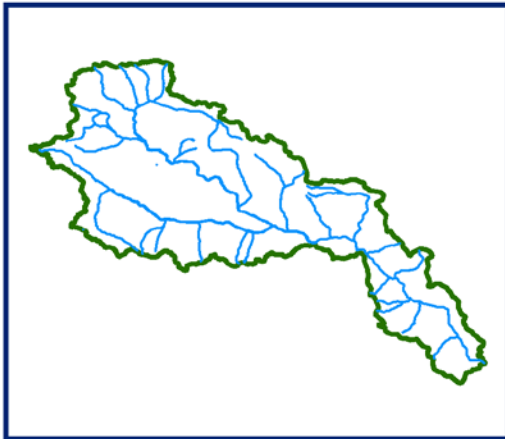
31 MARCH 2013



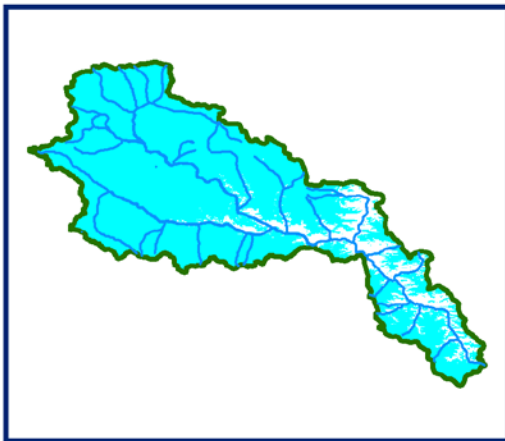
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
02 MARCH 2013
06 MARCH 2013
07 MARCH 2013

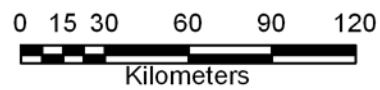


DATA USED
DATA NOT AVAILABLE



DATA USED
26 MARCH 2013
31 MARCH 2013

 SNOW



SNOW COVER MAP

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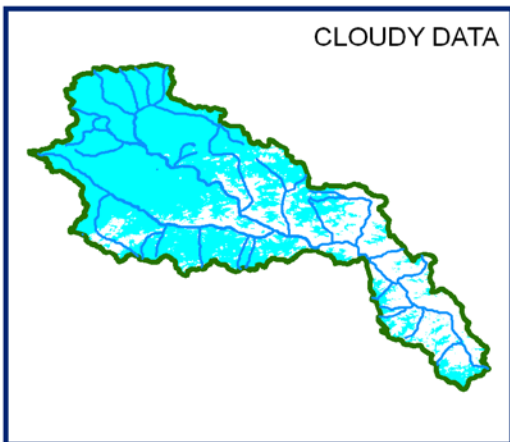
SHIGO BASIN



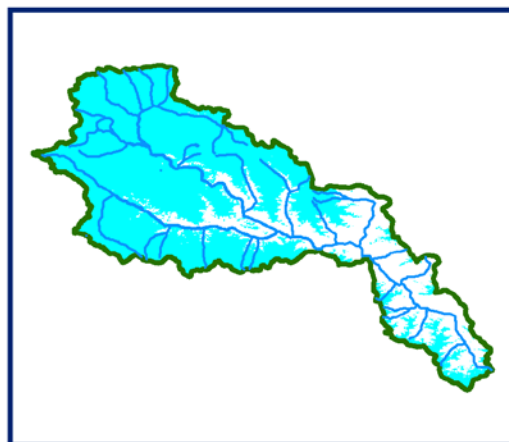
DATA NOT AVAILABLE



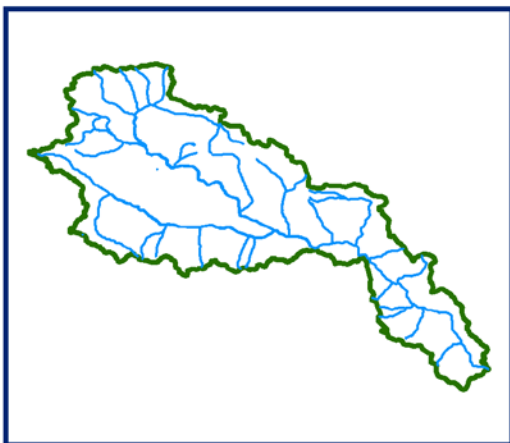
DATA NOT AVAILABLE



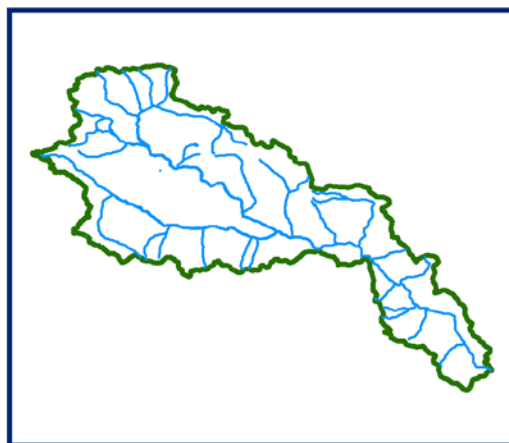
11 APRIL 2013



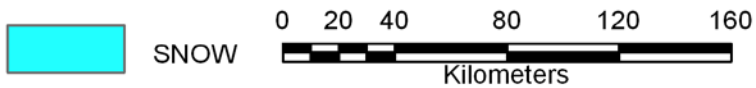
19 APRIL 2013



DATA NOT AVAILABLE



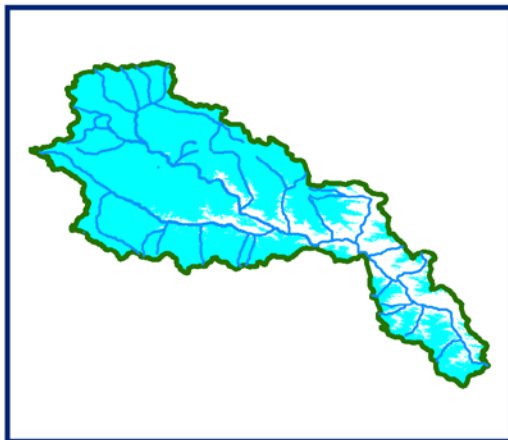
DATA NOT AVAILABLE



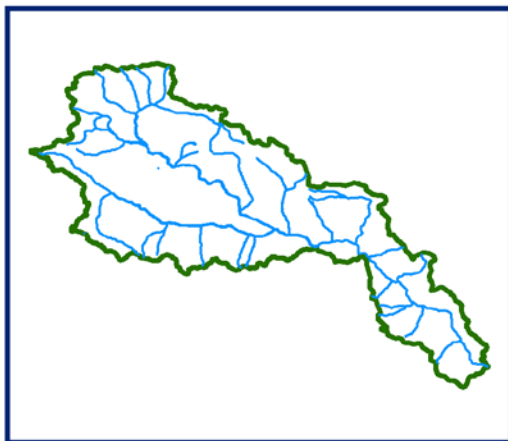
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
DATA NOT AVAILABLE



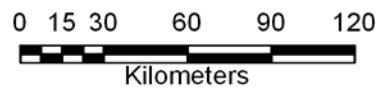
DATA USED
19 APRIL 2013
18 APRIL 2013



DATA USED
DATA NOT AVAILABLE



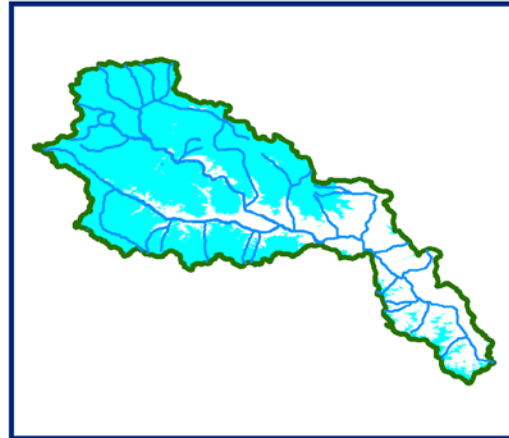
SNOW



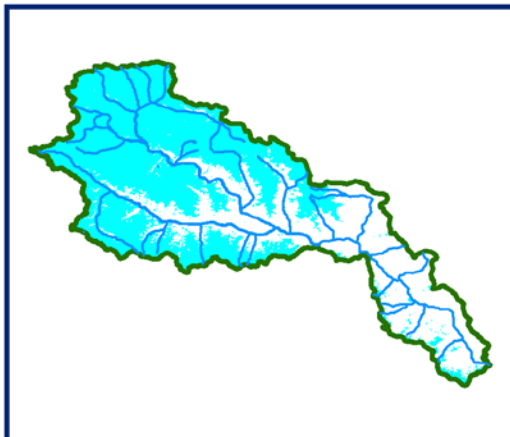
SNOW COVER MAP : SHIGO BASIN



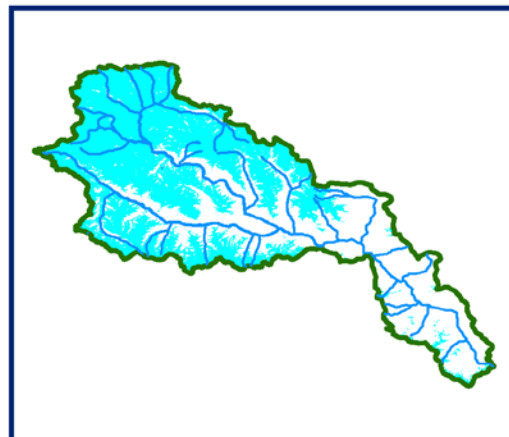
03 MAY 2013



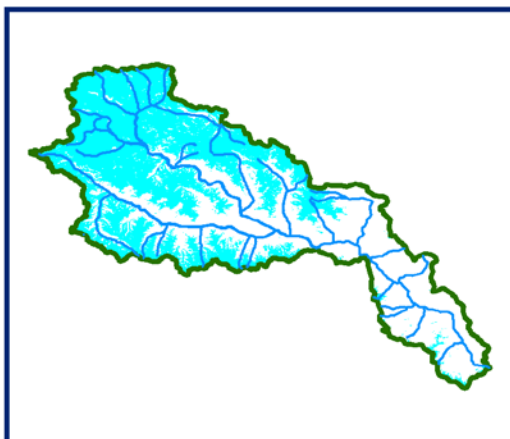
10 MAY 2013



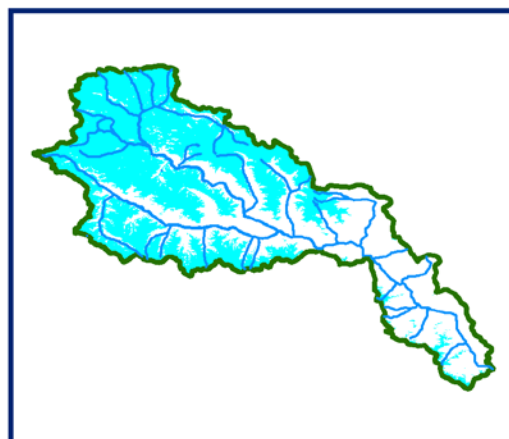
15 MAY 2013



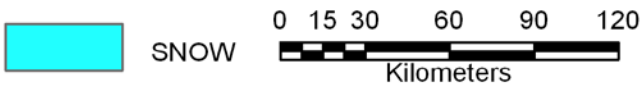
18 MAY 2013



22 MAY 2013



24 MAY 2013



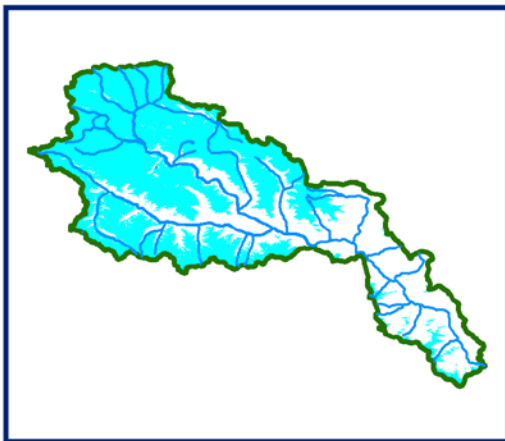
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
03 MAY 2013
10 MAY 2013

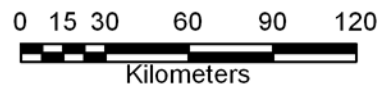


DATA USED
15 MAY 2013
17 MAY 2013
18 MAY 2013



DATA USED
22 MAY 2013
24 MAY 2013

 SNOW



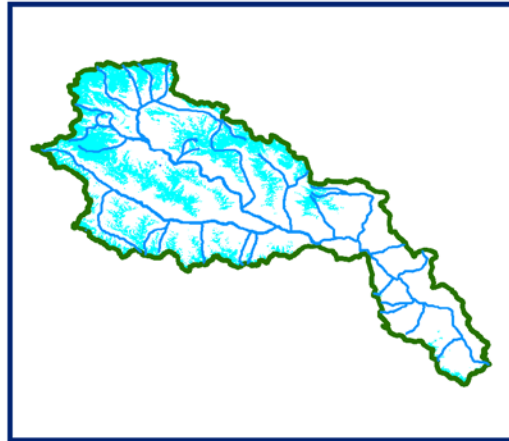
SNOW COVER MAP

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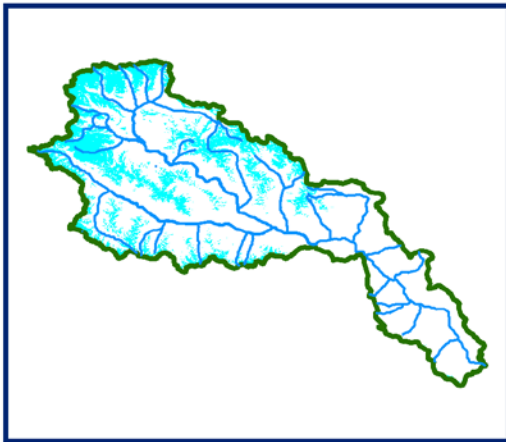
SHIGO BASIN



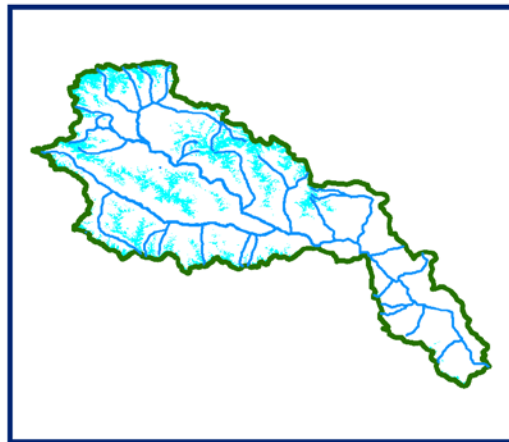
01 JUNE 2013



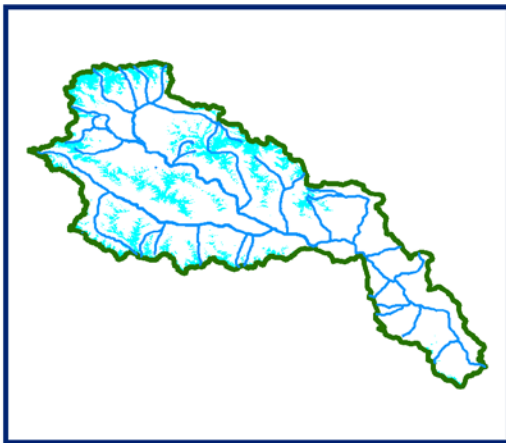
10 JUNE 2013



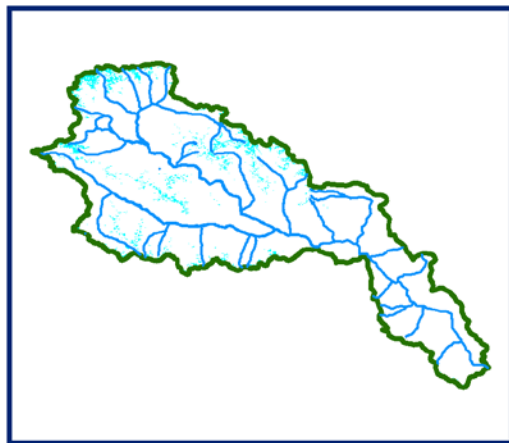
11 JUNE 2013



20 JUNE 2013



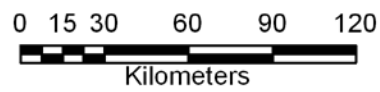
22 JUNE 2013



25 JUNE 2013



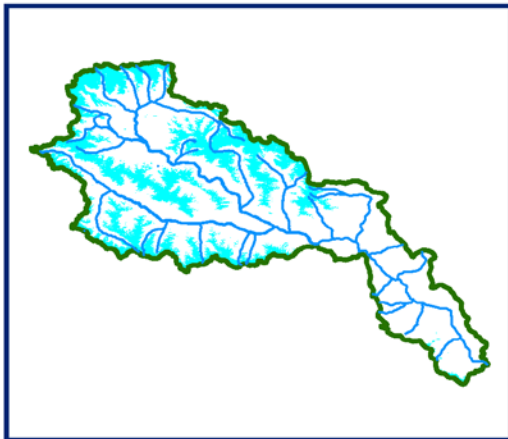
SNOW



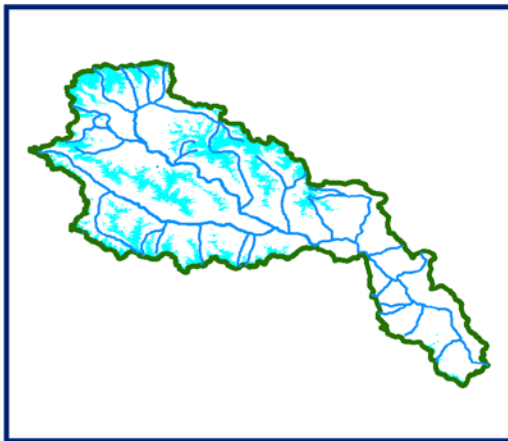
10 DAILY SNOW COVER MAP: SHIGO BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013
10 JUNE 2013

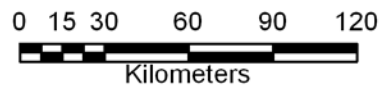


DATA USED
11 JUNE 2013
20 JUNE 2013



DATA USED
22 JUNE 2013
25 JUNE 2013

 SNOW



DRAS BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: DRASS

BASIN AREA: 1683 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	1-Oct-12	353	21	2	2-Oct-12	313	19
3	6-Oct-12	323	19	4	8-Oct-12	473	28
5	18-Oct-12	824	49	6	26-Oct-12	545	32
7	28-Oct-12	809	48	8	30-Oct-12	545	32
November 2012							
6	1-Nov-12	641	38	7	2-Nov-12	570	34
8	4-Nov-12	475	28	9	6-Nov-12	548	33
10	7-Nov-12	534	32	11	11-Nov-12	517	31
12	13-Nov-12	434	26	13	14-Nov-12	385	23
14	19-Nov-12	1384	82	15	25-Nov-12	1384	82
16	30-Nov-12	1638	97				
December 2012							
17	1-Dec-12	1605	95	18	2-Dec-12	1599	95
19	3-Dec-12	1537	91	20	12-Dec-12	1541	92
21	19-Dec-12	1654	98	22	22-Dec-12	1652	98
23	31-Dec-12	1649	98				
January 2013							
23	3-Jan-13	1657	98	24	13-Jan-13	1657	98
25	22-Jan-13	1657	98	26	24-Jan-13	1657	98
February 2013							
27	1-Feb-13	1656	98	28	8-Feb-13	1656	98
29	11-Feb-13	1656	98	30	17-Feb-13	1649	98
March 2013							
31	1-Mar-13	1657	98	32	2-Mar-13	1655	98
33	4-Mar-13	1655	98	34	6-Mar-13	1655	98
35	7-Mar-13	1653	98	36	8-Mar-13	1653	98
37	16-Mar-13	1657	98	38	26-Mar-13	1616	96
39	31-Mar-13	1542	92				
April 2013							
35	18-Apr-13	1484	88	36	19-Apr-13	1479	88

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
37	3-May-13	1270	75	38	10-May-13	1274	76
39	15-May-13	1142	68	40	17-May-13	1122	67
41	18-May-13	1079	64	42	22-May-13	1016	60
43	24-May-13	1037	62				
June 2013							
44	1-Jun-13	1008	60	45	5-Jun-13	792	47
46	8-Jun-13	806	48	47	10-Jun-13	688	41
48	11-Jun-13	523	31	49	20-Jun-13	574	34
50	22-Jun-13	563	33				

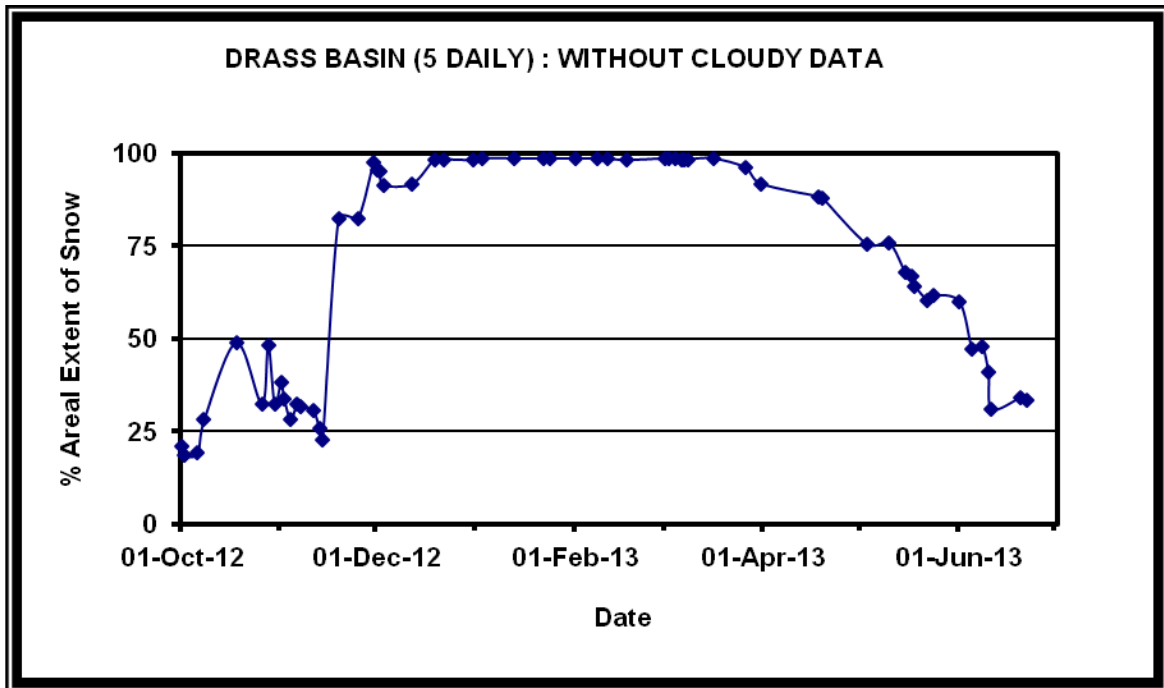
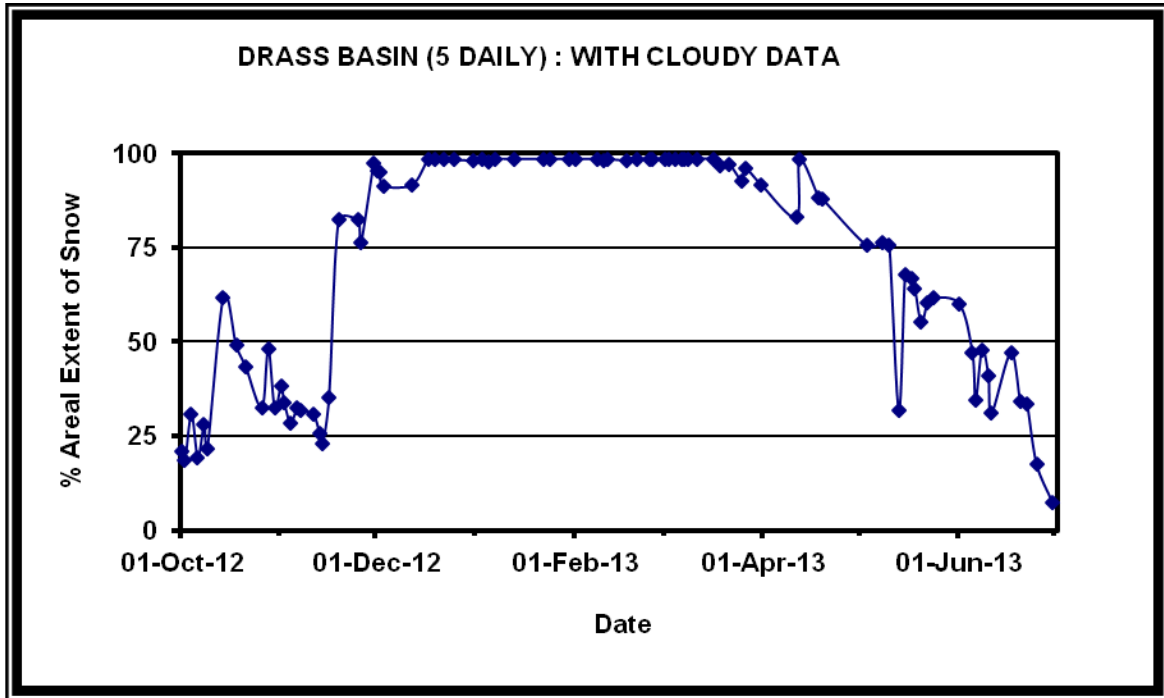
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: DRASS

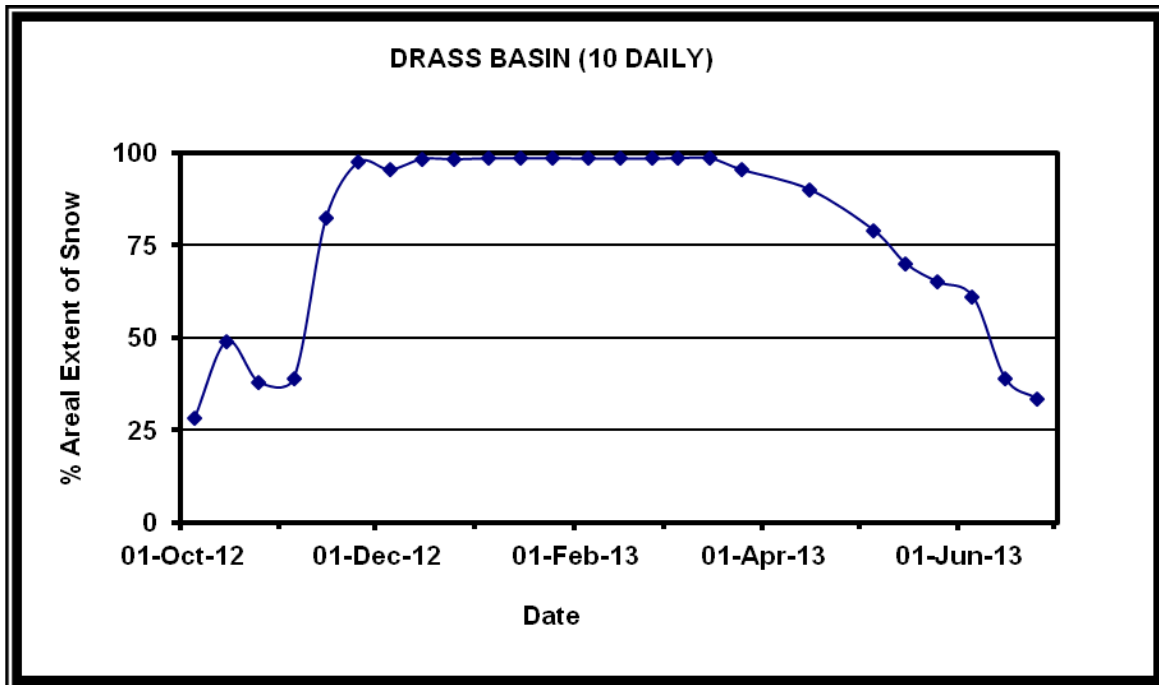
BASIN AREA: 1683 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	376	22	2	15-Oct-12	825	49
2	25-Oct-12	634	38				
November 2012							
3	5-Nov-12	664	39	4	15-Nov-12	1380	82
5	25-Nov-12	1638	97				
December 2012							
6	5-Dec-12	1606	95	7	15-Dec-12	1654	98
8	25-Dec-12	1657	98				
January 2013							
9	5-Jan-13	1657	98	10	15-Jan-13	1657	98
11	25-Jan-13	1657	98				
February 2013							
12	5-Feb-13	1656	98	13	15-Feb-13	1657	98
13	25-Feb-13	1657	98				
March 2013							
14	5-Mar-13	1657	98	15	15-Mar-13	1657	98
16	25-Mar-13	1604	95				
April 2013							
17	15-Apr-13	1514	90				
May 2013							
18	5-May-13	1330	79	19	15-May-13	1180	70
20	25-May-13	1089	65	21			
June 2013							
22	5-Jun-13	1020	61	23	15-Jun-13	662	39
24	25-Jun-13	563	33				

Snow cover depletion curve

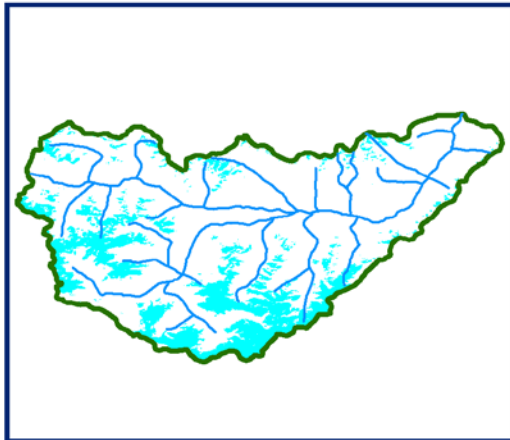


Snow cover depletion curve

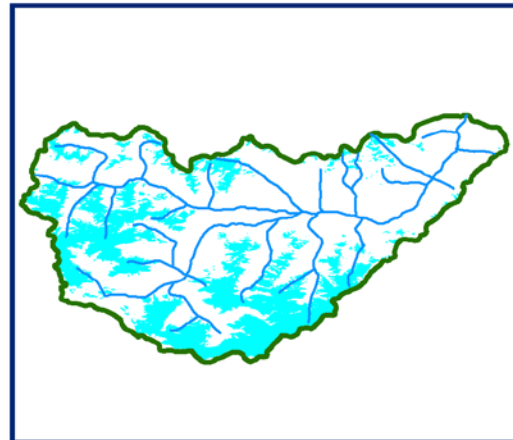


SNOW COVER MAP

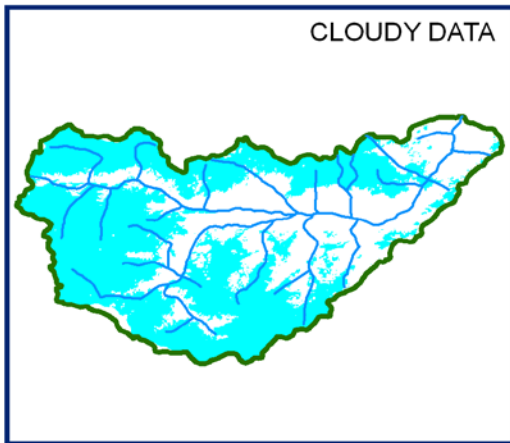
SNOW COVER MAP : DRASS BASIN



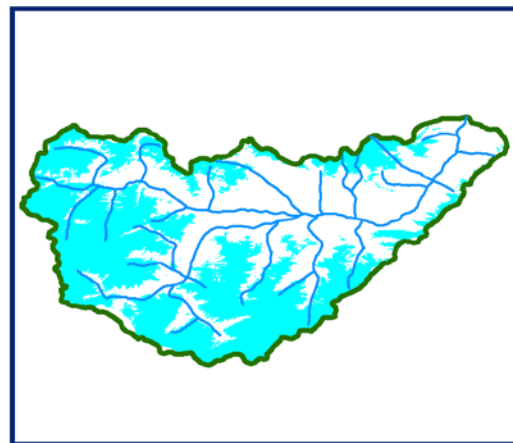
02 OCTOBER 2012



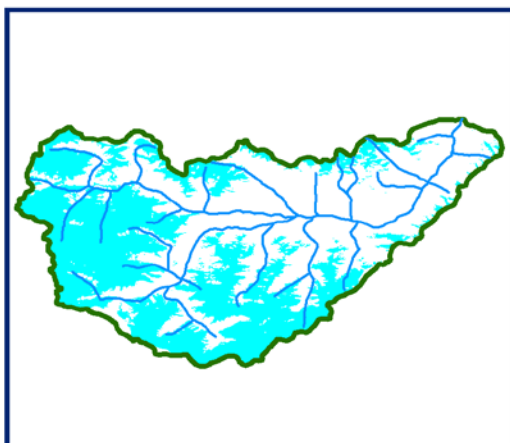
08 OCTOBER 2012



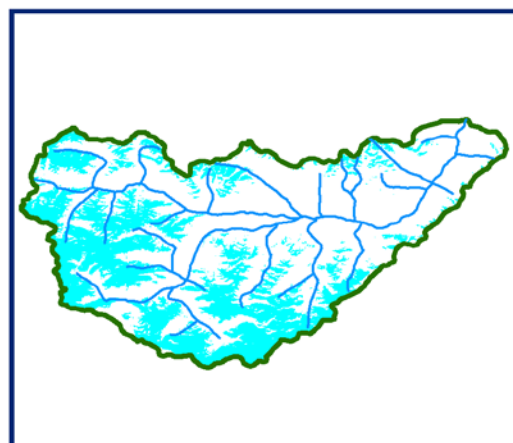
14 OCTOBER 2012



18 OCTOBER 2012



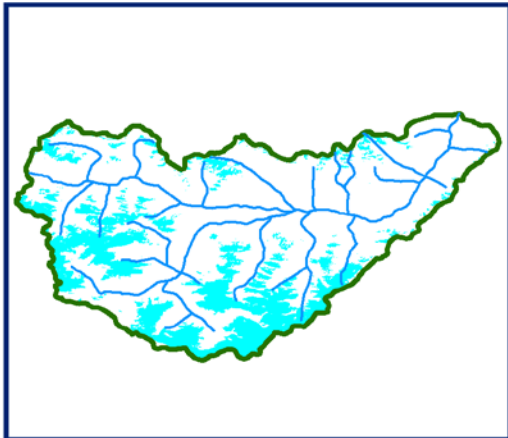
28 OCTOBER 2012



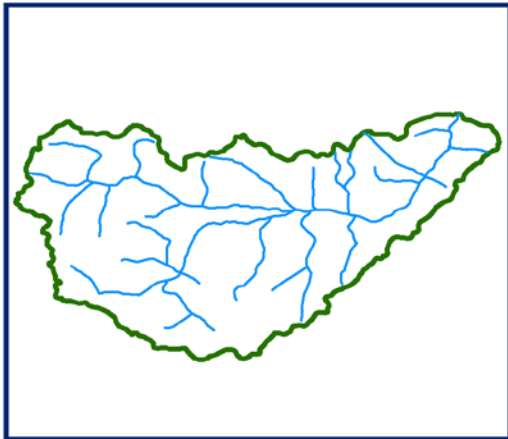
30 OCTOBER 2012



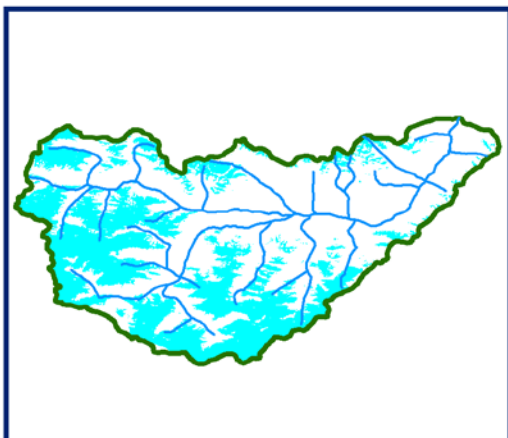
10 DAILY SNOW COVER MAP: DRASS BASIN



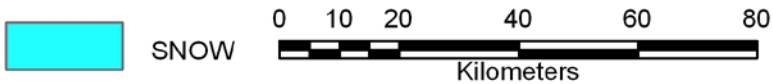
DATA USED
02 OCTOBER 2012
06 OCTOBER 2012
08 OCTOBER 2012



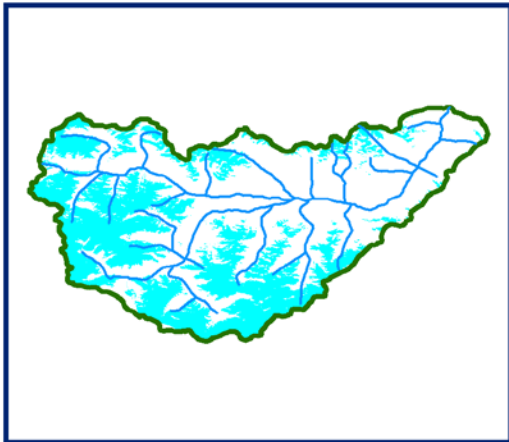
DATA USED
DATA NOT AVAILABLE



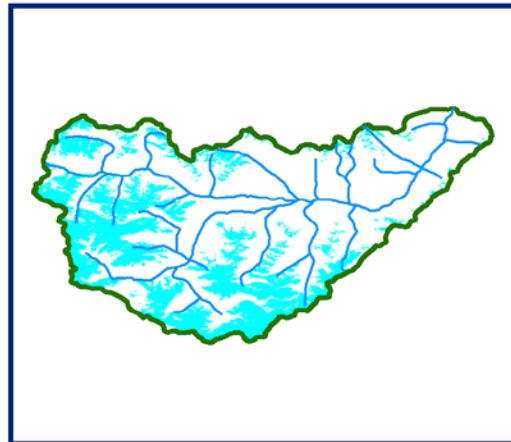
DATA USED
30 OCTOBER 2012
26 OCTOBER 2012
28 OCTOBER 2012



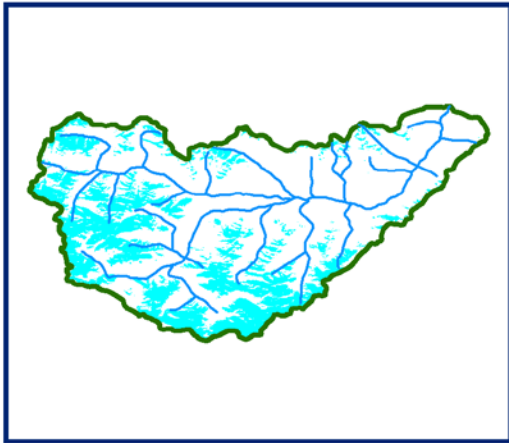
SNOW COVER MAP : DRASS BASIN



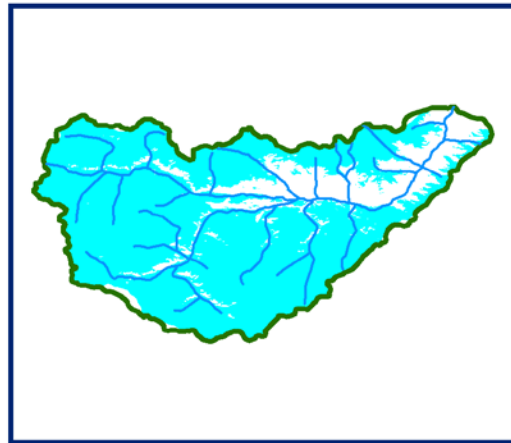
01 NOVEMBER 2012



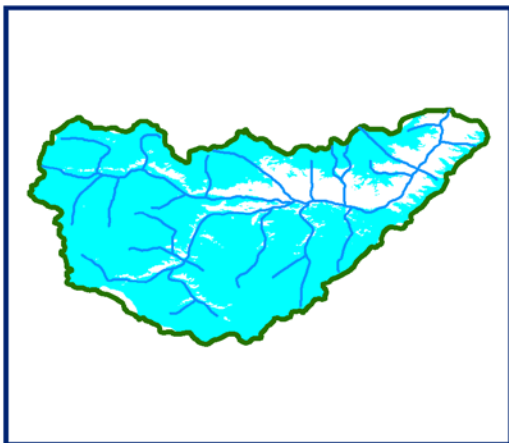
04 NOVEMBER 2012



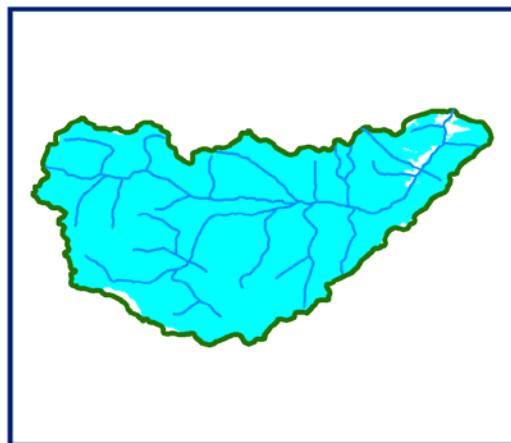
13 NOVEMBER 2012



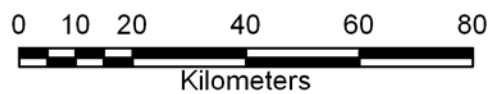
19 NOVEMBER 2012



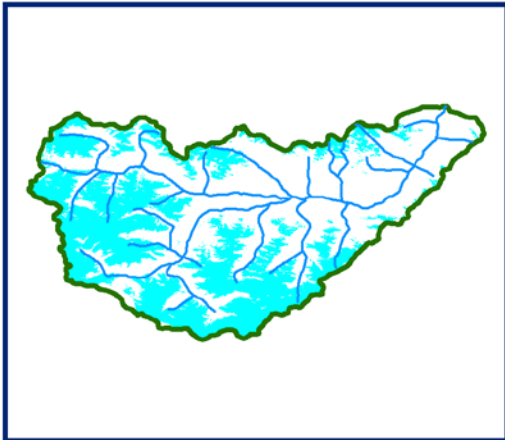
25 NOVEMBER 2012



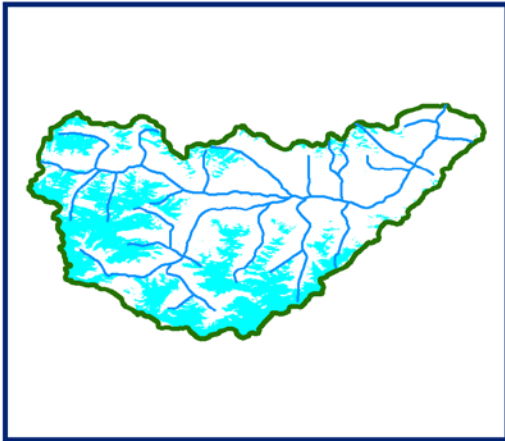
30 NOVEMBER 2012



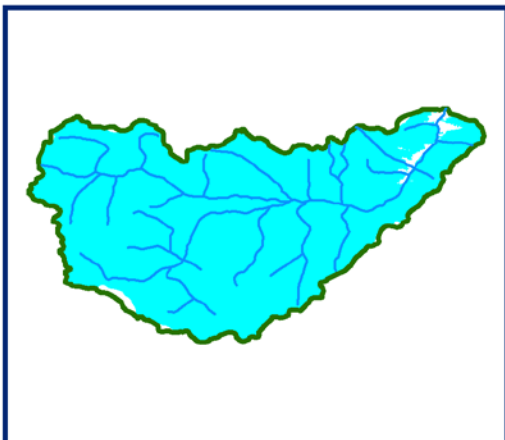
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
01 NOVEMBER 2012
04 NOVEMBER 2012
07 NOVEMBER 2012

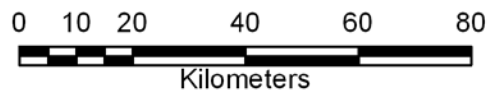


DATA USED
11 NOVEMBER 2012
14 NOVEMBER 2012
19 NOVEMBER 2012

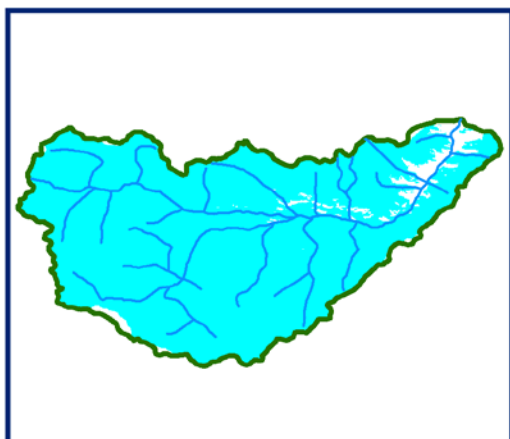


DATA USED
25 NOVEMBER 2012
30 NOVEMBER 2012

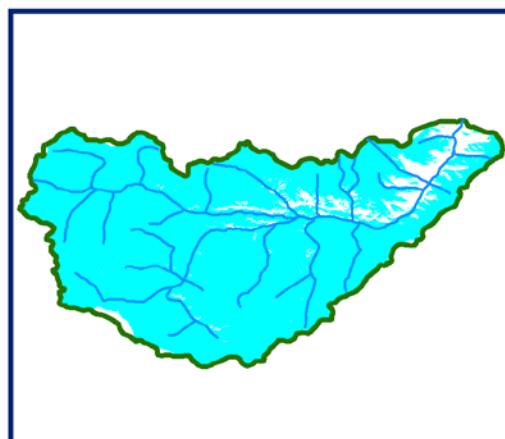
 SNOW



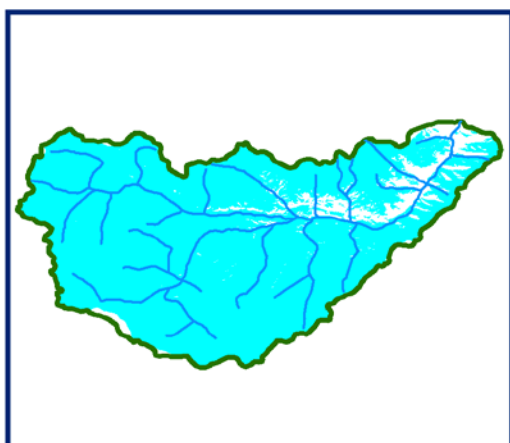
SNOW COVER MAP : DRASS BASIN



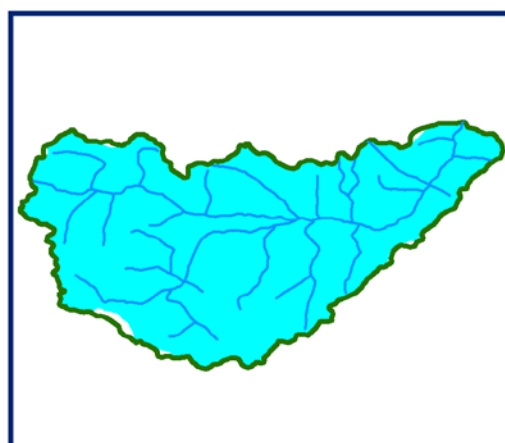
01 DECEMBER 2012



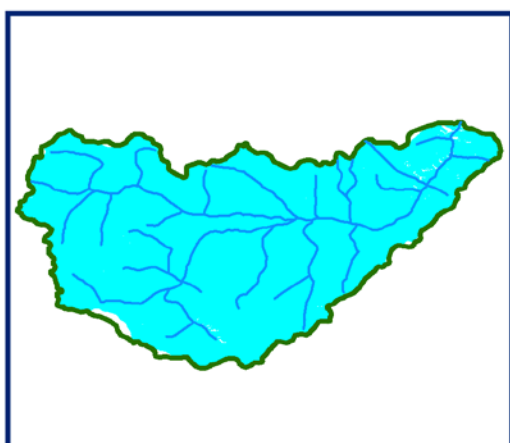
03 DECEMBER 2012



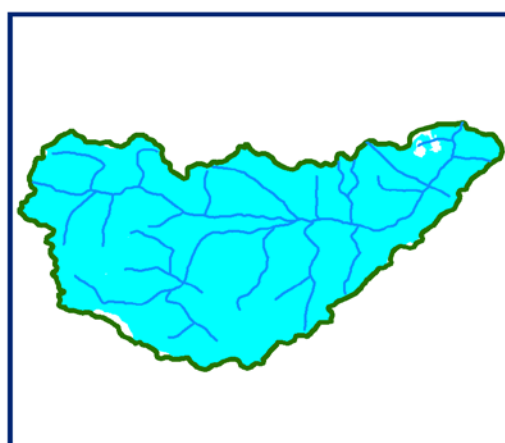
12 DECEMBER 2012



19 DECEMBER 2012



22 DECEMBER 2012



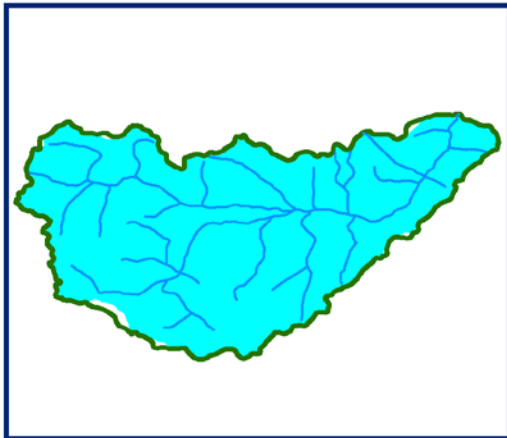
31 DECEMBER 2012



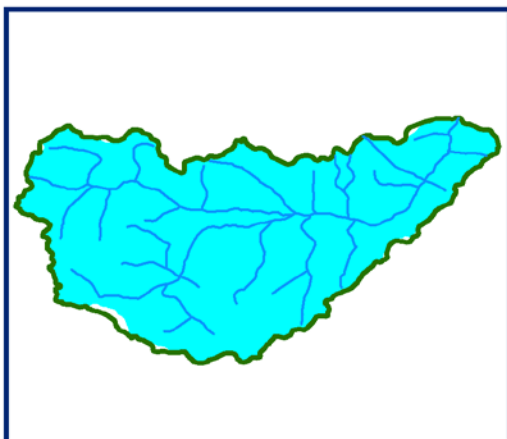
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
01 DECEMBER 2012
02 DECEMBER 2012
03 DECEMBER 2012



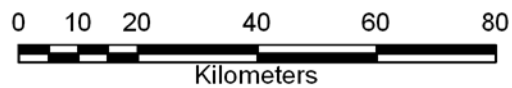
DATA USED
19 DECEMBER 2012
12 DECEMBER 2012



DATA USED
22 DECEMBER 2012
31 DECEMBER 2012



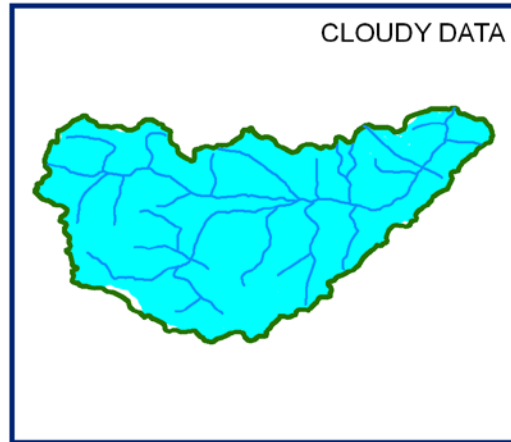
SNOW



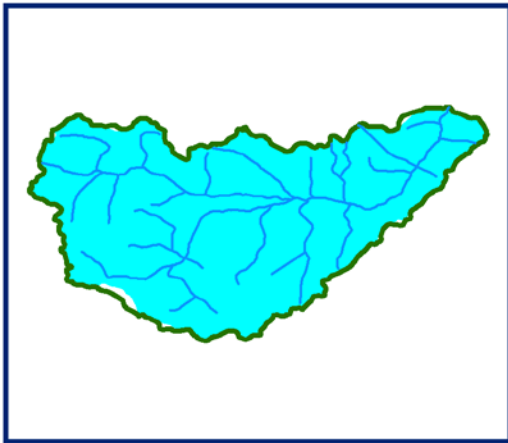
SNOW COVER MAP : DRASS BASIN



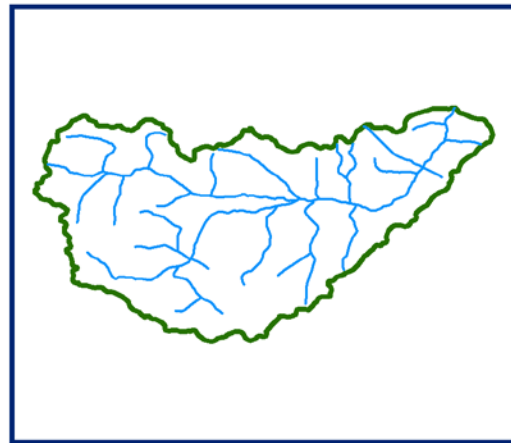
03 JANUARY 2013



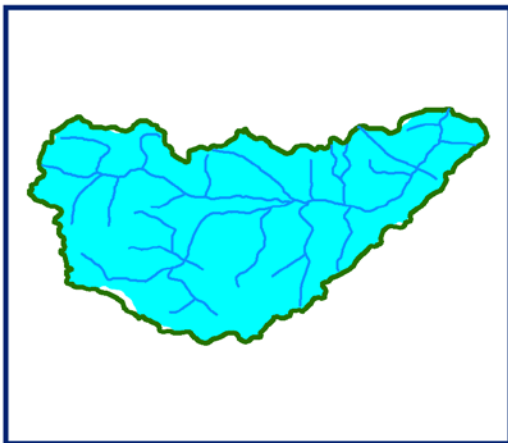
07 JANUARY 2013



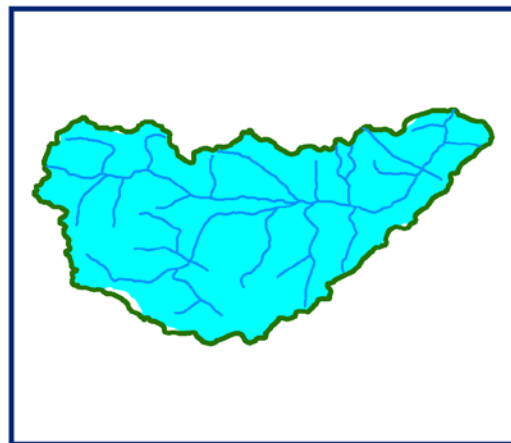
13 JANUARY 2013



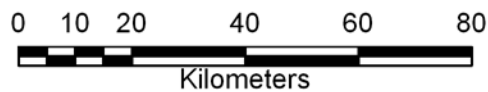
NO DATA AVAILABLE



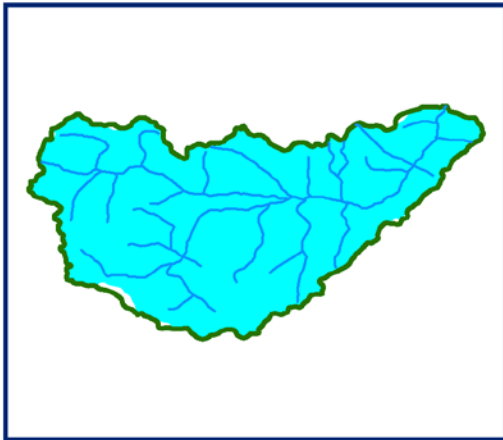
22 JANUARY 2013



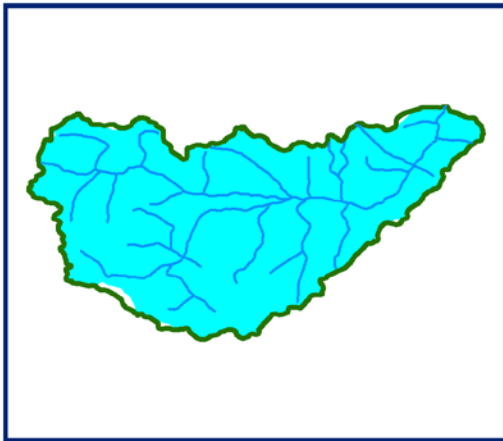
24 JANUARY 2013



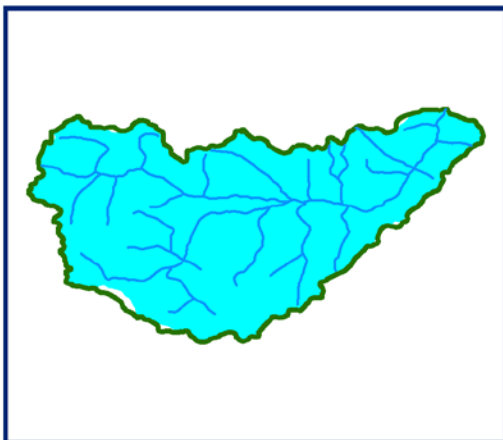
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
03 JANUARY 2013

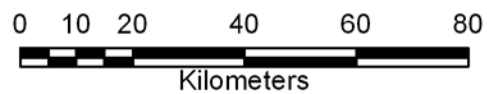


DATA USED
13 JANUARY 2013

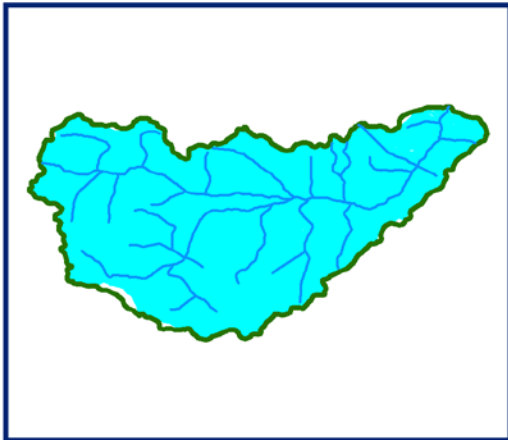


DATA USED
22 JANUARY 2013
24 JANUARY 2013

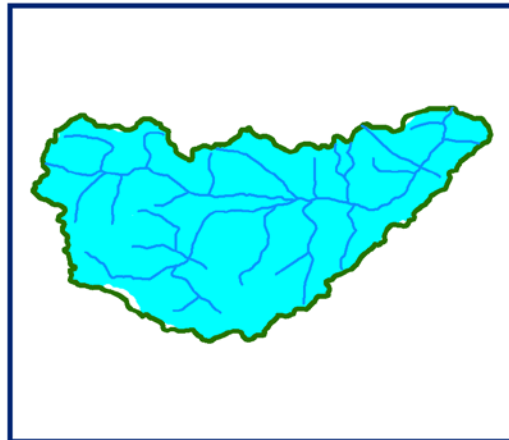
 SNOW



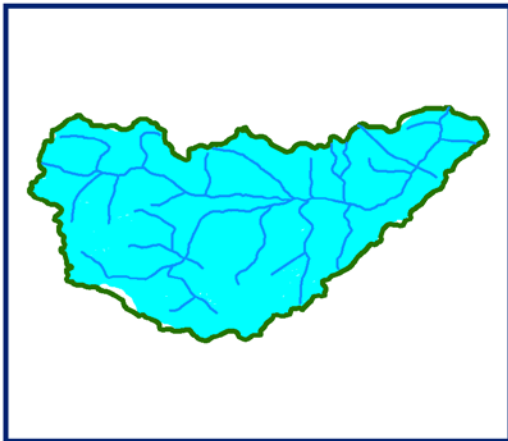
SNOW COVER MAP : DRASS BASIN



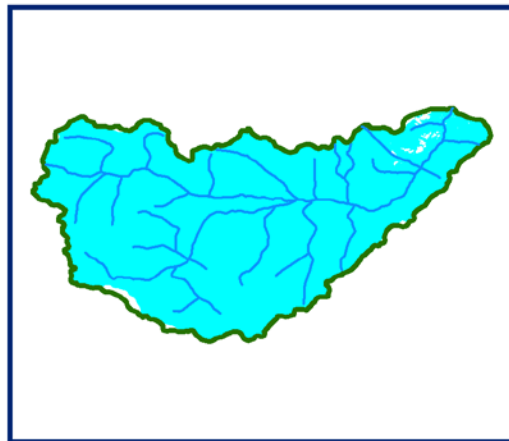
01 FEBRUARY 2013



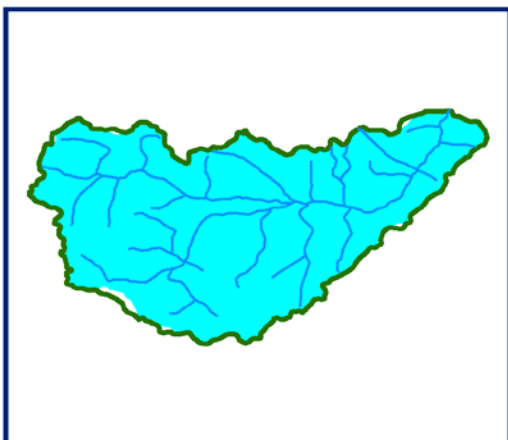
08 FEBRUARY 2013



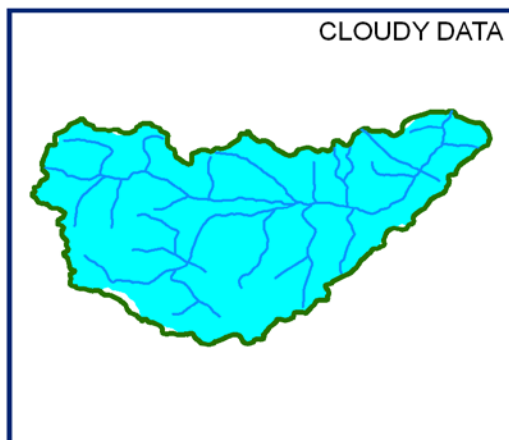
11 FEBRUARY 2013



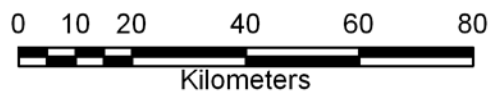
17 FEBRUARY 2013



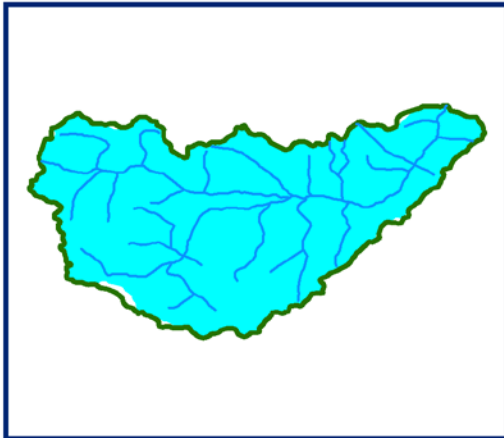
24 FEBRUARY 2013



25 FEBRUARY 2013



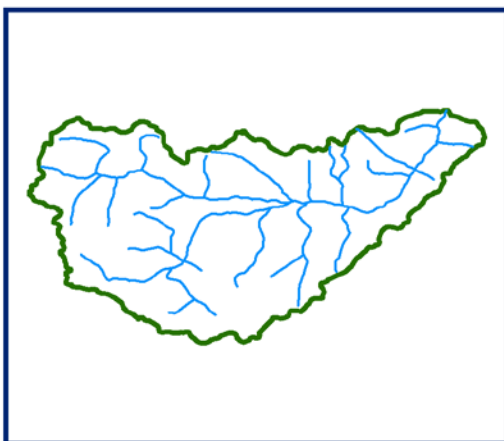
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
01 FEBRUARY 2013
08 FEBRUARY 2013

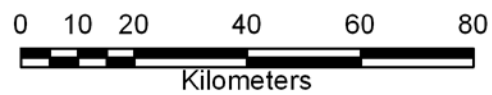


DATA USED
11 FEBRUARY 2013
17 FEBRUARY 2013



DATA USED
DATA NOT AVAILABLE

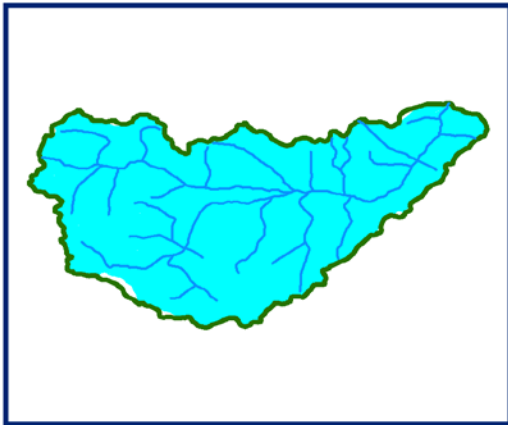
 SNOW



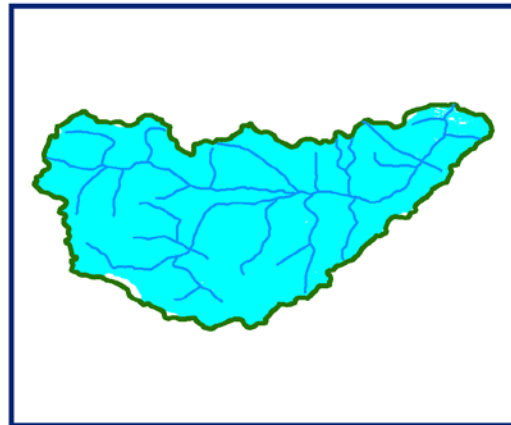
SNOW COVER MAP

:

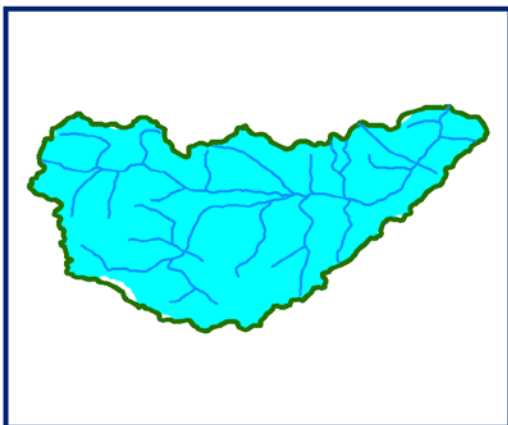
DRASS BASIN



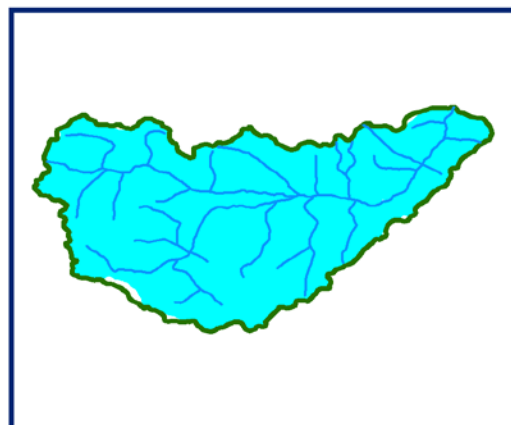
01 MARCH 2013



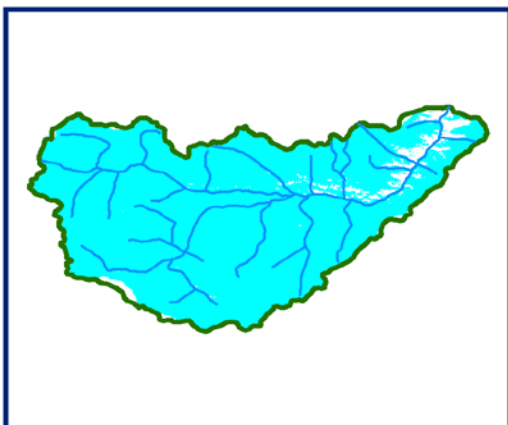
07 MARCH 2013



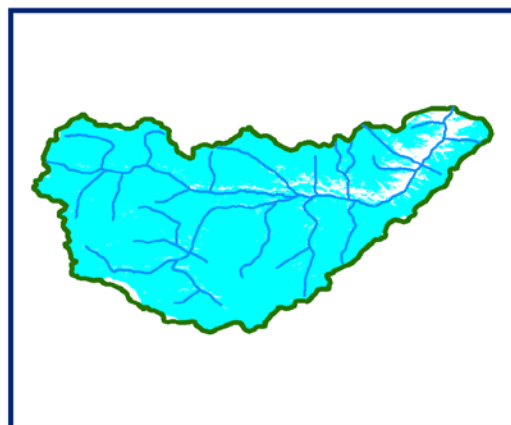
11 MARCH 2013



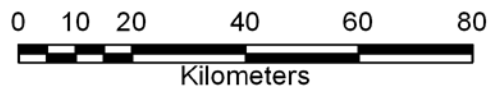
16 MARCH 2013



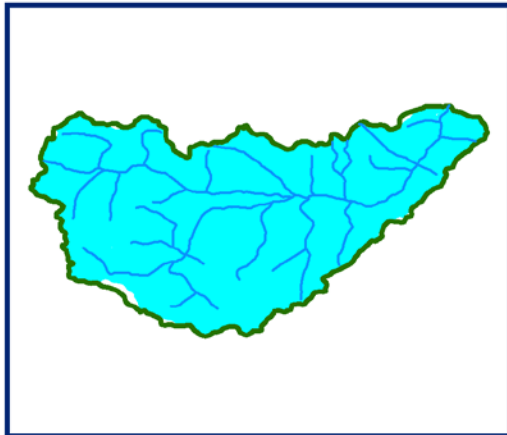
26 MARCH 2013



31 MARCH 2013



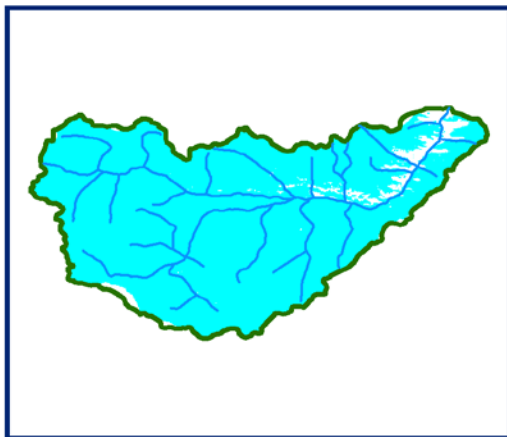
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
01 MARCH 2013
06 MARCH 2013
07 MARCH 2013

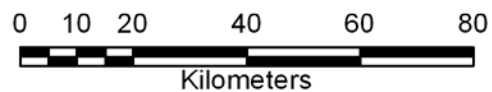


DATA USED
16 MARCH 2013



DATA USED
26 MARCH 2013
31 MARCH 2013

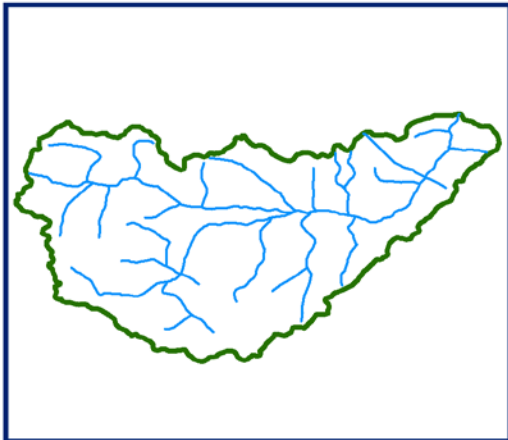
 SNOW



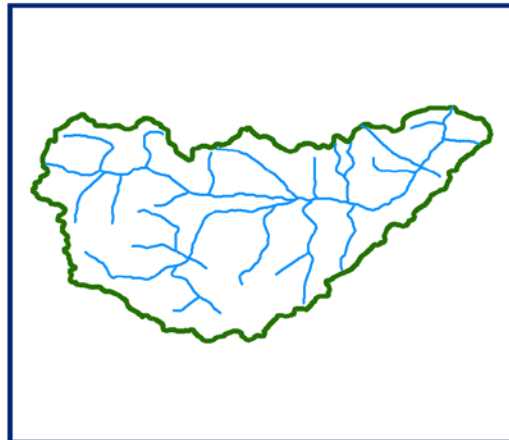
SNOW COVER MAP

:

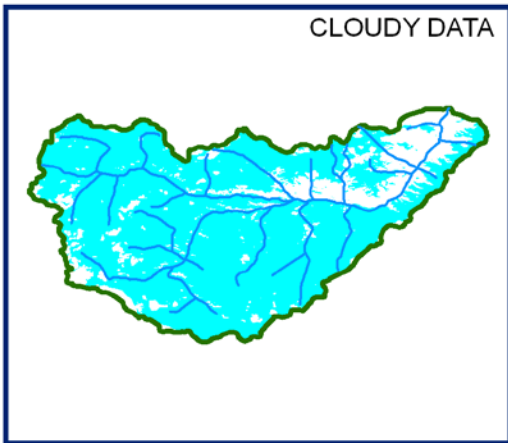
DRASS BASIN



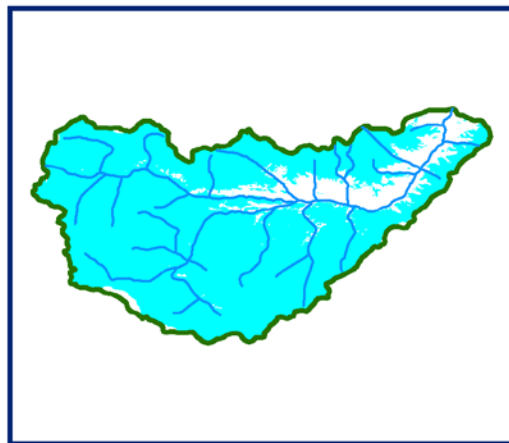
DATA NOT AVAILABLE



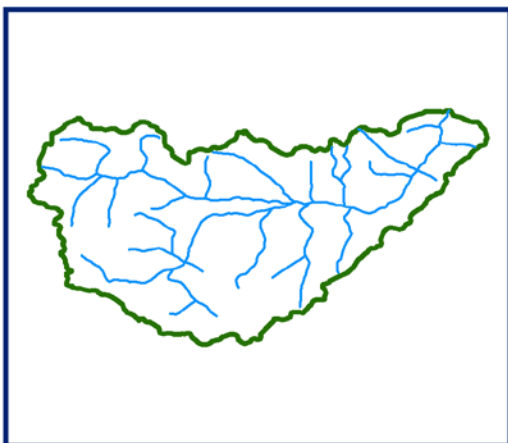
DATA NOT AVAILABLE



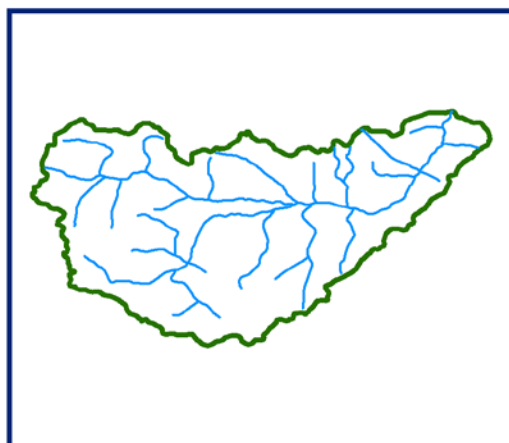
11 APRIL 2013



19 APRIL 2013



DATA NOT AVAILABLE



DATA NOT AVAILABLE



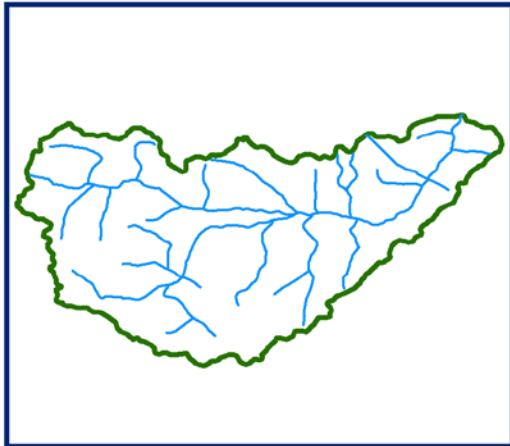
SNOW

0 10 20 40 60 80



Kilometers

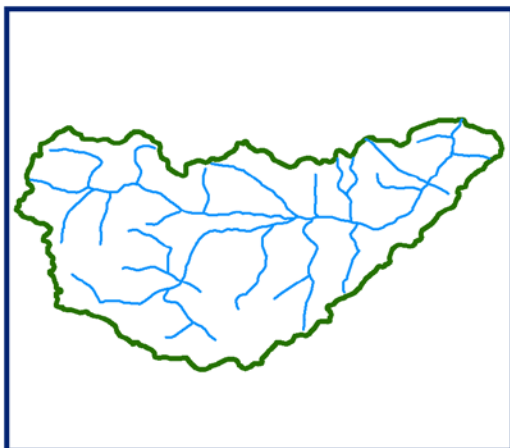
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
DATA NOT AVAILABLE



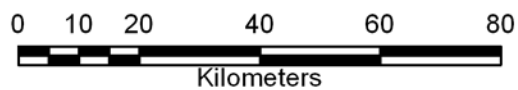
DATA USED
19 APRIL 2013
18 APRIL 2013



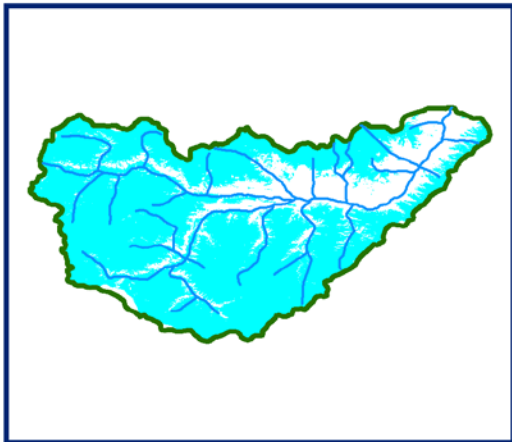
DATA USED
DATA NOT AVAILABLE



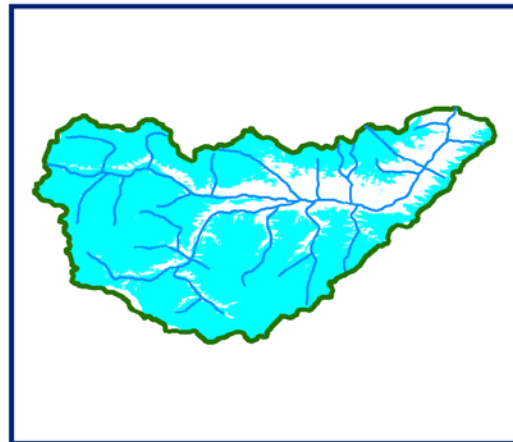
SNOW



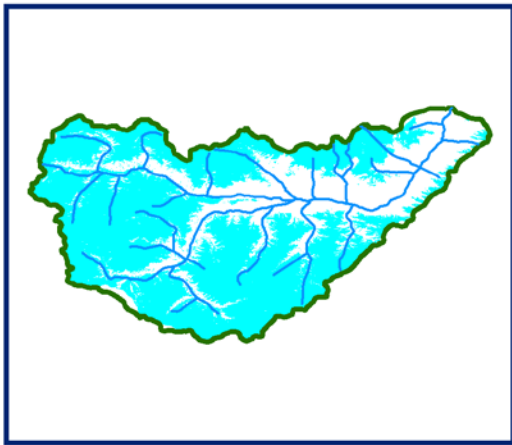
SNOW COVER MAP : DRASS BASIN



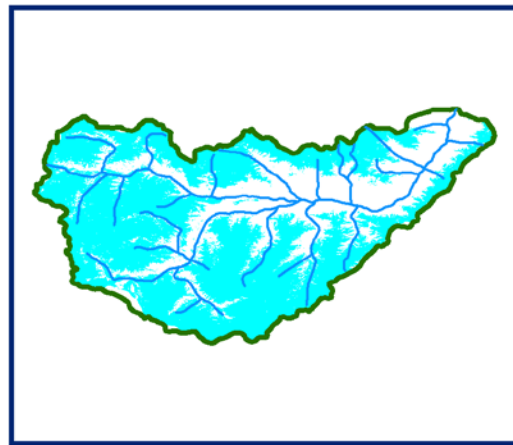
03 MAY 2013



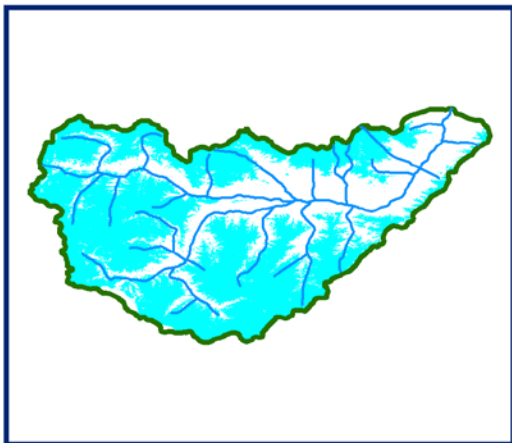
10 MAY 2013



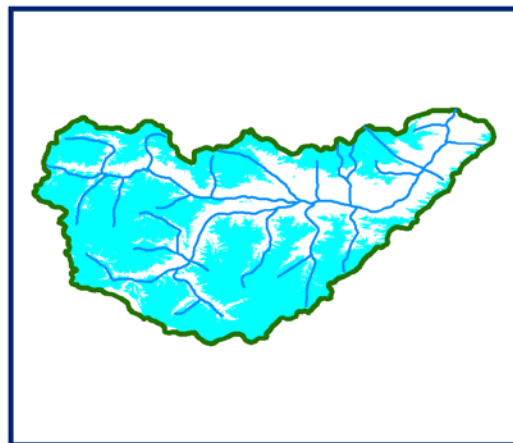
17 MAY 2013



18 MAY 2013



22 MAY 2013



24 MAY 2013



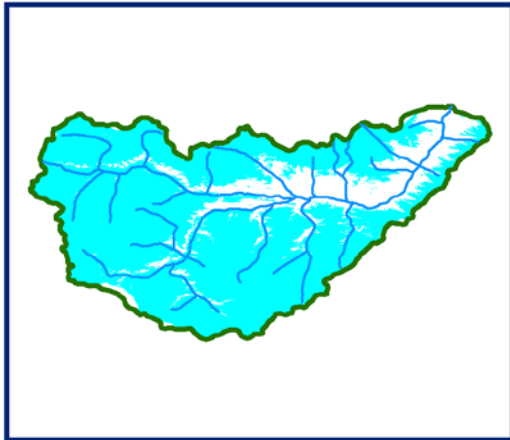
SNOW

0 10 20 40 60 80

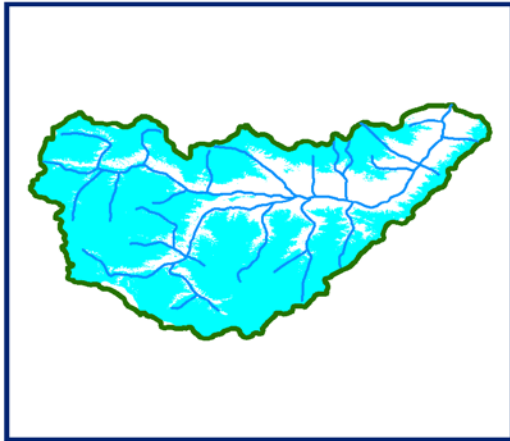


Kilometers

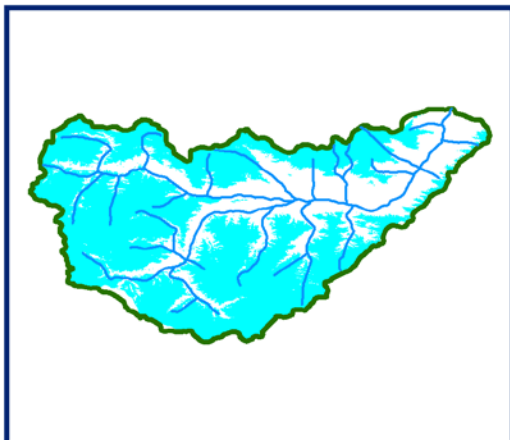
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
03 MAY 2013
10 MAY 2013

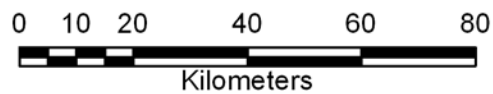


DATA USED
17 MAY 2013
18 MAY 2013

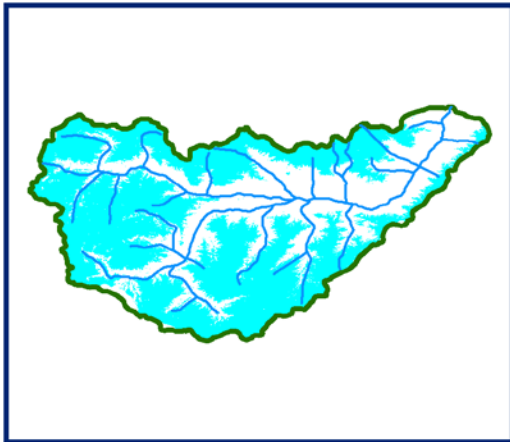


DATA USED
22 MAY 2013
24 MAY 2013

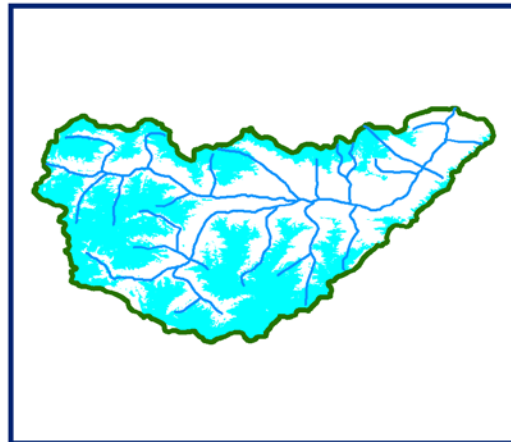
 SNOW



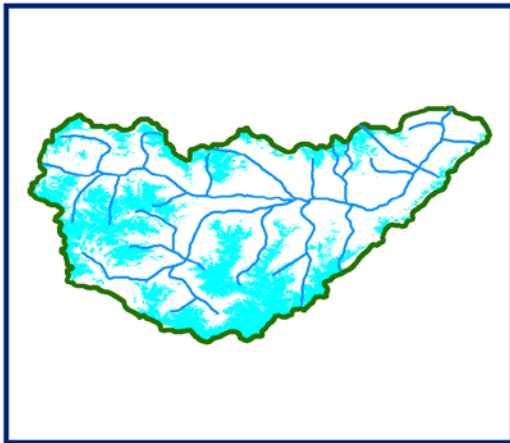
SNOW COVER MAP : DRASS BASIN



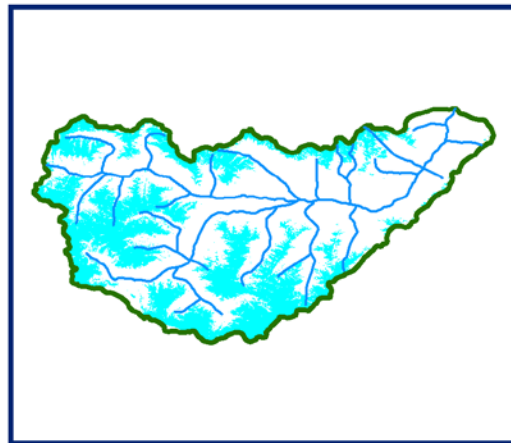
01 JUNE 2013



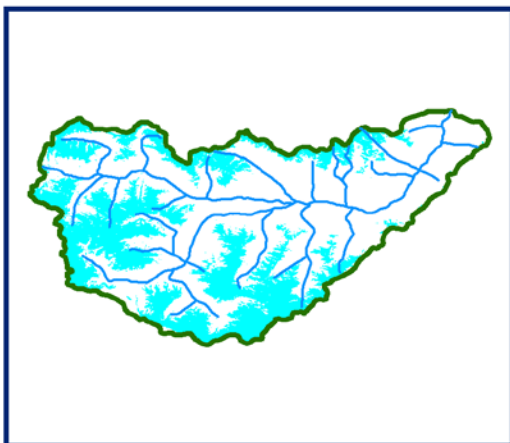
08 JUNE 2013



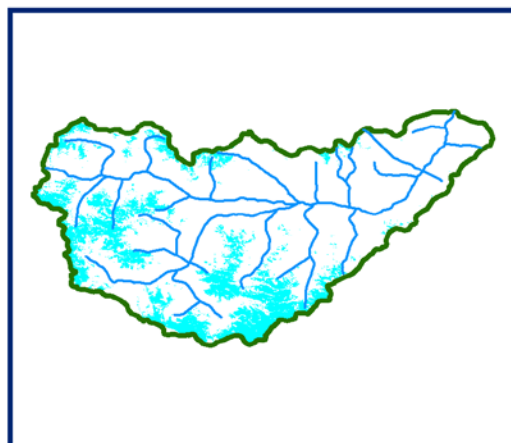
11 JUNE 2013



20 JUNE 2013



22 JUNE 2013



25 JUNE 2013



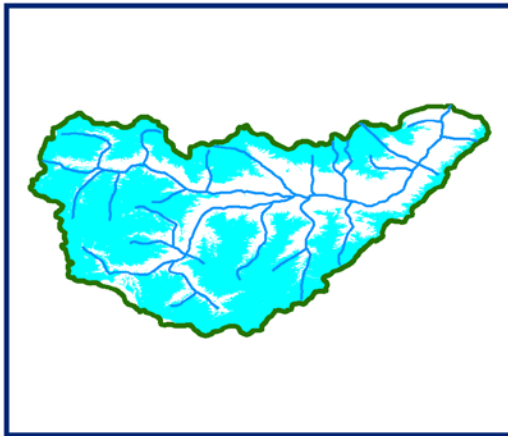
SNOW

0 10 20 40 60 80

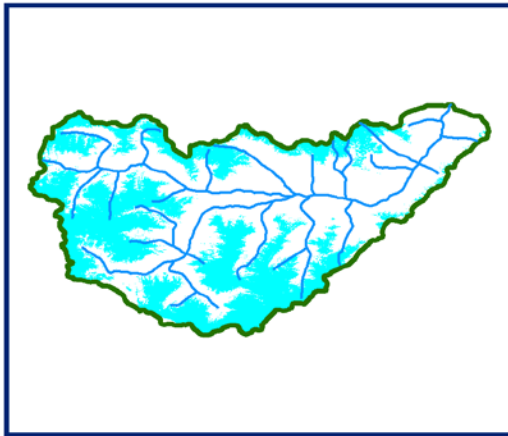


Kilometers

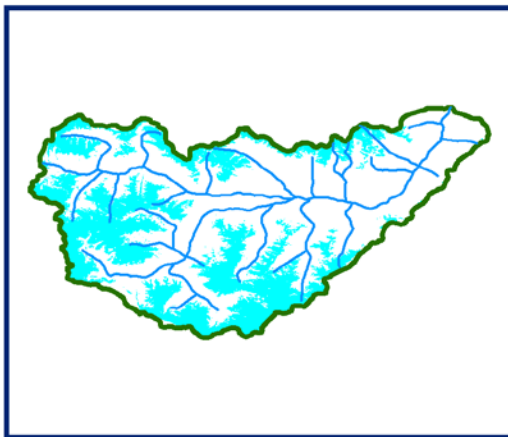
10 DAILY SNOW COVER MAP: DRASS BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013
10 JUNE 2013

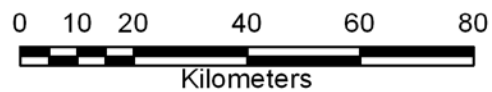


DATA USED
11 JUNE 2013
20 JUNE 2013



DATA USED
22 JUNE 2013

 SNOW



SURU BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SURU

BASIN AREA: 3575 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	1-Oct-12	1229	34	2	2-Oct-12	1126	31
3	6-Oct-12	1097	31	4	8-Oct-12	1389	39
5	18-Oct-12	1449	41	6	19-Oct-12	1551	43
7	26-Oct-12	1233	34	8	28-Oct-12	1484	42
9	30-Oct-12	1169	33	10	31-Oct-12	1110	31
November 2012							
11	1-Nov-12	1377	39	12	2-Nov-12	1283	36
13	4-Nov-12	1069	30	14	7-Nov-12	1259	35
15	11-Nov-12	1416	40	16	12-Nov-12	1246	35
17	13-Nov-12	1041	29	18	19-Nov-12	2776	78
19	25-Nov-12	2438	68	20	30-Nov-12	3360	94
December 2012							
21	1-Dec-12	3323	93	22	3-Dec-12	3112	87
23	12-Dec-12	3112	87	24	19-Dec-12	3269	91
25	22-Dec-12	3444	96	26	30-Dec-12	3505	98
27	31-Dec-12	3494	98				
January 2013							
28	13-Jan-13	3546	99	29	22-Jan-13	3559	100
30	24-Jan-13	3551	99				
February 2013							
31	1-Feb-13	3554	99	32	8-Feb-13	3554	99
33	11-Feb-13	3551	99				
March 2013							
34	1-Mar-13	3537	99	35	2-Mar-13	3553	99
36	6-Mar-13	3517	98	37	7-Mar-13	3541	99
38	19-Mar-13	3486	98	39	21-Mar-13	3320	93
40	25-Mar-13	3326	93	41	26-Mar-13	3392	95
42	31-Mar-13	3201	90				
April 2013							
43	18-Apr-13	2975	83	44	19-Apr-13	3062	86

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
45	3-May-13	2651	74	46	10-May-13	2604	73
47	13-May-13	2080	58	48	15-May-13	2243	63
49	17-May-13	2369	66	50	18-May-13	2243	63
51	22-May-13	2135	60	52	23-May-13	2047	57
53	24-May-13	2191	61				
June 2013							
54	1-Jun-13	2455	69	55	5-Jun-13	1861	52
56	8-Jun-13	1806	51	57	10-Jun-13	1609	45
58	11-Jun-13	1368	38	59	20-Jun-13	1423	40
60	22-Jun-13	1403	39	61	25-Jun-13	950	27

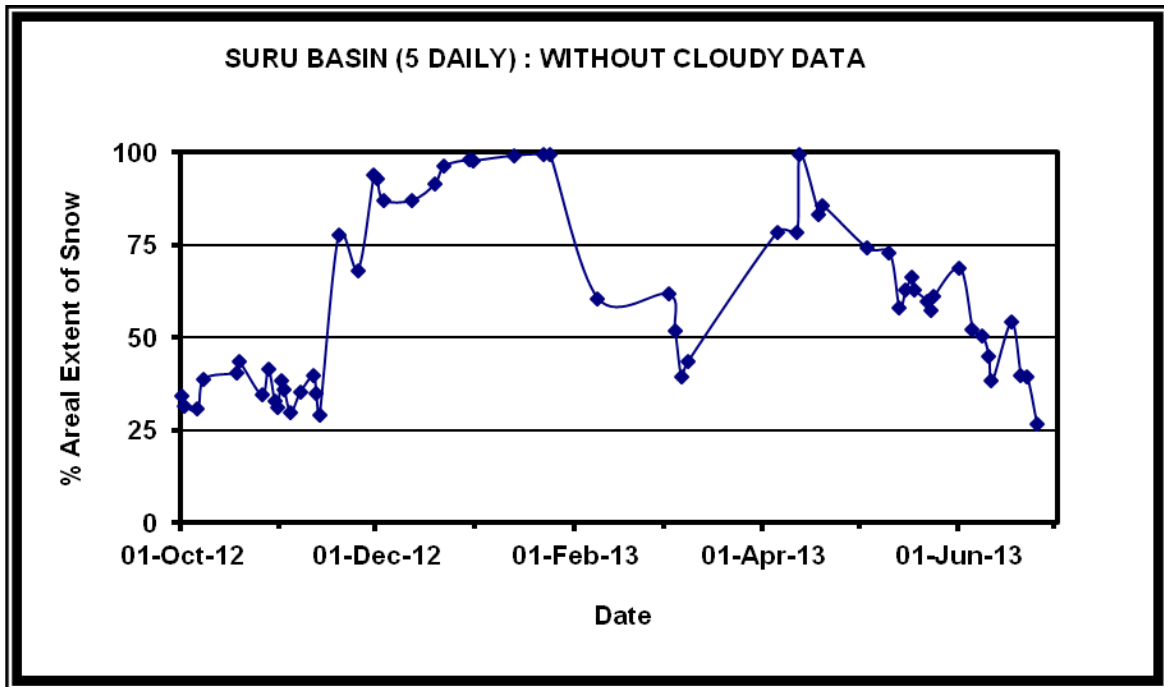
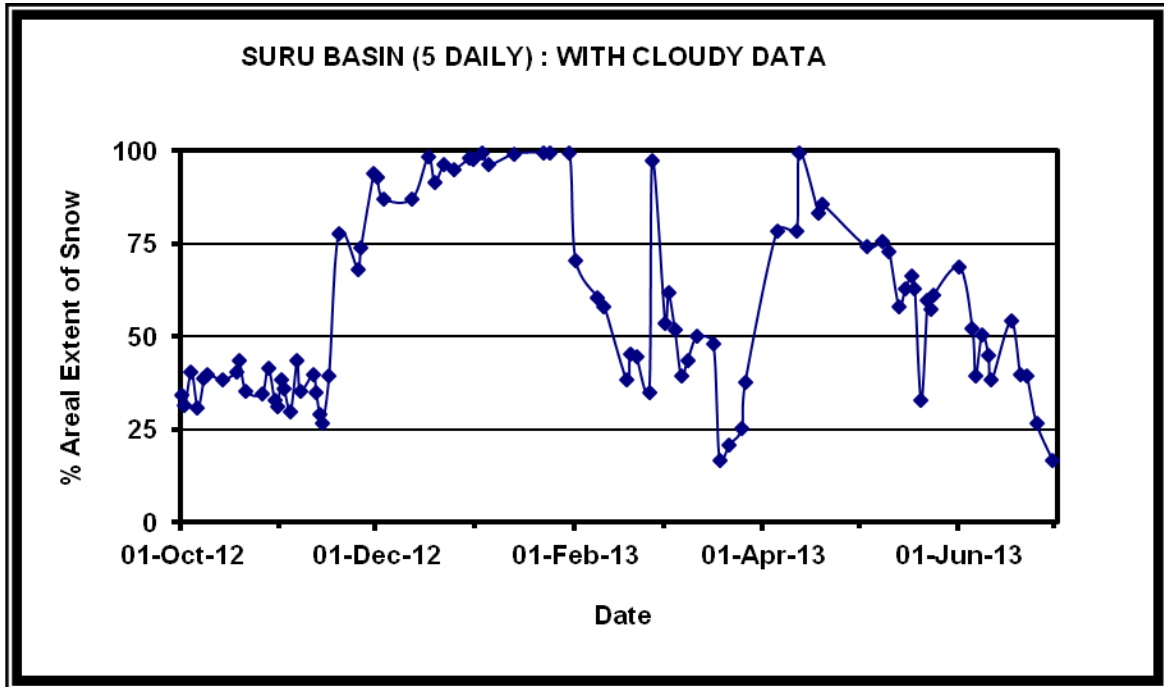
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: SURU

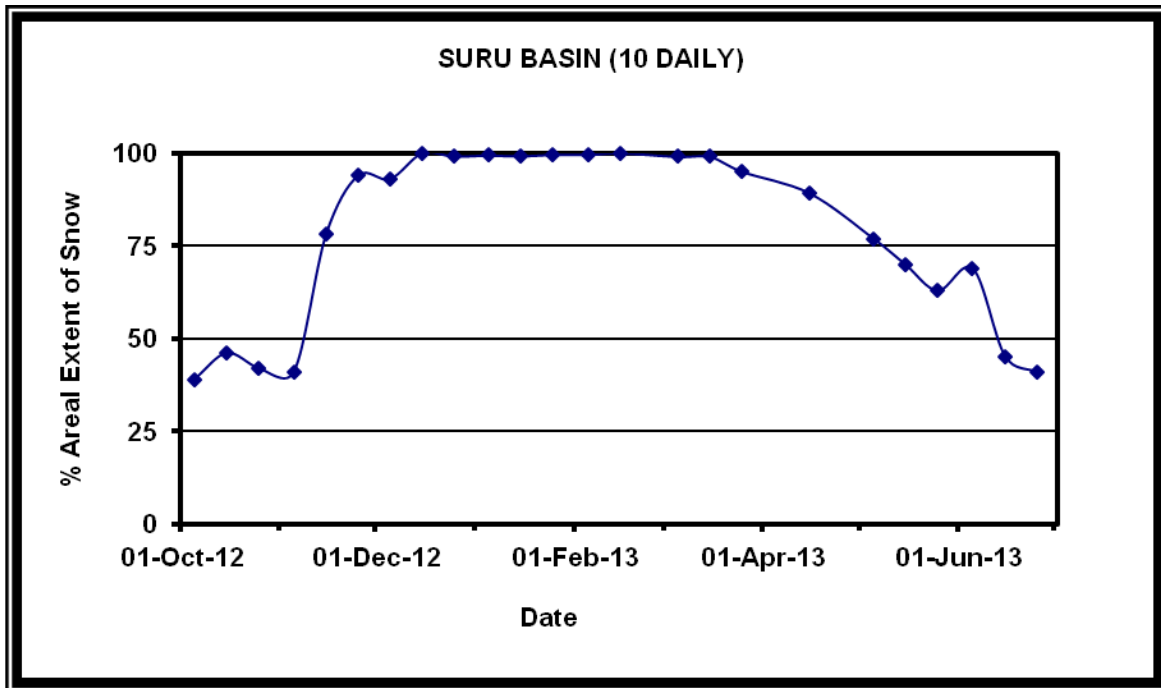
BASIN AREA: 3575 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	1394	39	2	15-Oct-12	1646	46
3	25-Oct-12	1501	42				
November 2012							
4	5-Nov-12	1465	41	5	15-Nov-12	2789	78
6	25-Nov-12	3361	94				
December 2012							
7	5-Dec-12	3327	93	8	15-Dec-12	3575	100
9	25-Dec-12	3545	99				
January 2013							
10	5-Jan-13	3546	99	10	15-Jan-13	3546	99
11	25-Jan-13	3561	100				
February 2013							
12	5-Feb-13	3560	100	13	15-Feb-13	3551	99
March 2013							
14	5-Mar-13	3541	99	15	15-Mar-13	3539	99
16	31-Mar-13	3396	95				
April 2013							
17	15-Apr-13	3189	89				
May 2013							
18	5-May-13	2749	77	19	15-May-13	2498	70
20	25-May-13	2249	63				
June 2013							
21	5-Jun-13	2459	69	22	15-Jun-13	1615	45
23	25-Jun-13	1462	41				

Snow cover depletion curve



Snow cover depletion curve

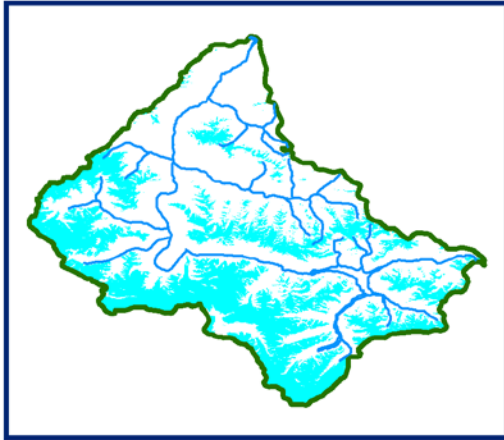


SNOW COVER MAP

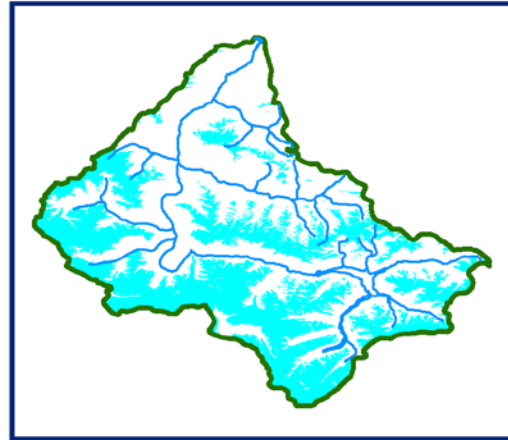
SNOW COVER MAP

:

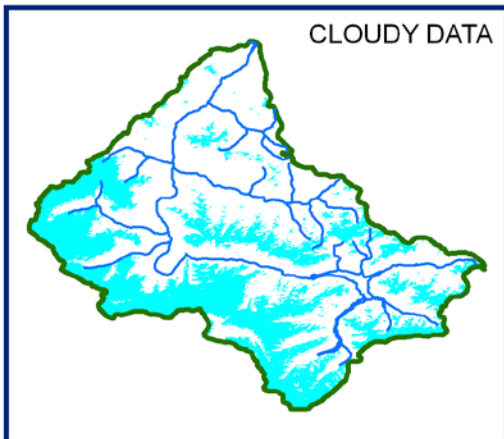
SURU BASIN



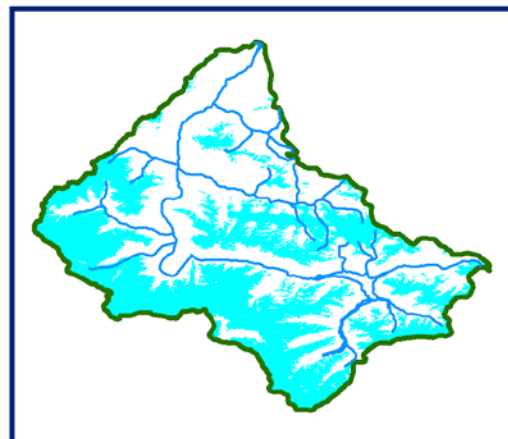
01 OCTOBER 2012



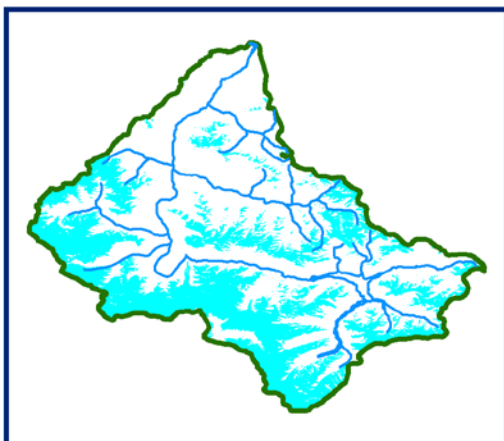
08 OCTOBER 2012



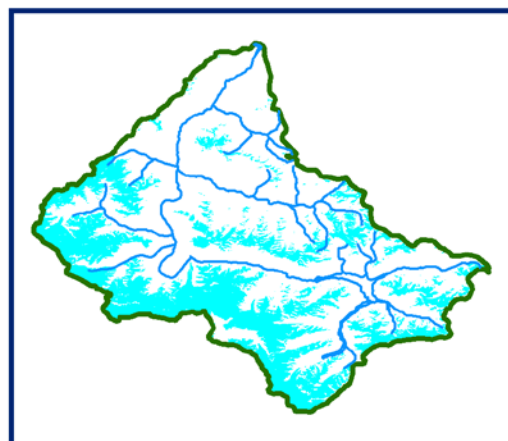
14 OCTOBER 2012



19 OCTOBER 2012



26 OCTOBER 2012



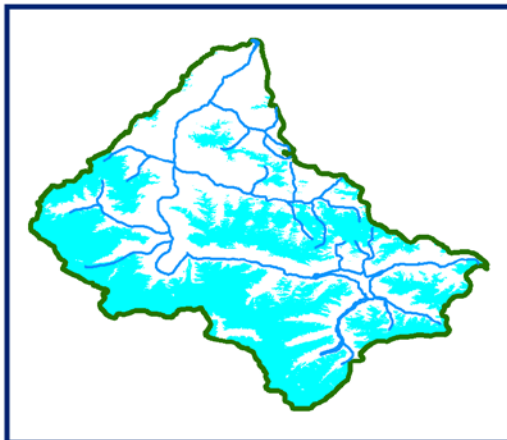
31 OCTOBER 2012



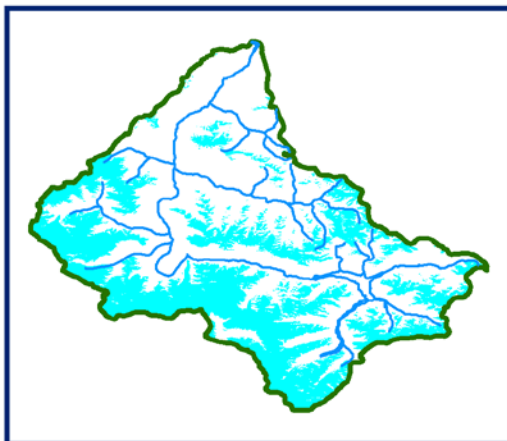
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 OCTOBER 2012
06 OCTOBER 2012
08 OCTOBER 2012



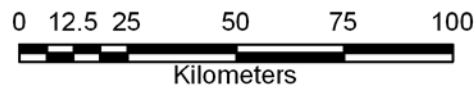
DATA USED
18 OCTOBER 2012
19 OCTOBER 2012



DATA USED
30 OCTOBER 2012
26 OCTOBER 2012
31 OCTOBER 2012

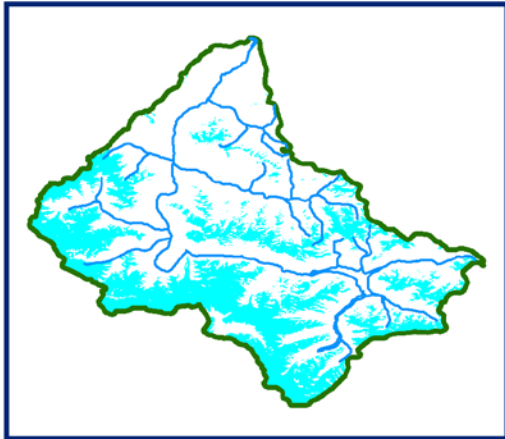


SNOW

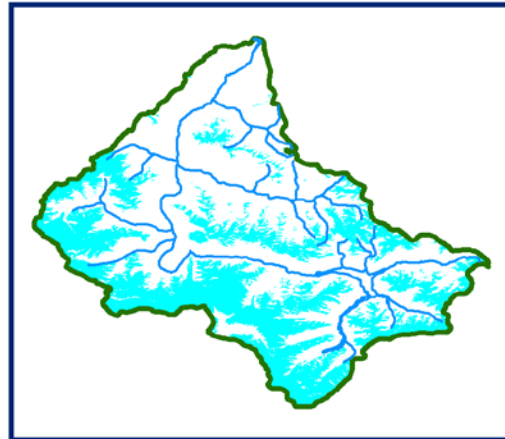


Kilometers

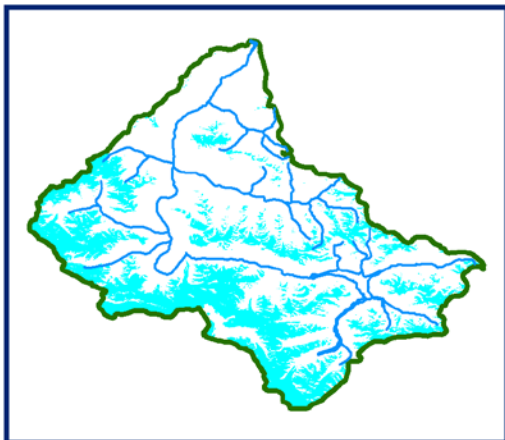
SNOW COVER MAP : SURU BASIN



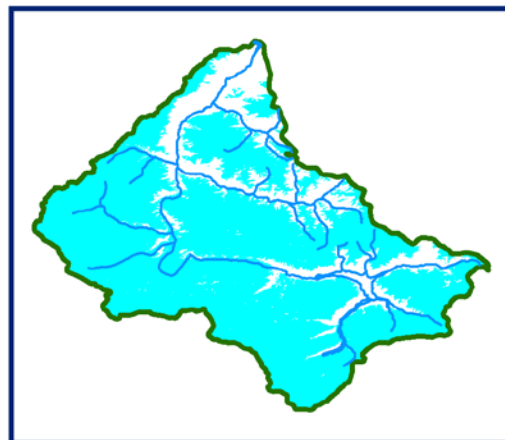
02 NOVEMBER 2012



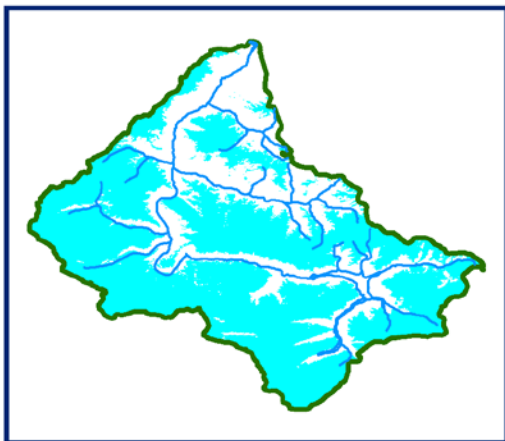
07 NOVEMBER 2012



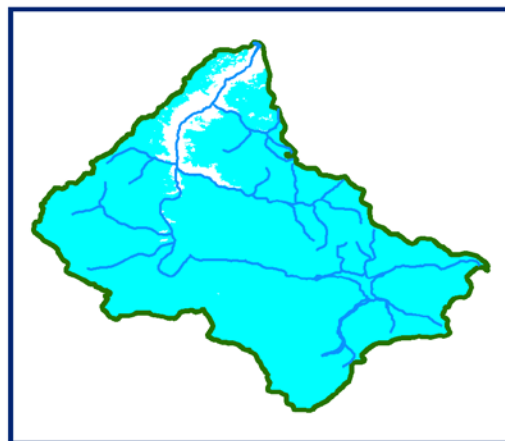
13 NOVEMBER 2012



19 NOVEMBER 2012



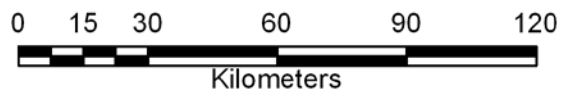
25 NOVEMBER 2012



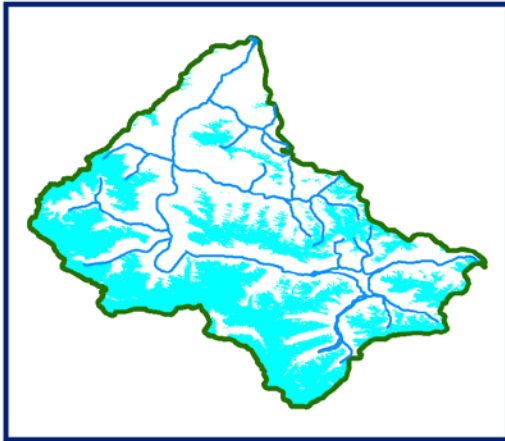
30 NOVEMBER 2012



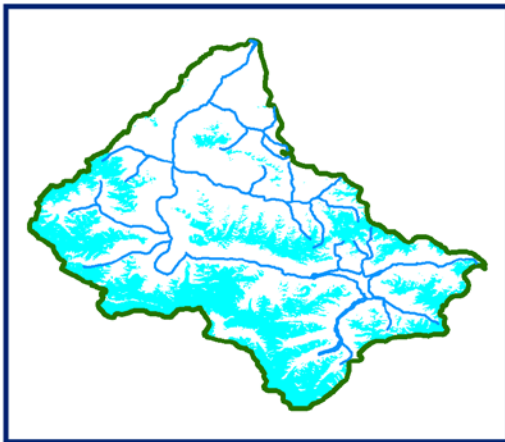
SNOW



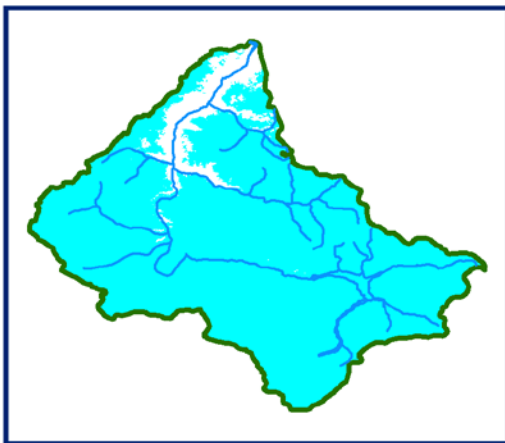
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 NOVEMBER 2012
04 NOVEMBER 2012
07 NOVEMBER 2012



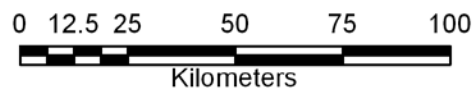
DATA USED
11 NOVEMBER 2012
13 NOVEMBER 2012
19 NOVEMBER 2012



DATA USED
25 NOVEMBER 2012
30 NOVEMBER 2012



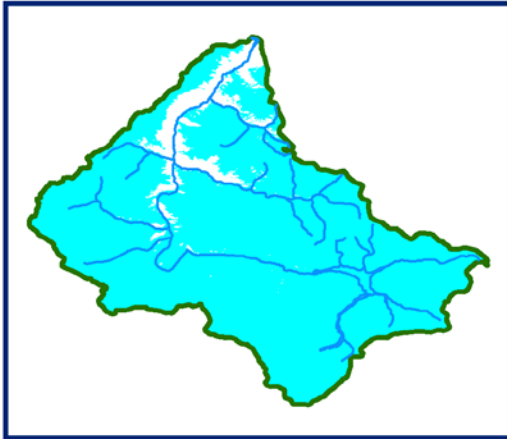
SNOW



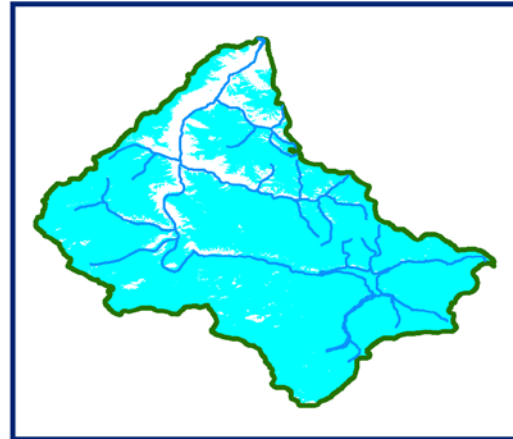
SNOW COVER MAP

:

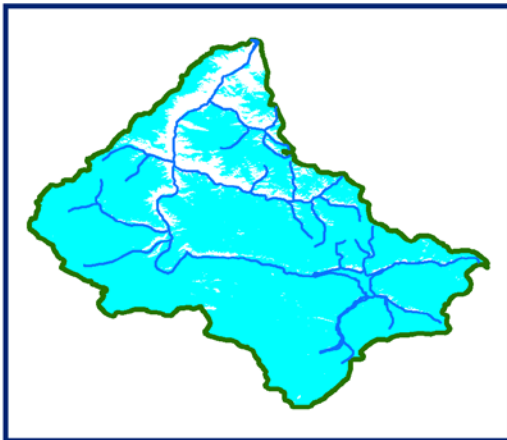
SURU BASIN



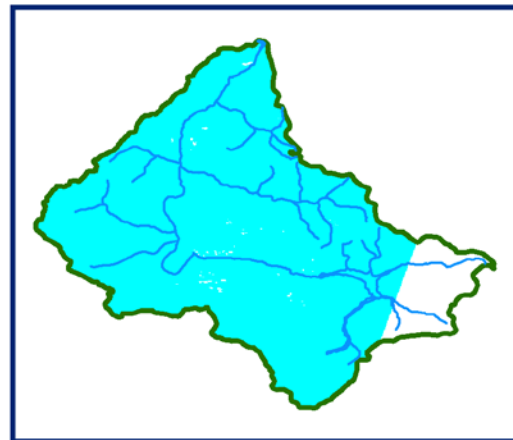
01 DECEMBER 2012



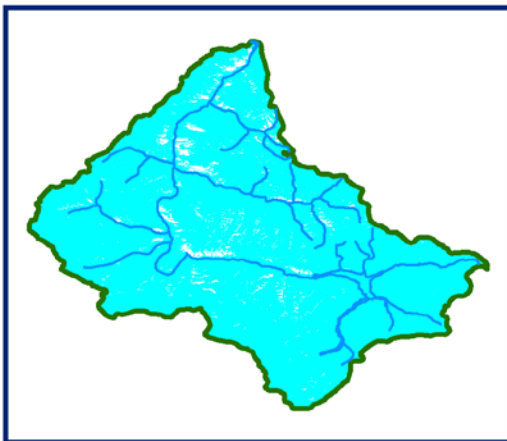
03 DECEMBER 2012



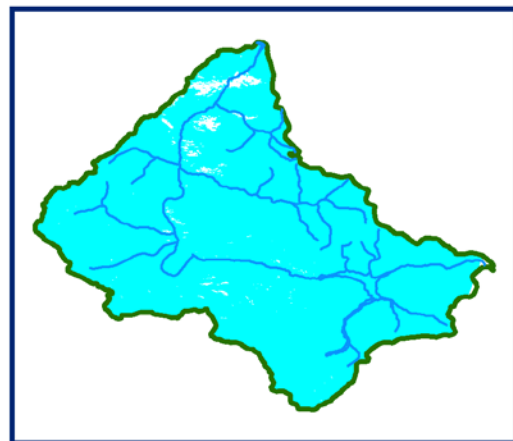
12 DECEMBER 2012



19 DECEMBER 2012



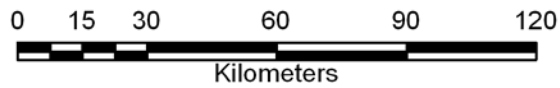
22 DECEMBER 2012



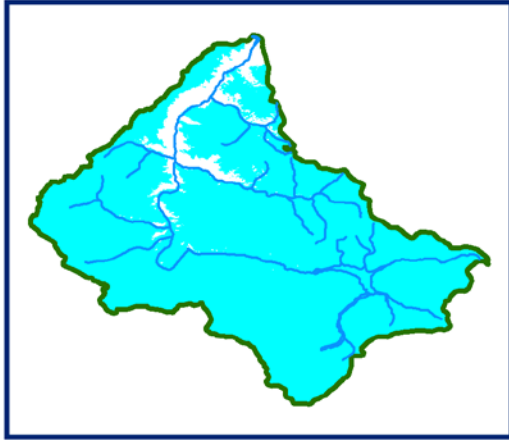
31 DECEMBER 2012



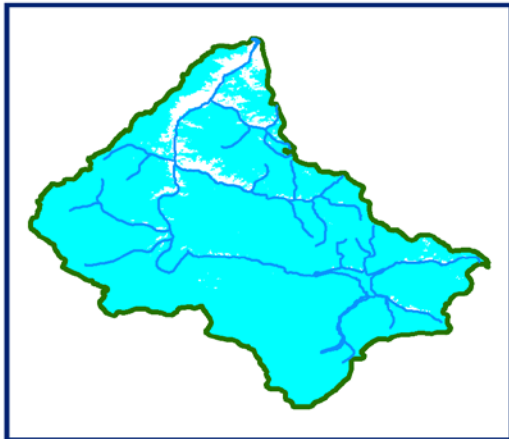
SNOW



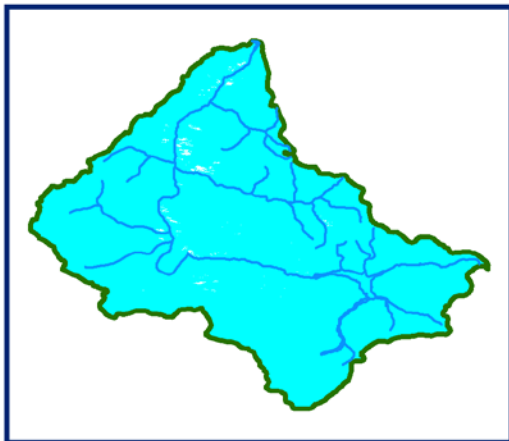
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 DECEMBER 2012
03 DECEMBER 2012



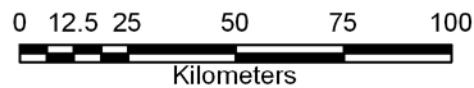
DATA USED
12 DECEMBER 2012
19 DECEMBER 2012



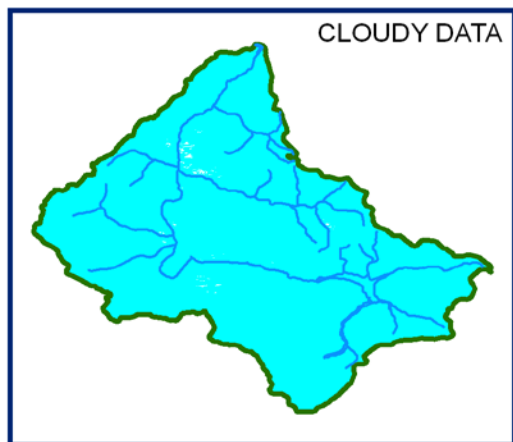
DATA USED
22 DECEMBER 2012
30 DECEMBER 2012
31 DECEMBER 2012



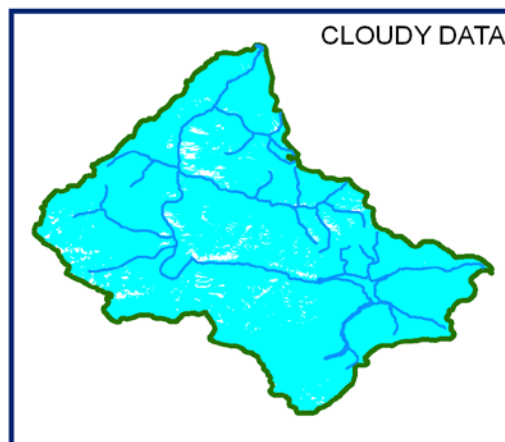
SNOW



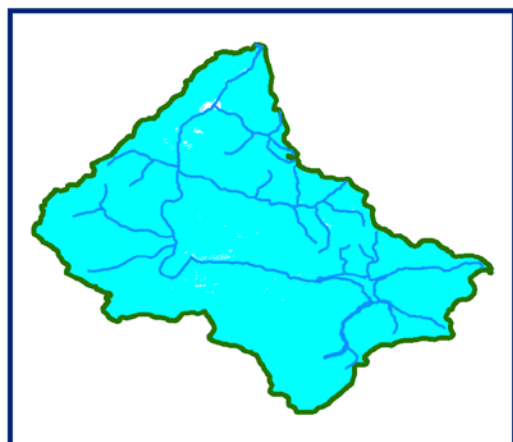
SNOW COVER MAP : SURU BASIN



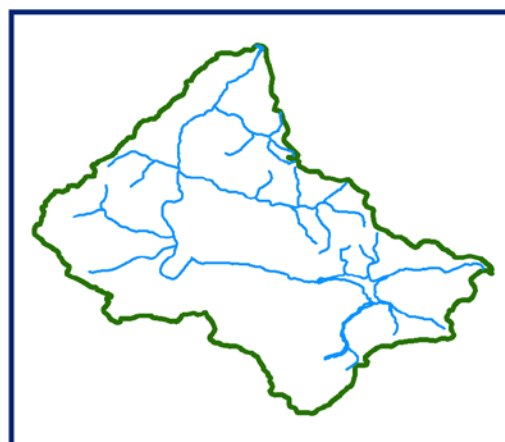
03 JANUARY 2013



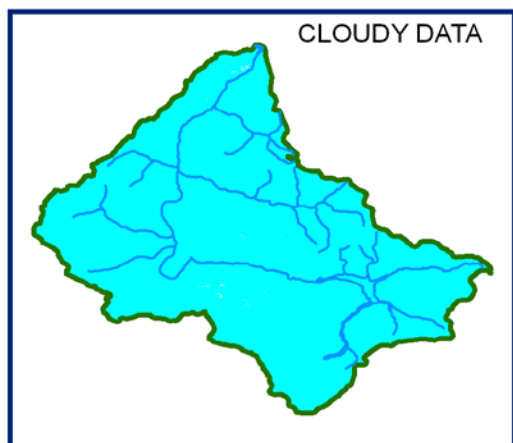
05 JANUARY 2013



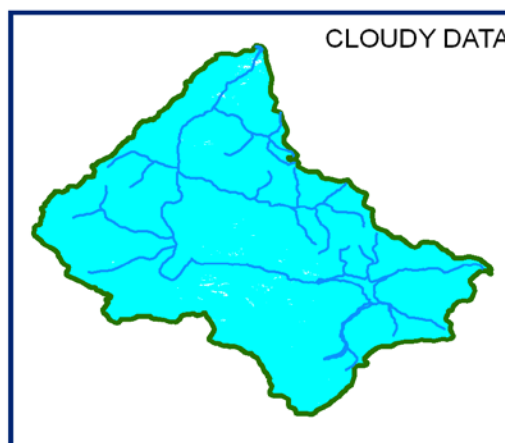
13 JANUARY 2013



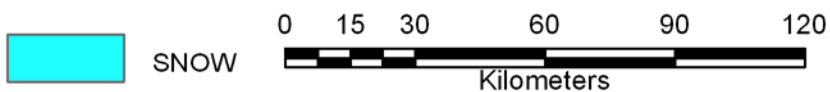
NO DATA AVAILABLE



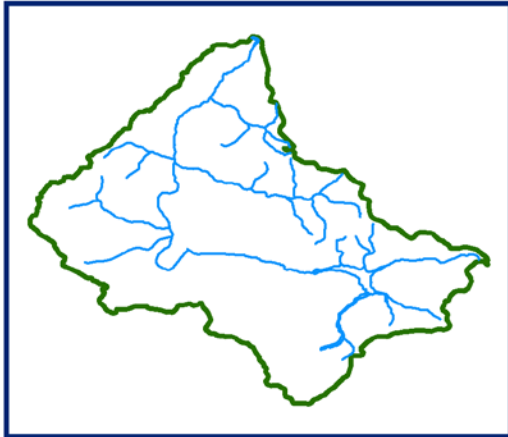
22 JANUARY 2013



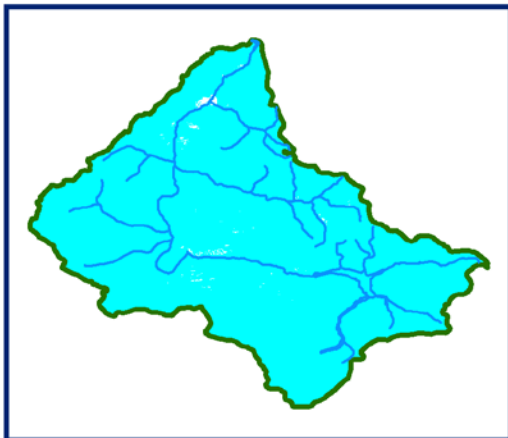
24 JANUARY 2013



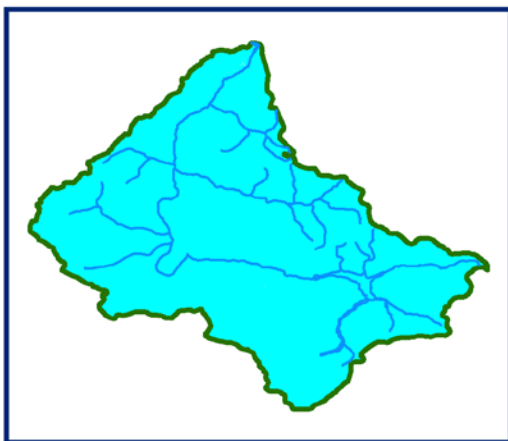
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
DATA NOT AVAILABLE



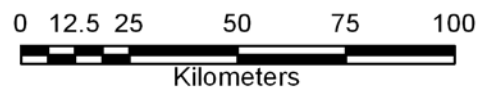
DATA USED
13 JANUARY 2013



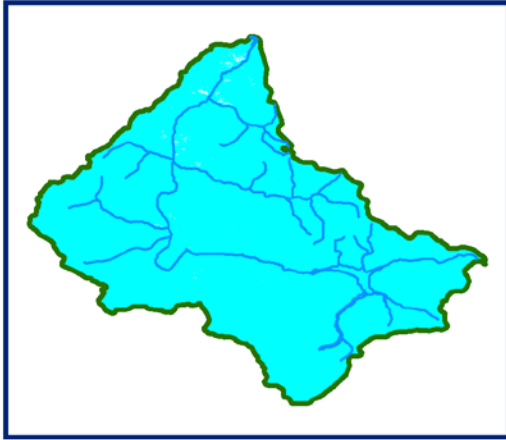
DATA USED
22 JANUARY 2013
24 JANUARY 2013



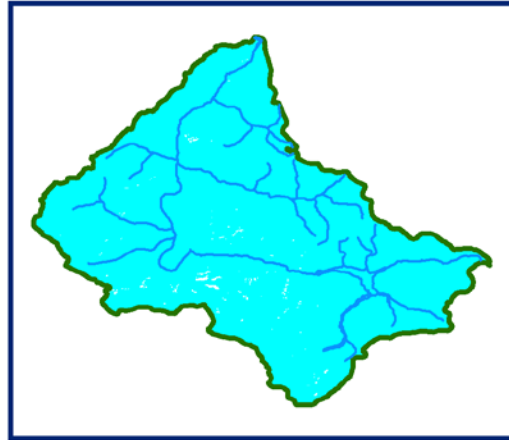
SNOW



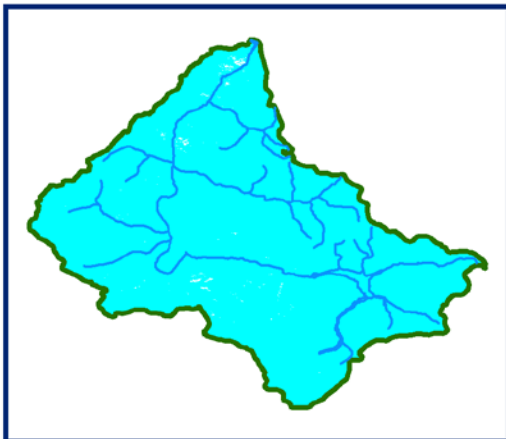
SNOW COVER MAP : SURU BASIN



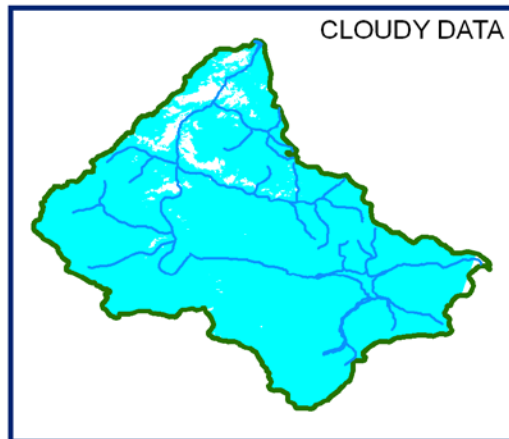
01 FEBRUARY 2013



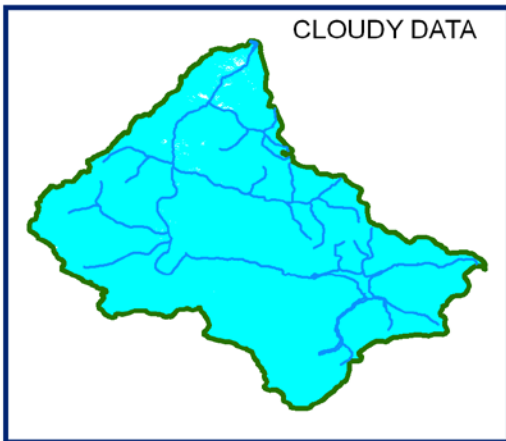
08 FEBRUARY 2013



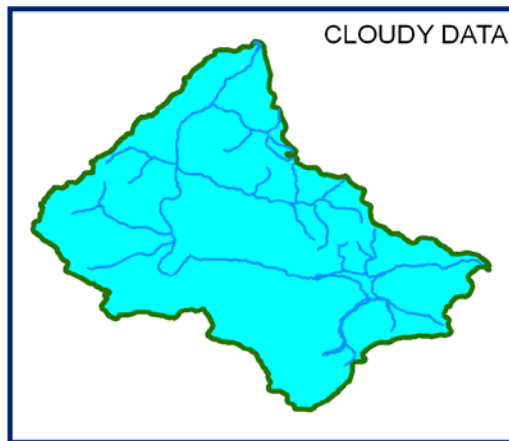
11 FEBRUARY 2013



17 FEBRUARY 2013



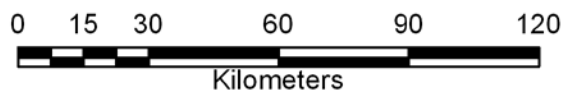
20 FEBRUARY 2013



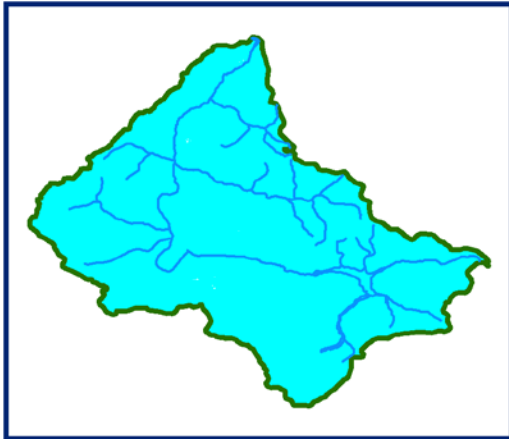
25 FEBRUARY 2013



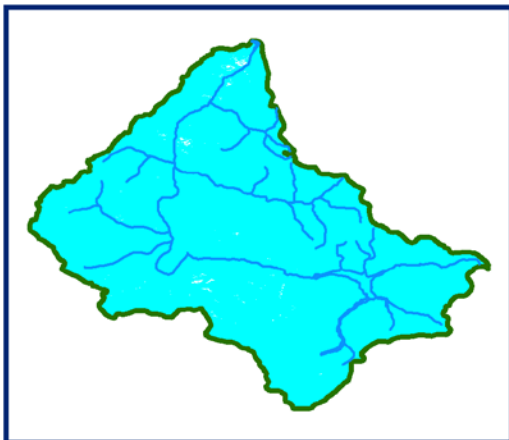
SNOW



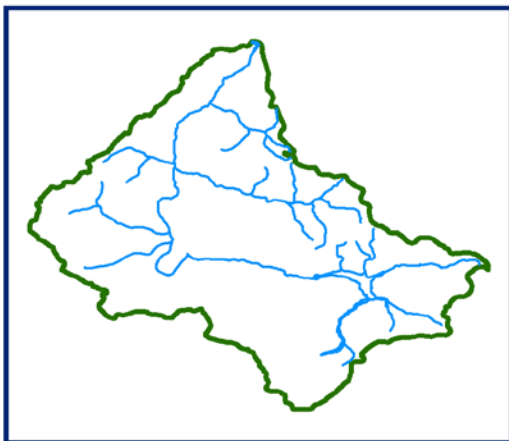
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 FEBRUARY 2013
08 FEBRUARY 2013



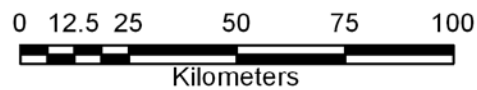
DATA USED
11 FEBRUARY 2013



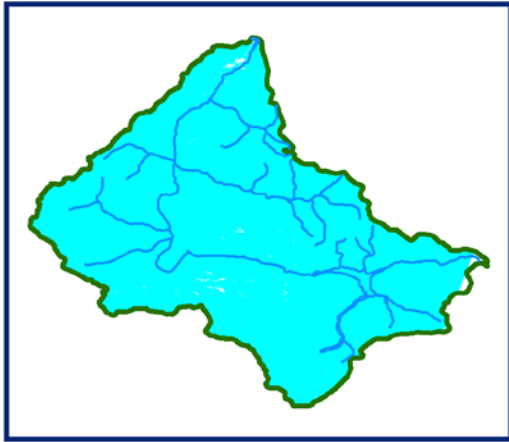
DATA USED
DATA NOT AVAILABLE



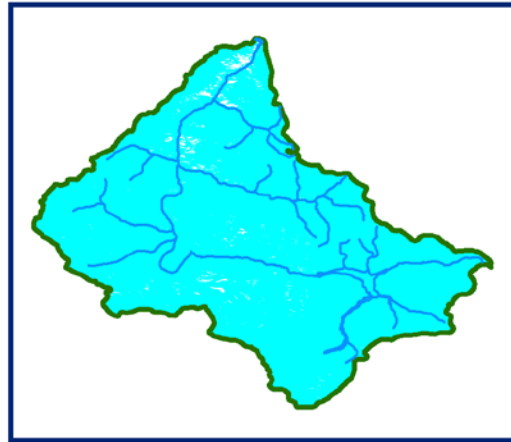
SNOW



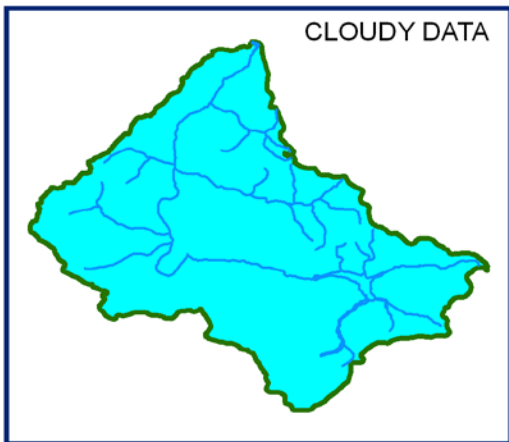
SNOW COVER MAP : SURU BASIN



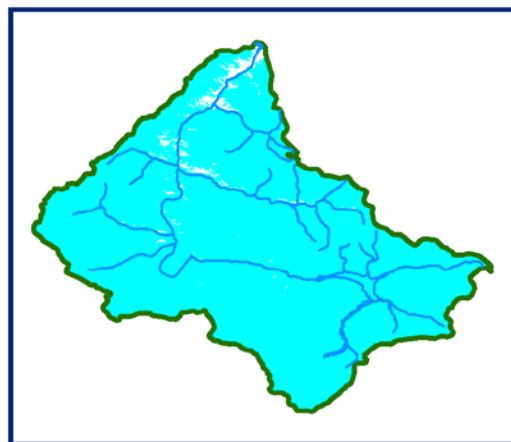
01 MARCH 2013



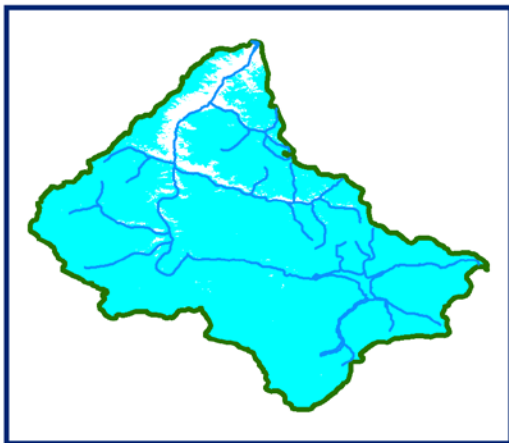
06 MARCH 2013



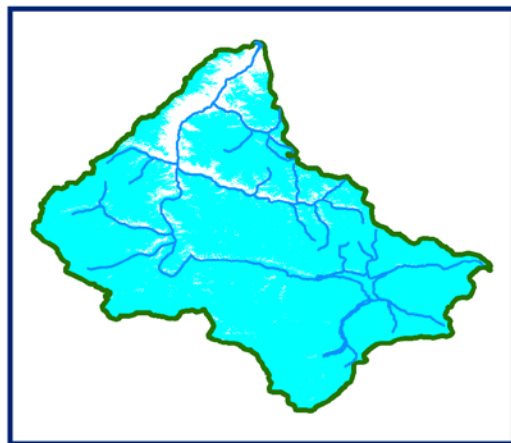
11 MARCH 2013



19 MARCH 2013



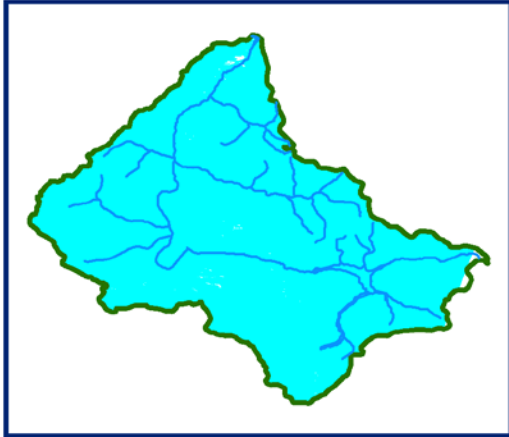
26 MARCH 2013



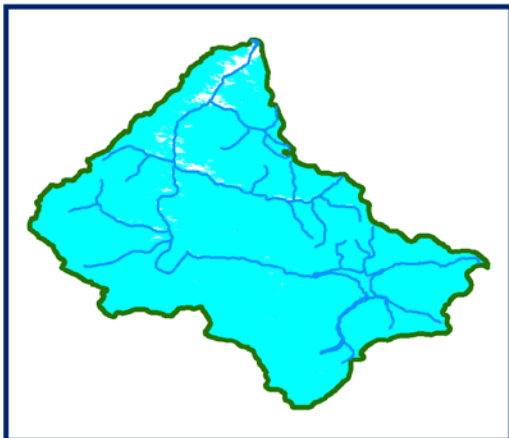
31 MARCH 2013



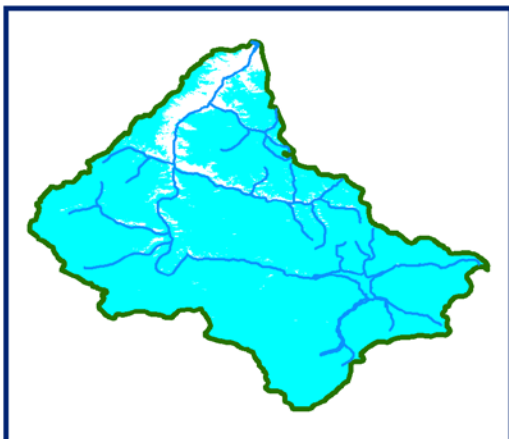
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 MARCH 2013
06 MARCH 2013
07 MARCH 2013



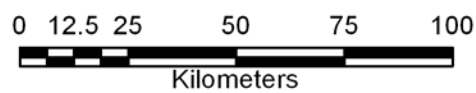
DATA USED
19 MARCH 2013



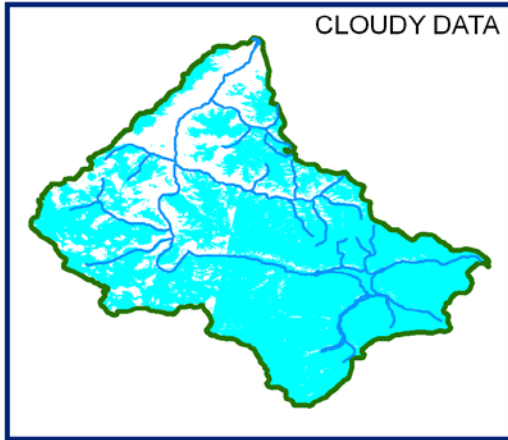
DATA USED
21 MARCH 2013
26 MARCH 2013
31 MARCH 2013



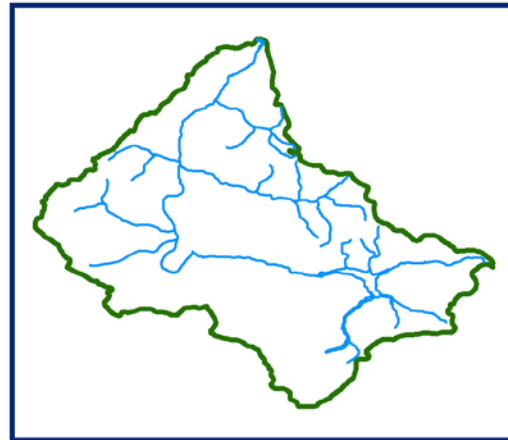
SNOW



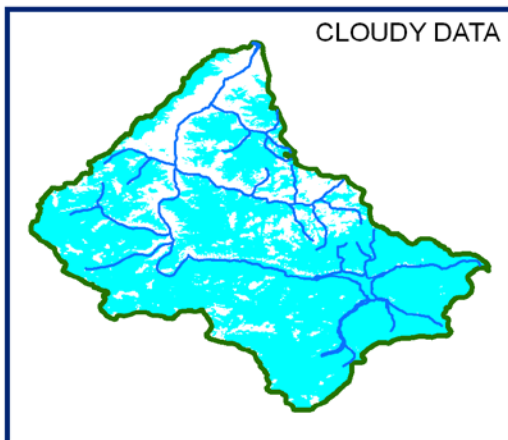
SNOW COVER MAP : SURU BASIN



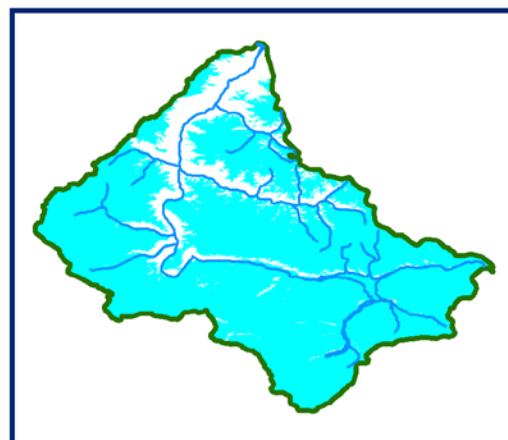
05 APRIL 2013



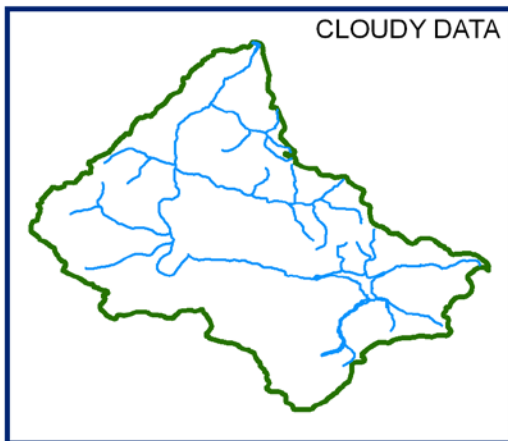
DATA NOT AVAILABLE



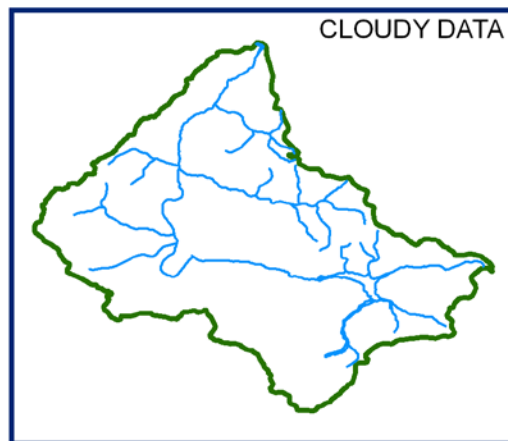
11 APRIL 2013



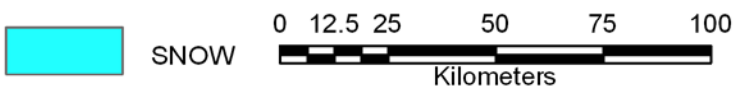
19 APRIL 2013



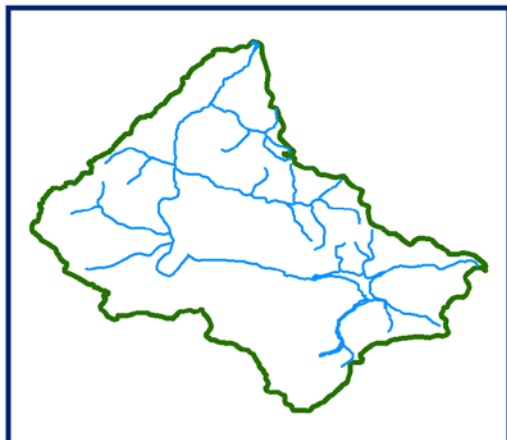
DATA NOT AVAILABLE



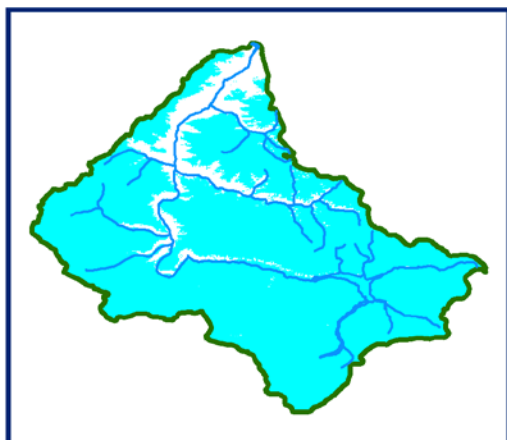
DATA NOT AVAILABLE



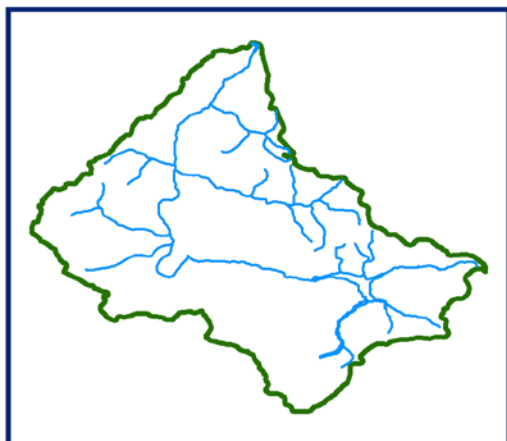
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
DATA NOT AVAILABLE



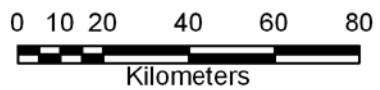
DATA USED
19 APRIL 2013
18 APRIL 2013



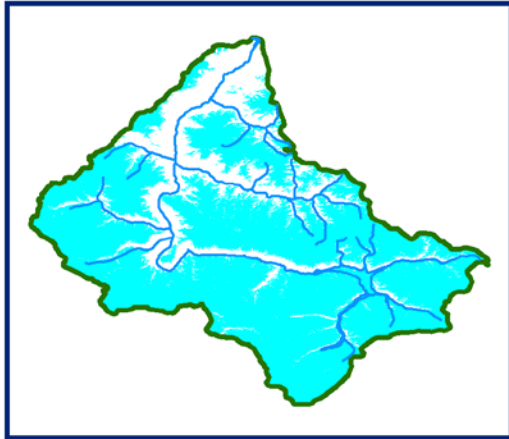
DATA USED
DATA NOT AVAILABLE



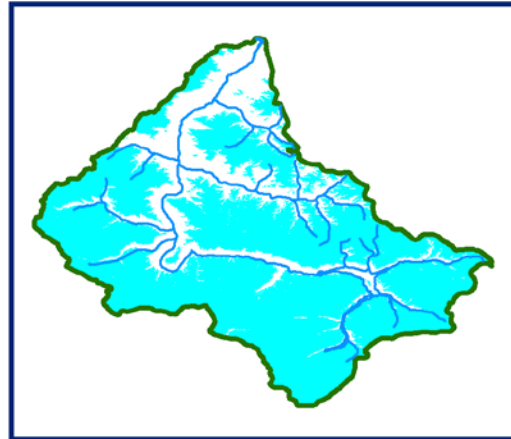
SNOW



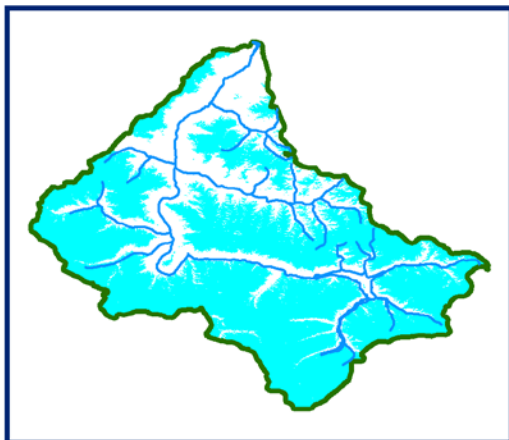
SNOW COVER MAP : SURU BASIN



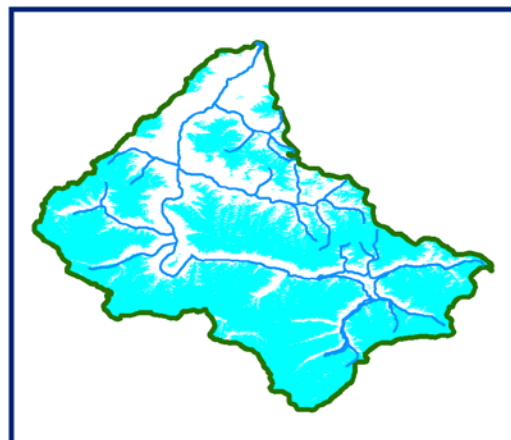
03 MAY 2013



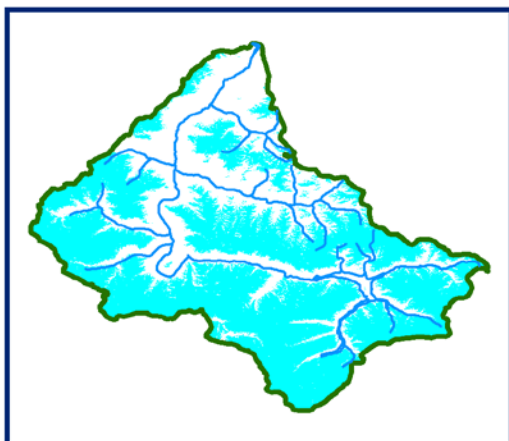
10 MAY 2013



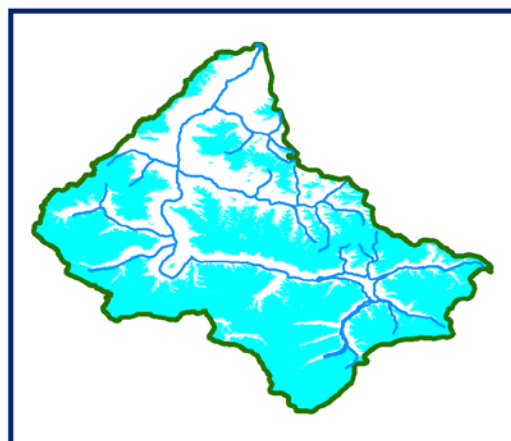
17 MAY 2013



18 MAY 2013



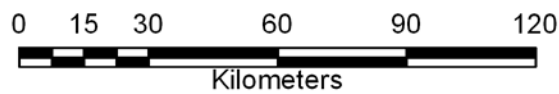
22 MAY 2013



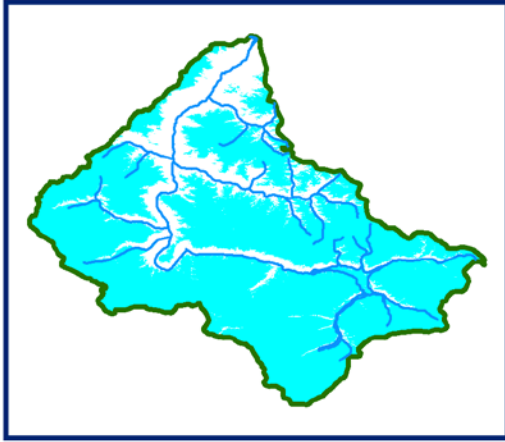
24 MAY 2013



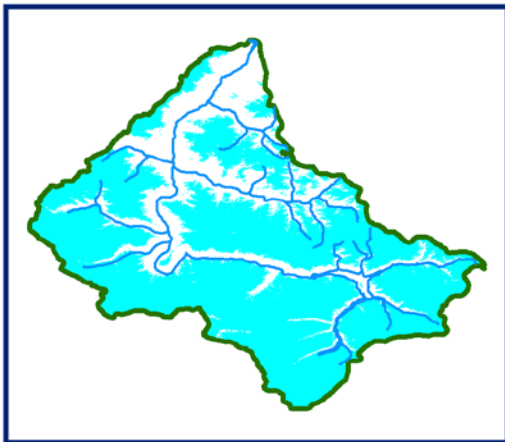
SNOW



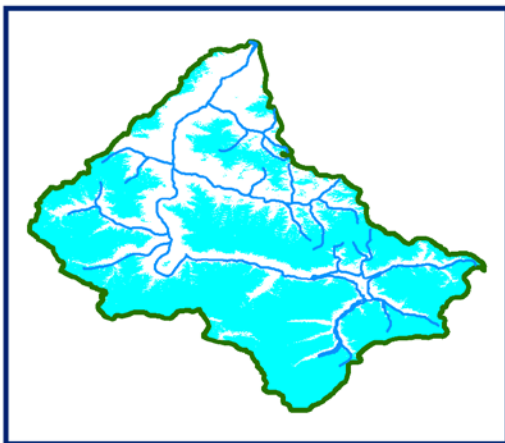
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
03 MAY 2013
10 MAY 2013



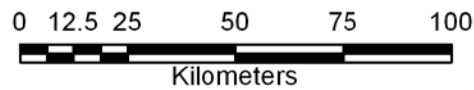
DATA USED
13 MAY 2013
17 MAY 2013
18 MAY 2013



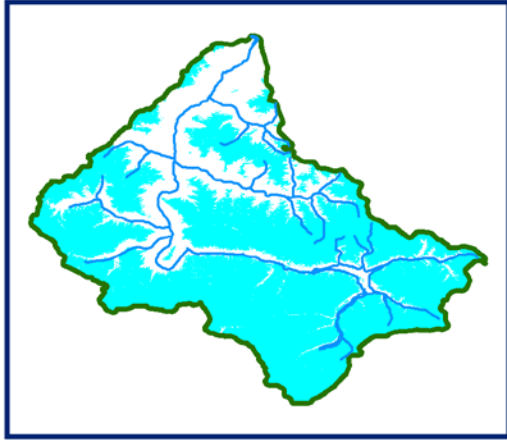
DATA USED
22 MAY 2013
23 MAY 2013
24 MAY 2013



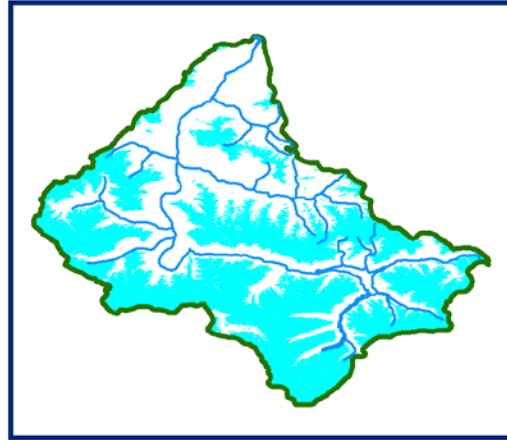
SNOW



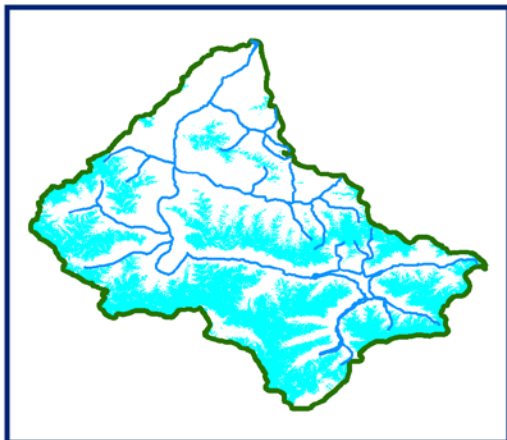
SNOW COVER MAP : SURU BASIN



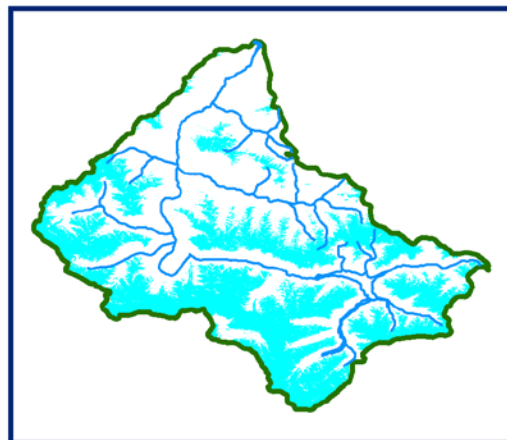
01 JUNE 2013



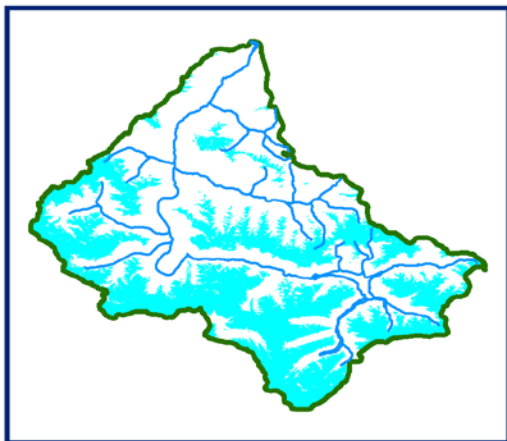
08 JUNE 2013



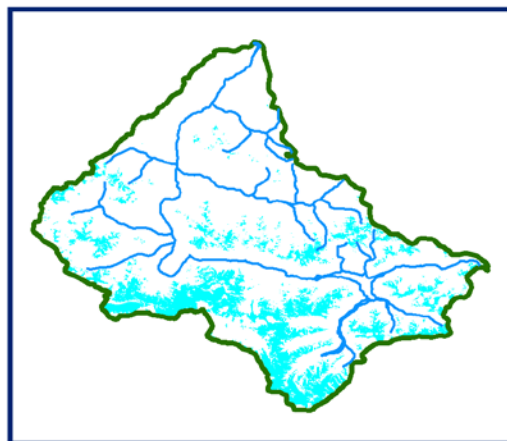
11 JUNE 2013



20 JUNE 2013



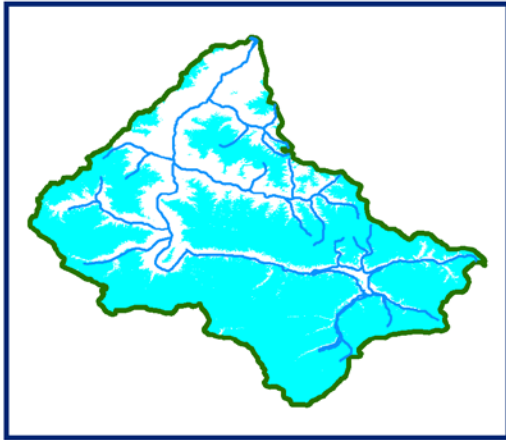
22 JUNE 2013



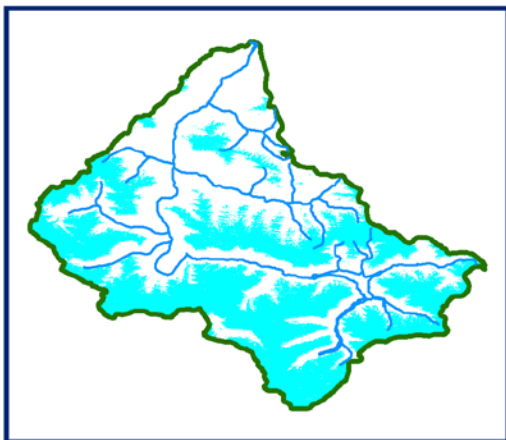
30 JUNE 2013



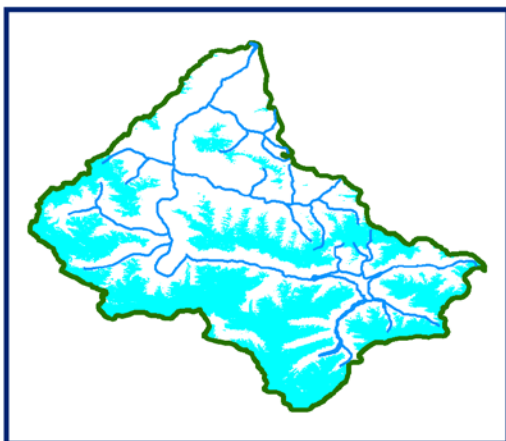
10 DAILY SNOW COVER MAP: SURU BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013
10 JUNE 2013



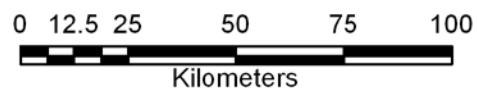
DATA USED
11 JUNE 2013
20 JUNE 2013



DATA USED
22 JUNE 2013
25 JUNE 2013



SNOW



ZASKAR BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: ZASKER

BASIN AREA: 14914 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	1-Oct-12	2339	16	2	2-Oct-12	2172	15
3	4-Oct-12	2797	19	4	6-Oct-12	2067	14
5	7-Oct-13	1905	13	6	14-Oct-12	2753	18
7	18-Oct-12	2747	18	8	19-Oct-12	2626	18
9	21-Oct-12	1952	13	10	26-Oct-12	3215	22
11	30-Oct-12	2498	17	12	31-Oct-12	2232	15
November 2012							
13	4-Nov-12	2021	14	14	5-Nov-12	1873	13
15	7-Nov-12	3209	22	16	11-Nov-12	4140	28
17	12-Nov-12	2971	20	18	16-Nov-12	2618	18
19	17-Nov-12	2487	17	20	19-Nov-12	3168	21
December 2012							
21	1-Dec-12	13030	87	22	3-Dec-12	11567	78
23	12-Dec-12	11923	80	24	22-Dec-12	10526	71
25	25-Dec-12	11564	78	26	30-Dec-12	13299	89
January 2013							
27	3-Jan-13	12301	82	28	5-Jan-13	11497	77
29	13-Jan-13	13179	88	30	22-Jan-13	14802	99
31	30-Jan-13	14001	94				
February 2013							
32	1-Feb-13	14199	95	33	8-Feb-13	14819	99
34	18-Feb-13	14430	97	34	20-Feb-13	14509	97
March 2013							
35	2-Mar-13	14365	96	36	6-Mar-13	13131	88
37	7-Mar-13	14006	94	38	17-Mar-13	12126	81
39	18-Mar-13	12235	82	40	19-Mar-13	12125	81
41	26-Mar-13	14138	95				
April 2013							
42	5-Apr-13	12271	82	43	12-Apr-13	13996	94
44	19-Apr-13	12035	81				

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
May 2013							
45	3-May-13	9497	64	46	10-May-13	9564	64
47	13-May-13	8092	54	48	18-May-13	7457	50
49	22-May-13	6886	46	50	23-May-13	6105	41
June 2013							
51	1-Jun-13	7015	47	52	8-Jun-13	3805	26
53	10-Jun-13	3910	26	54	20-Jun-13	4358	29
55	21-Jun-13	3748	25				

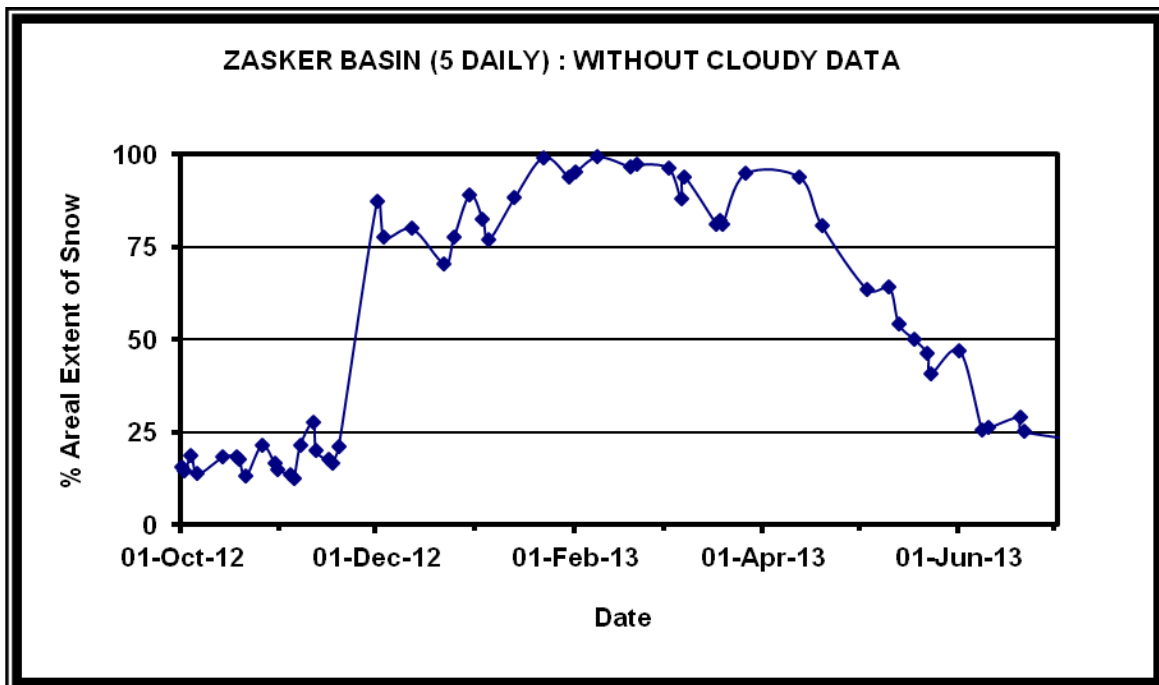
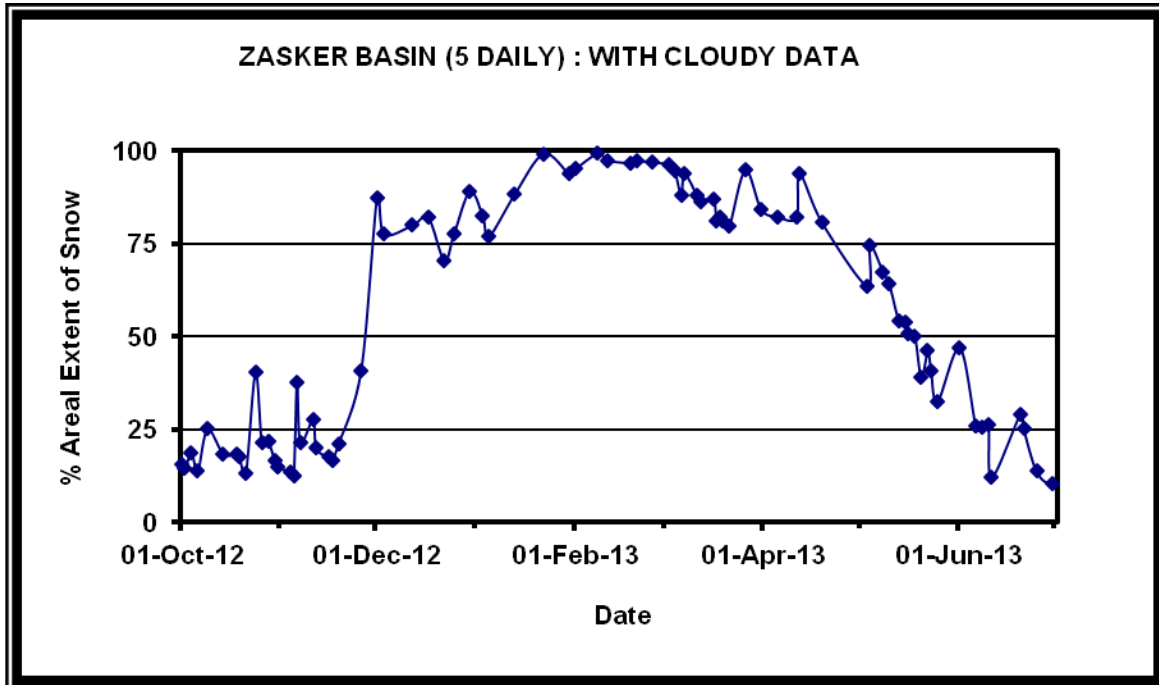
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: ZASKER

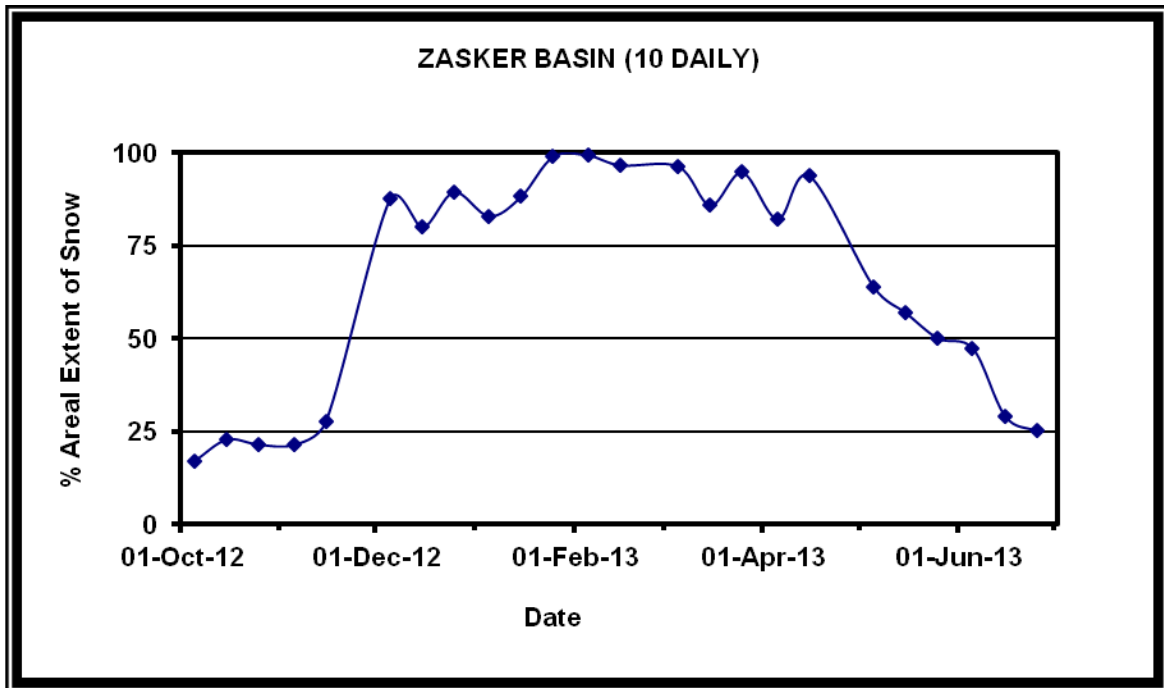
BASIN AREA: 14914 sq km

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012							
1	5-Oct-12	2548	17	2	15-Oct-12	3412	23
2	25-Oct-12	3215	22				
November 2012							
3	5-Nov-12	3209	22	4	15-Nov-12	4140	28
December 2012							
5	5-Dec-12	13071	88	6	15-Dec-12	11923	80
7	25-Dec-12	13348	90				
January 2013							
8	5-Jan-13	12380	83	9	15-Jan-13	13179	88
10	25-Jan-13	14779	99				
February 2013							
11	5-Feb-13	14819	99	11	15-Feb-13	14429	97
March 2013							
12	5-Mar-13	14384	96	13	15-Mar-13	12826	86
14	25-Mar-13	14138	95				
April 2013							
15	5-Apr-13	12271	82	16	15-Apr-13	14089	94
May 2013							
17	5-May-13	9545	64	18	15-May-13	8512	57
19	25-May-13	7482	50				
June 2013							
20	5-Jun-13	7063	47	21	15-Jun-13	4358	29
22	25-Jun-13	3748	25				

Snow cover depletion curve



Snow cover depletion curve



SNOW COVER MAP

SNOW COVER MAP

:

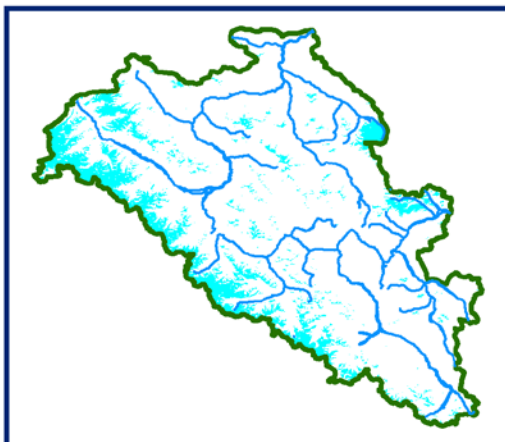
ZASKER BASIN



01 OCTOBER 2012



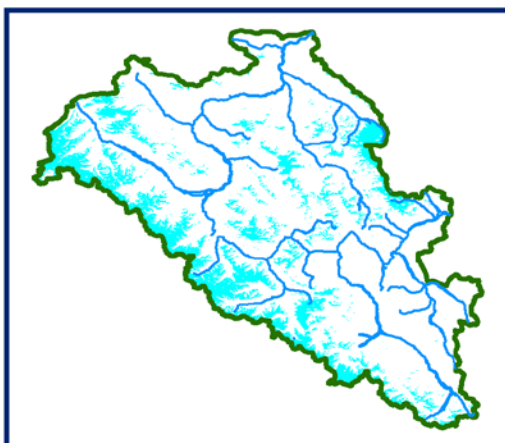
07 OCTOBER 2012



14 OCTOBER 2012



19 OCTOBER 2012



26 OCTOBER 2012



31 OCTOBER 2012



SNOW

0 20 40 80 120 160

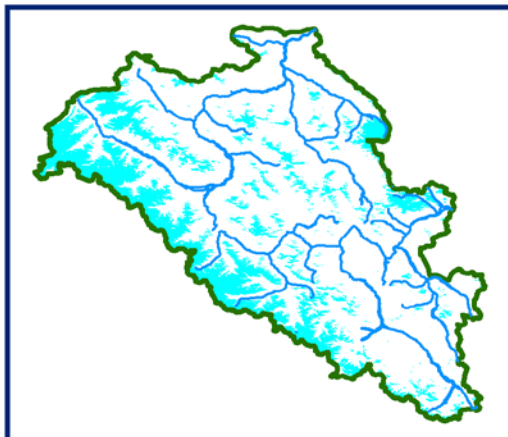


Kilometers

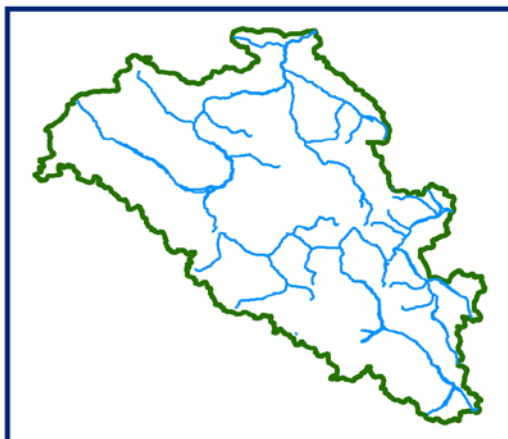
10 DAILY SNOW COVER MAP: ZASKER BASIN



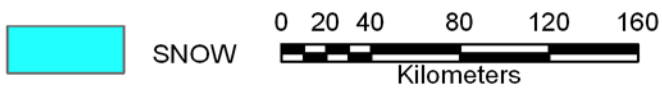
DATA USED
06 OCTOBER 2012
01 OCTOBER 2012
02 OCTOBER 2012



DATA USED
15 OCTOBER 2011



DATA USED
DATA NOT AVAILABLE



SNOW COVER MAP : ZASKER BASIN



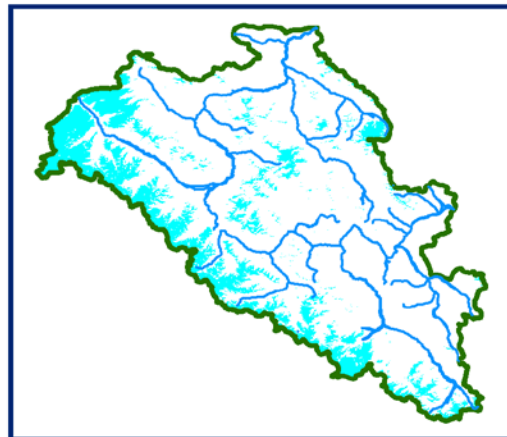
04 NOVEMBER 2012



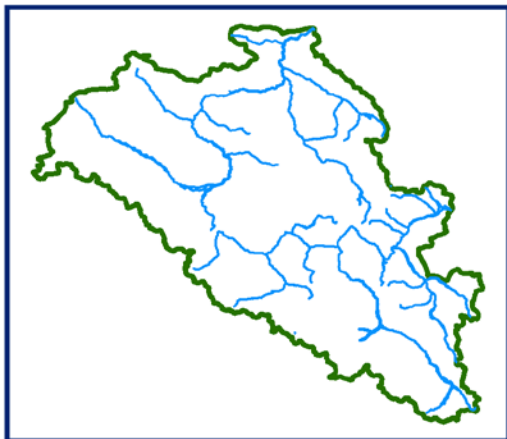
07 NOVEMBER 2012



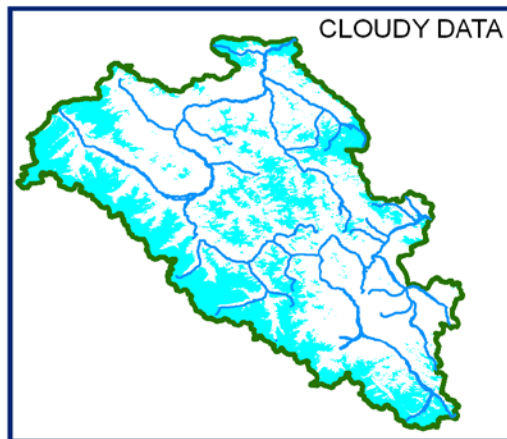
12 NOVEMBER 2012



19 NOVEMBER 2012



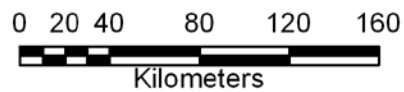
NO DATA AVAILABLE



26 NOVEMBER 2012



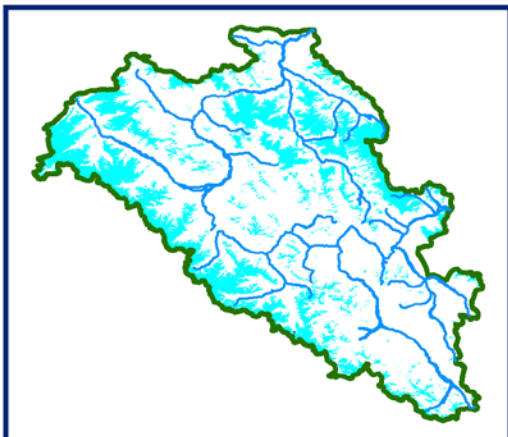
SNOW



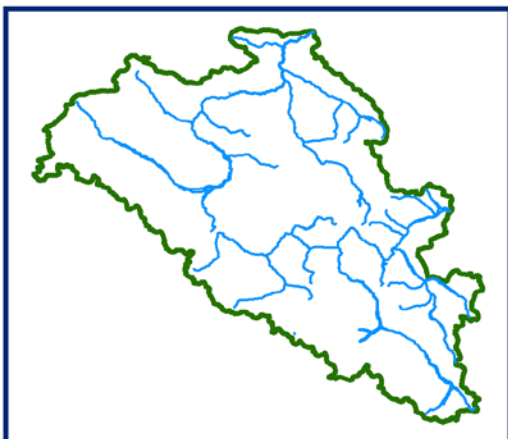
10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
04 NOVEMBER 2012
05 NOVEMBER 2012
07 NOVEMBER 2012



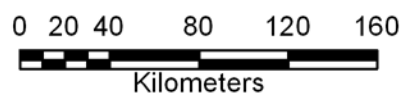
DATA USED
11 NOVEMBER 2012
16 NOVEMBER 2012
19 NOVEMBER 2012



DATA USED
DATA NOT AVAILABLE



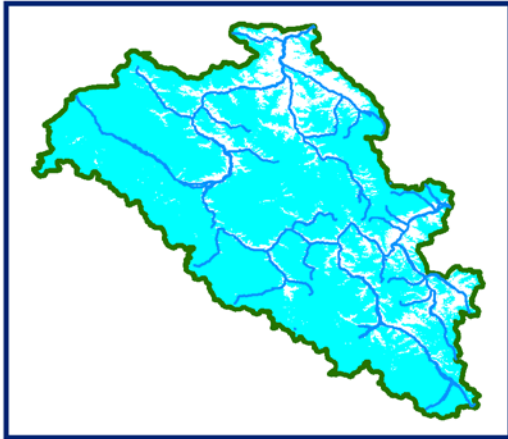
SNOW



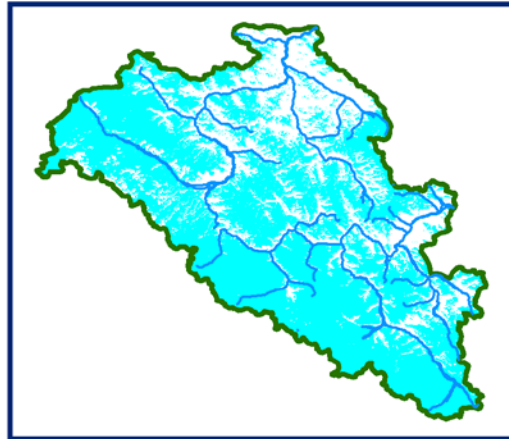
SNOW COVER MAP

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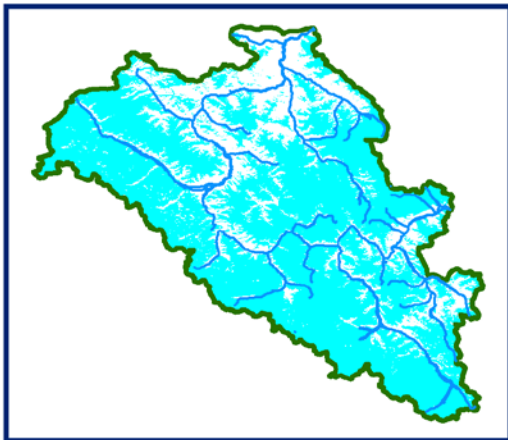
ZASKER BASIN



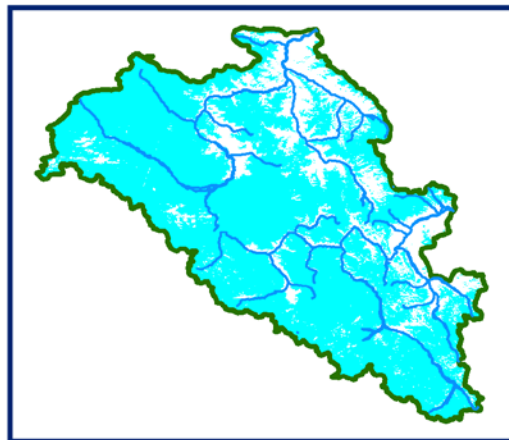
01 DECEMBER 2012



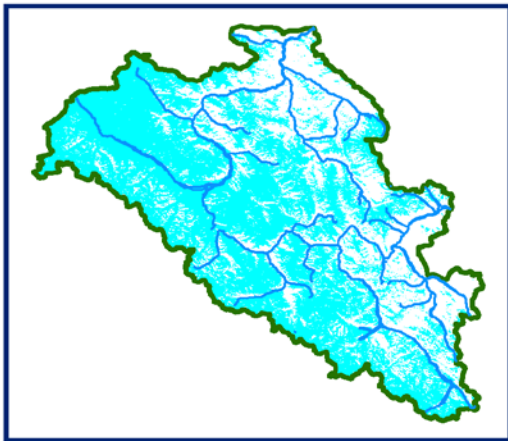
03 DECEMBER 2012



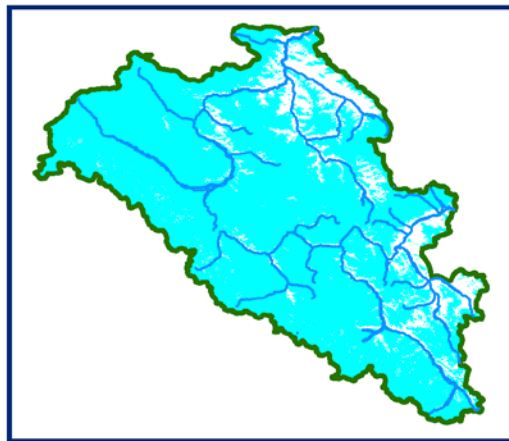
12 DECEMBER 2012



17 DECEMBER 2012



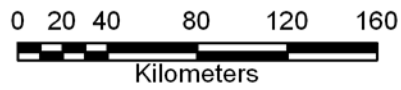
22 DECEMBER 2012



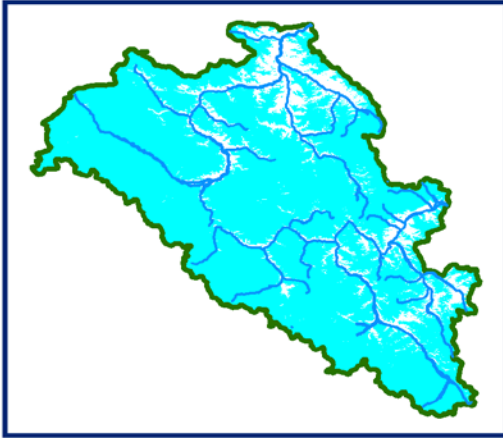
30 DECEMBER 2012



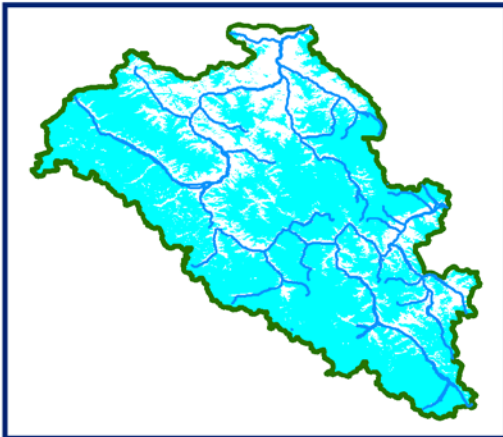
SNOW



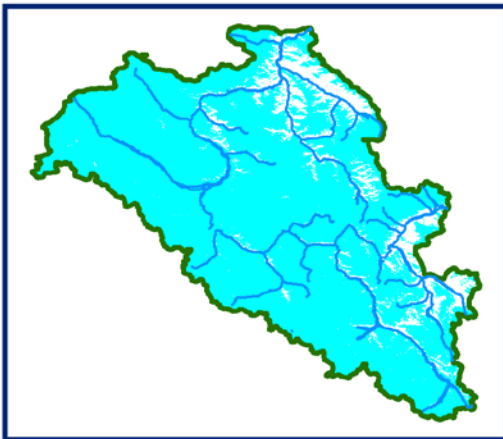
10 DAILY SNOW COVER MAP: ZASKER BASIN



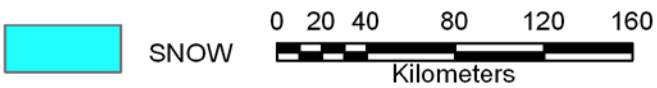
DATA USED
01 DECEMBER 2012
03 DECEMBER 2012



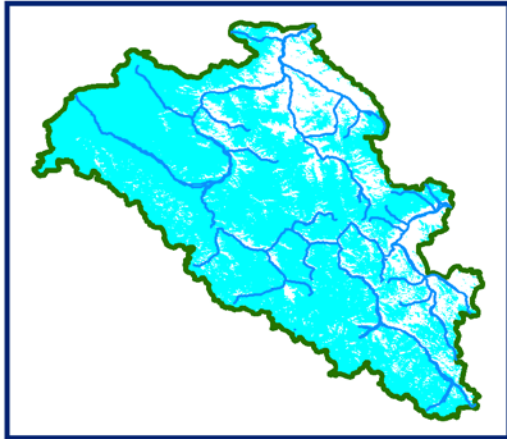
DATA USED
12 DECEMBER 2012



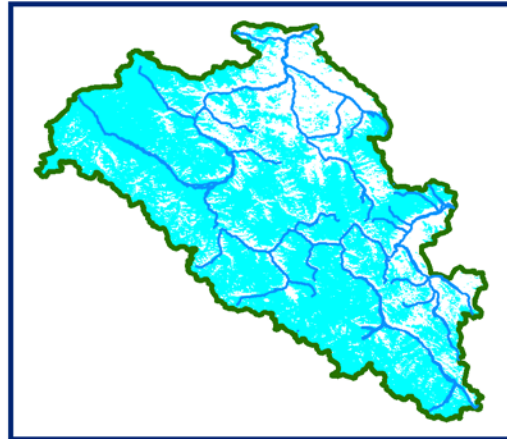
DATA USED
30 DECEMBER 2012
22 DECEMBER 2012
25 DECEMBER 2012



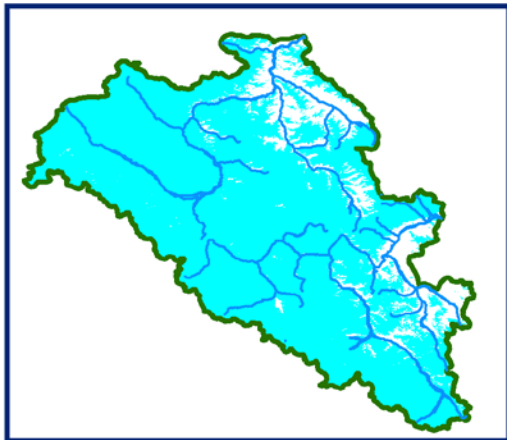
SNOW COVER MAP : ZASKER BASIN



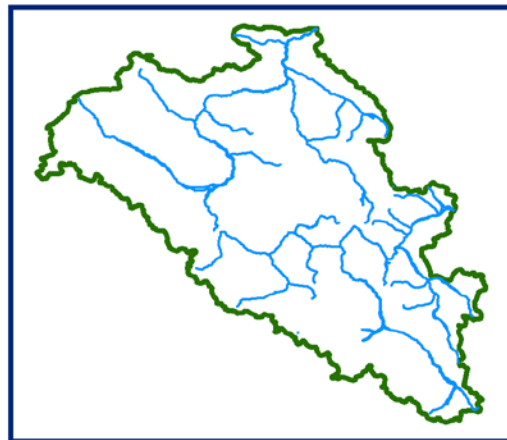
03 JANUARY 2013



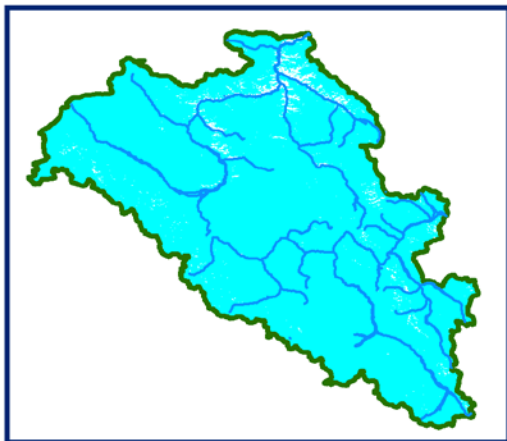
05 JANUARY 2013



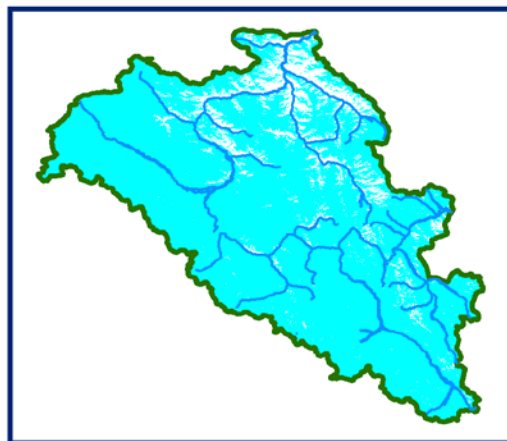
13 JANUARY 2013



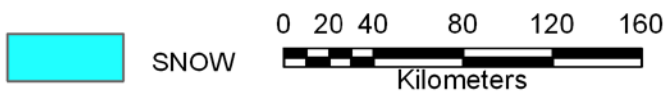
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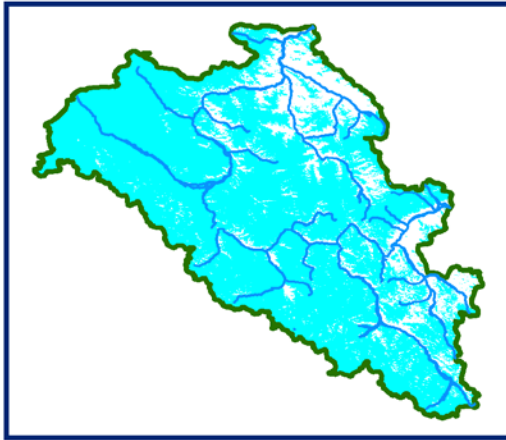
22 JANUARY 2013



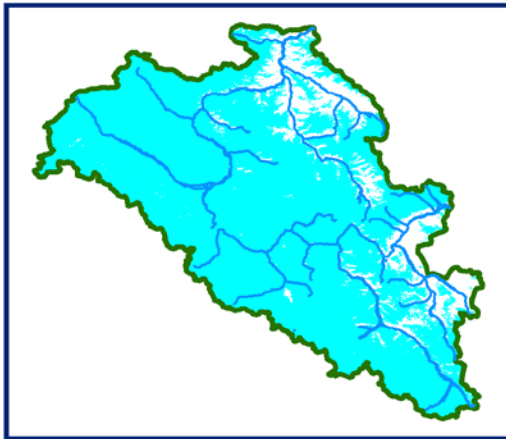
30 JANUARY 2013



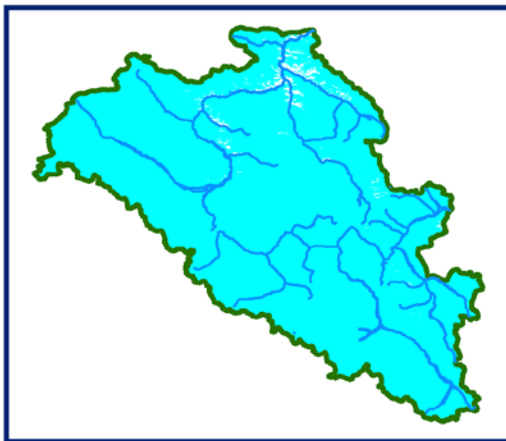
10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
03 JANUARY 2013
05 JANUARY 2013

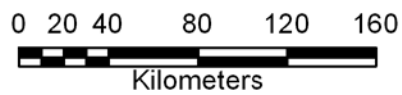


DATA USED
13 JANUARY 2013



DATA USED
22 JANUARY 2013
30 JANUARY 2013

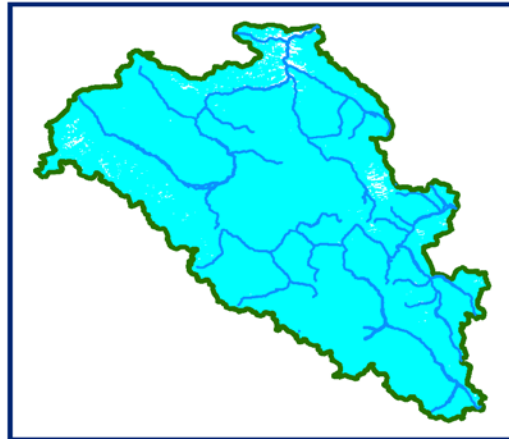
 SNOW



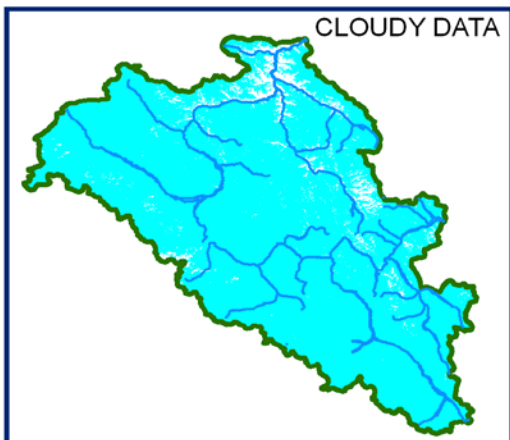
SNOW COVER MAP : ZASKER BASIN



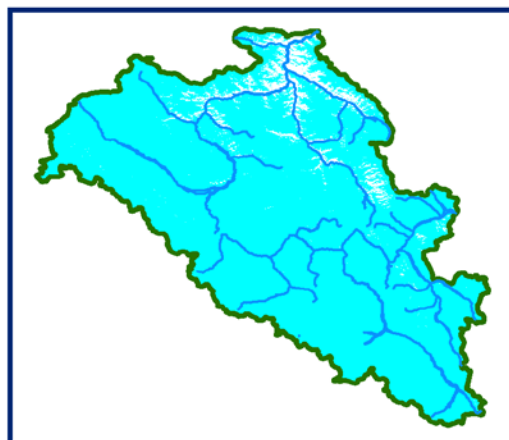
01 FEBRUARY 2013



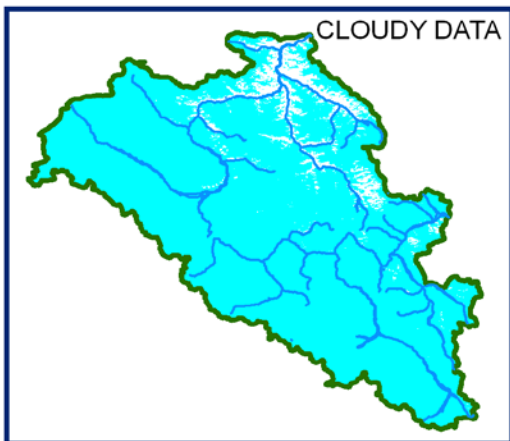
08 FEBRUARY 2013



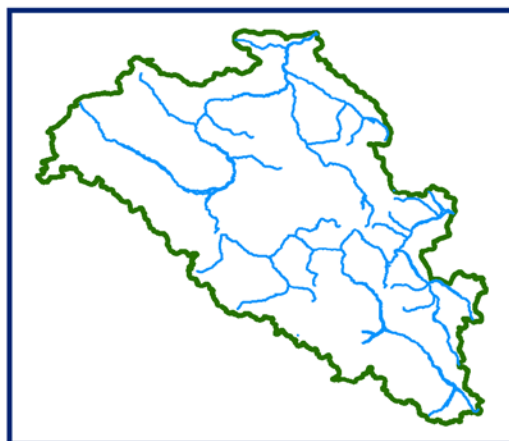
11 FEBRUARY 2013



20 FEBRUARY 2013



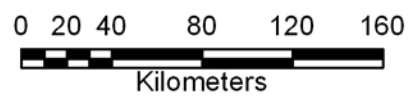
25 FEBRUARY 2013



NO DATA AVAILABLE



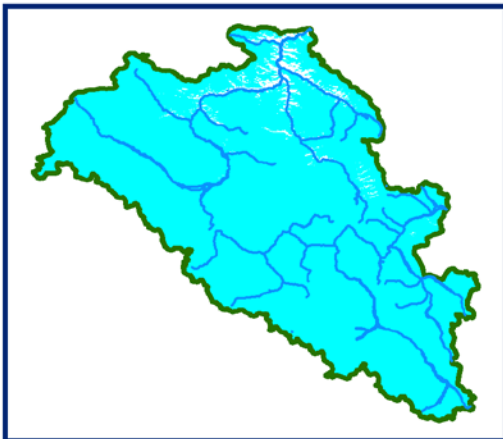
SNOW



10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
DATA NOT AVAILABLE



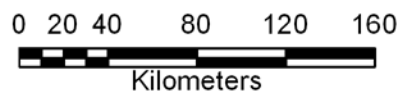
DATA USED
20 FEBRUARY 2013



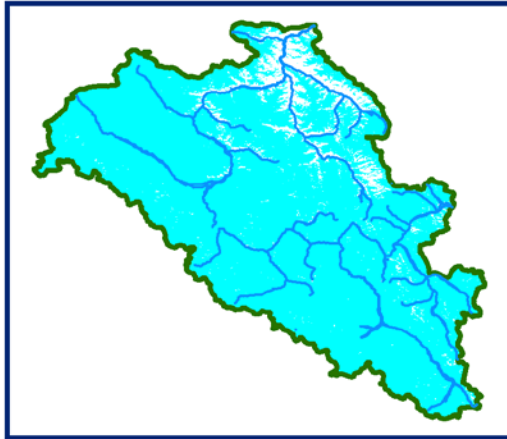
DATA USED
DATA NOT AVAILABLE



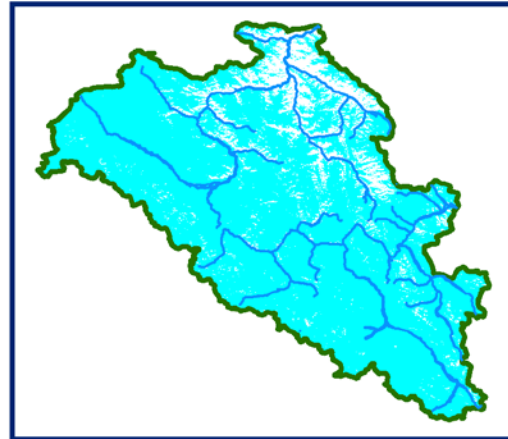
SNOW



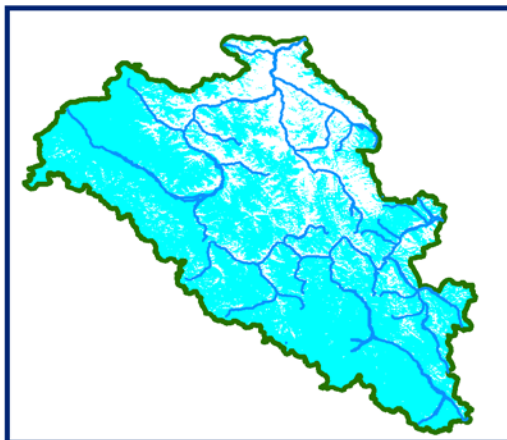
SNOW COVER MAP : ZASKER BASIN



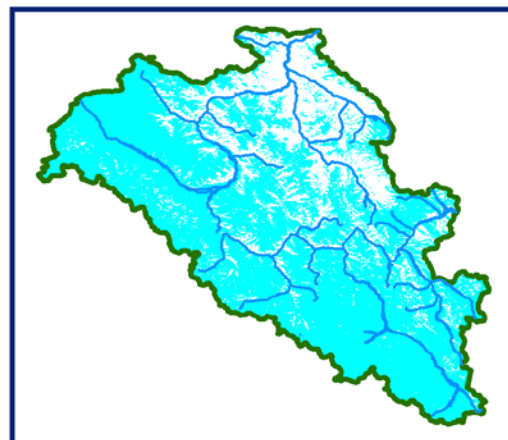
02 MARCH 2013



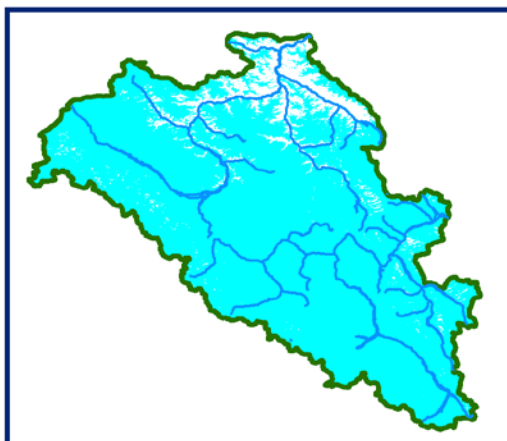
07 MARCH 2013



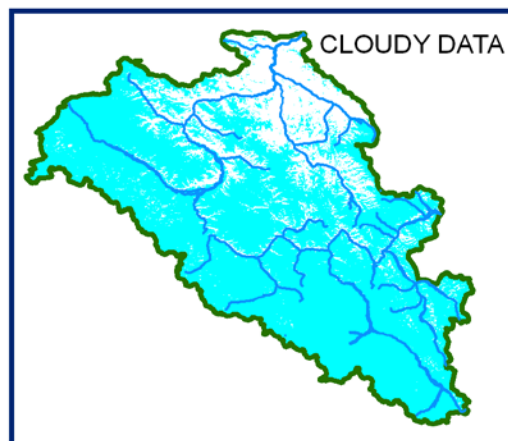
17 MARCH 2013



19 MARCH 2013



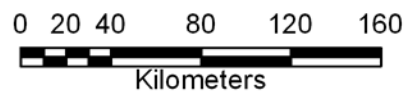
26 MARCH 2013



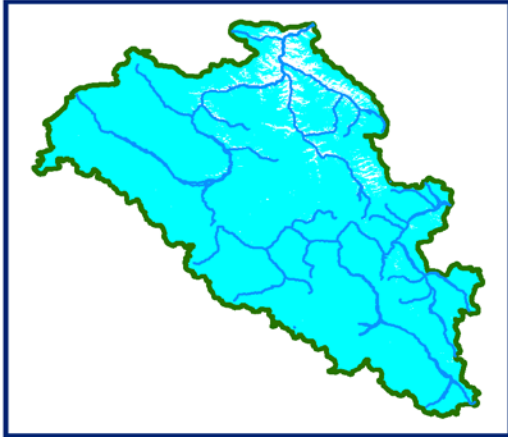
31 MARCH 2013



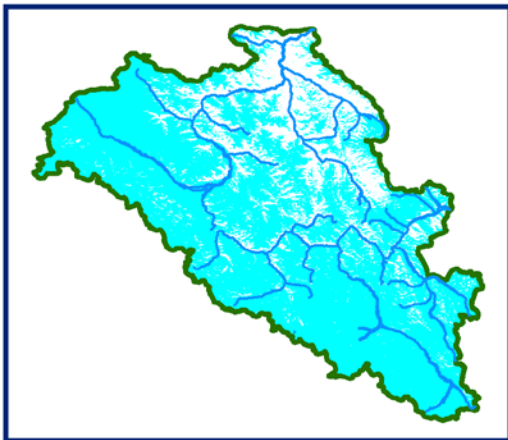
SNOW



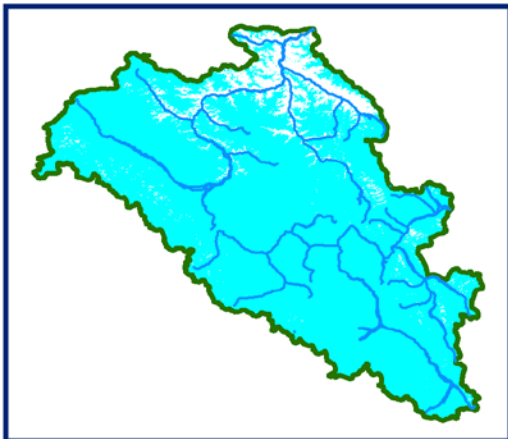
10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
02 MARCH 2013
06 MARCH 2013
07 MARCH 2013



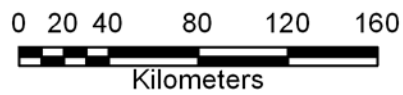
DATA USED
17 MARCH 2013
18 MARCH 2013
19 MARCH 2013



DATA USED
26 MARCH 2013



SNOW



SNOW COVER MAP

:

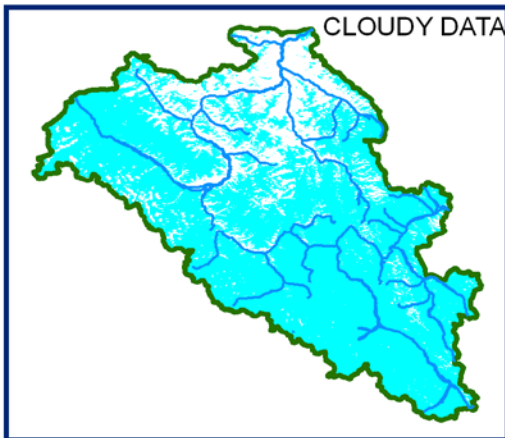
ZASKER BASIN



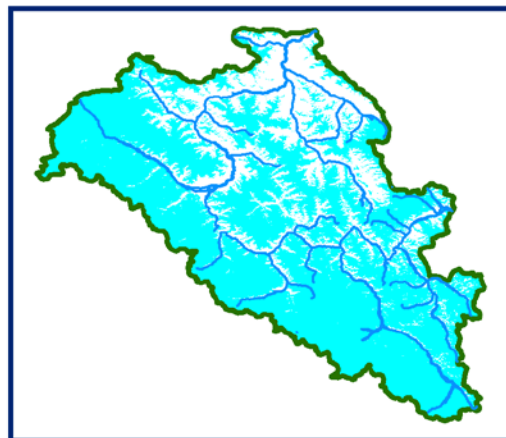
05 APRIL 2013



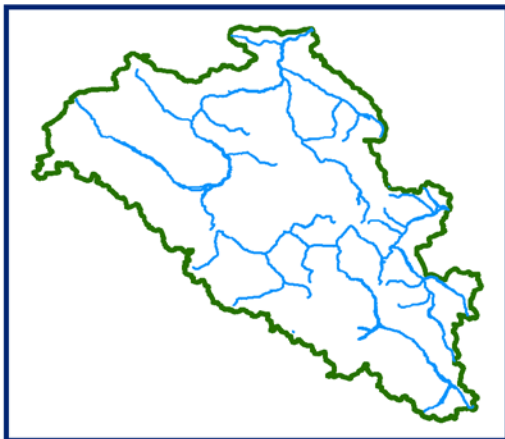
DATA NOT AVAILABLE



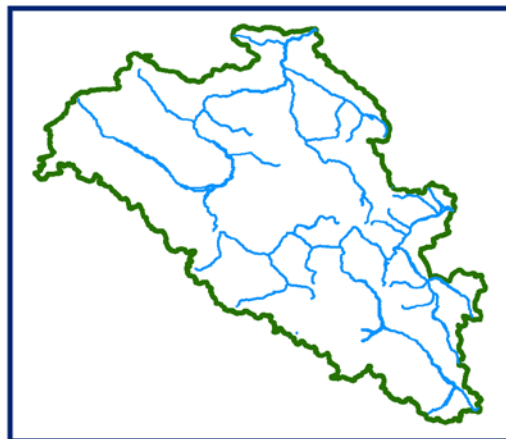
11 APRIL 2013



19 APRIL 2013



DATA NOT AVAILABLE



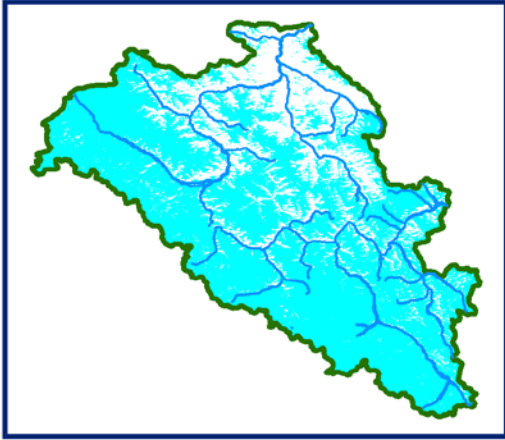
DATA NOT AVAILABLE



SNOW



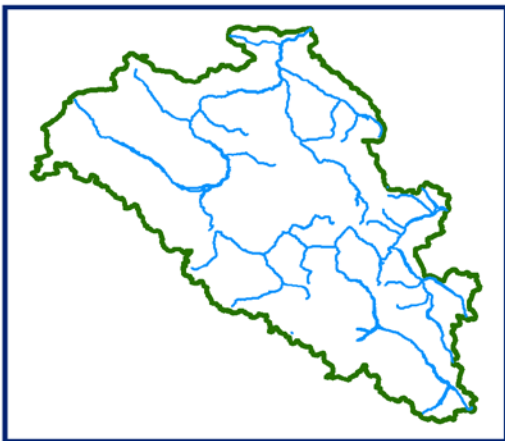
10 DAILY SNOW COVER MAP: ZASKER BASIN



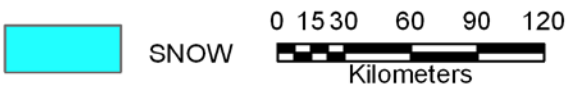
DATA USED
05 APRIL 2013



DATA USED
19 APRIL 2013
12 APRIL 2013



DATA USED
DATA NOT AVAILABLE



SNOW COVER MAP

:

ZASKER BASIN



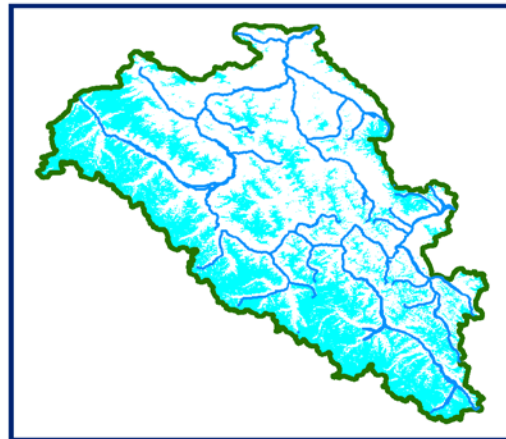
03 MAY 2013



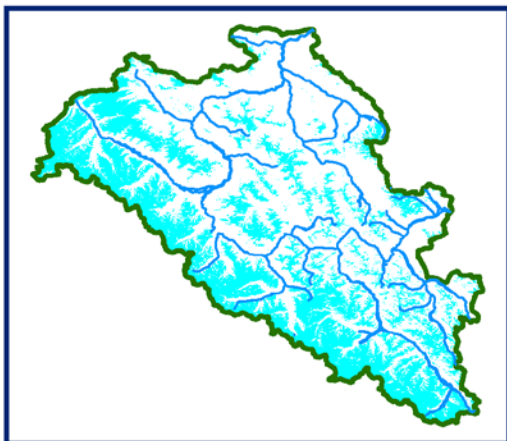
10 MAY 2013



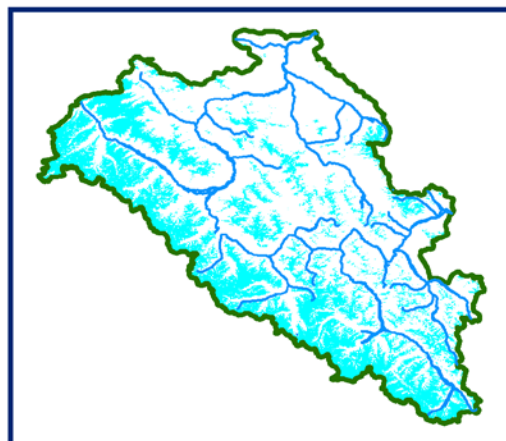
13 MAY 2013



18 MAY 2013



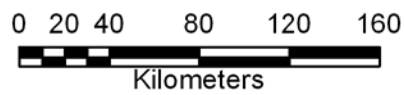
22 MAY 2013



23 MAY 2013



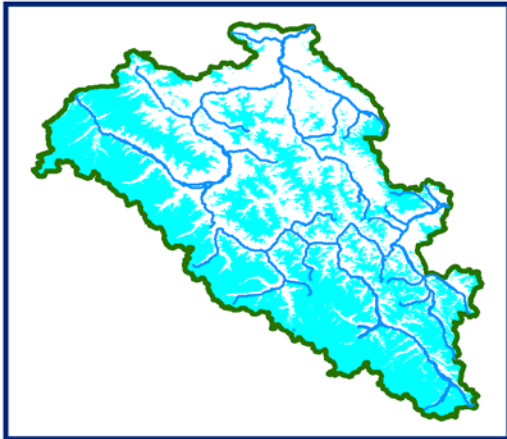
SNOW



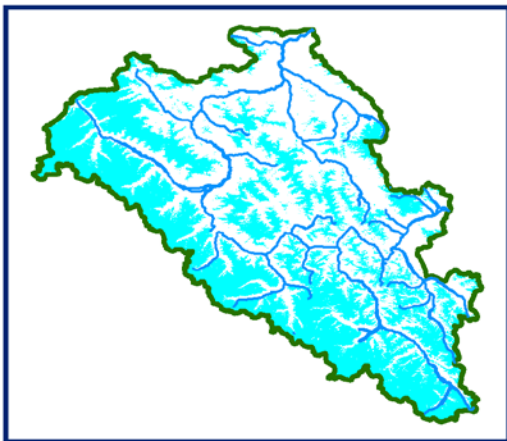
10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
03 MAY 2013
10 MAY 2013



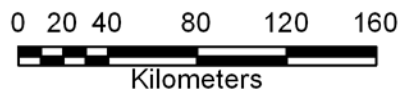
DATA USED
13 MAY 2013
18 MAY 2013



DATA USED
22 MAY 2013
23 MAY 2013



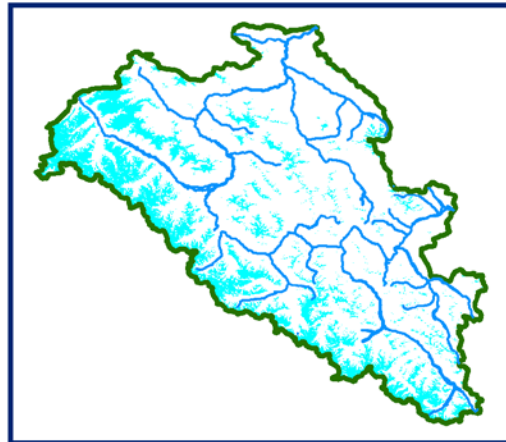
SNOW



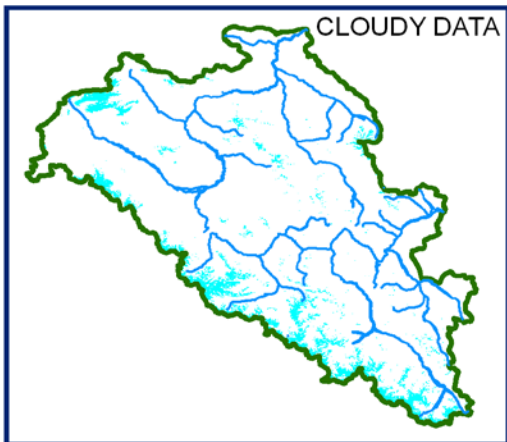
SNOW COVER MAP : ZASKER BASIN



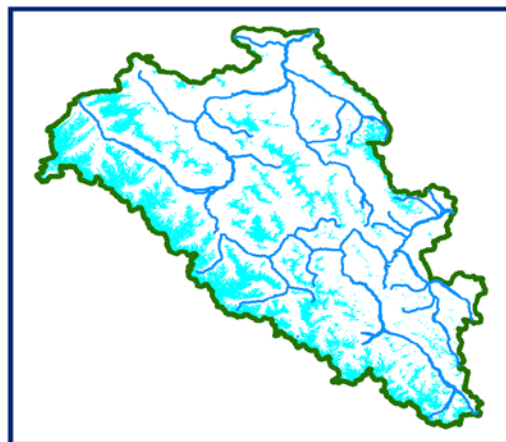
01 JUNE 2013



08 JUNE 2013



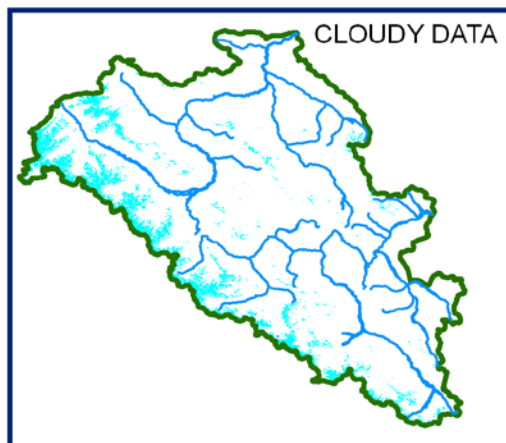
11 JUNE 2013



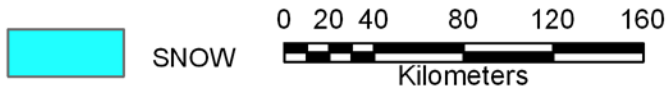
20 JUNE 2013



21 JUNE 2013



25 JUNE 2013



10 DAILY SNOW COVER MAP: ZASKER BASIN



DATA USED
01 JUNE 2013
08 JUNE 2013
10 JUNE 2013



DATA USED
20 JUNE 2013



DATA USED
21 JUNE 2013

 SNOW

