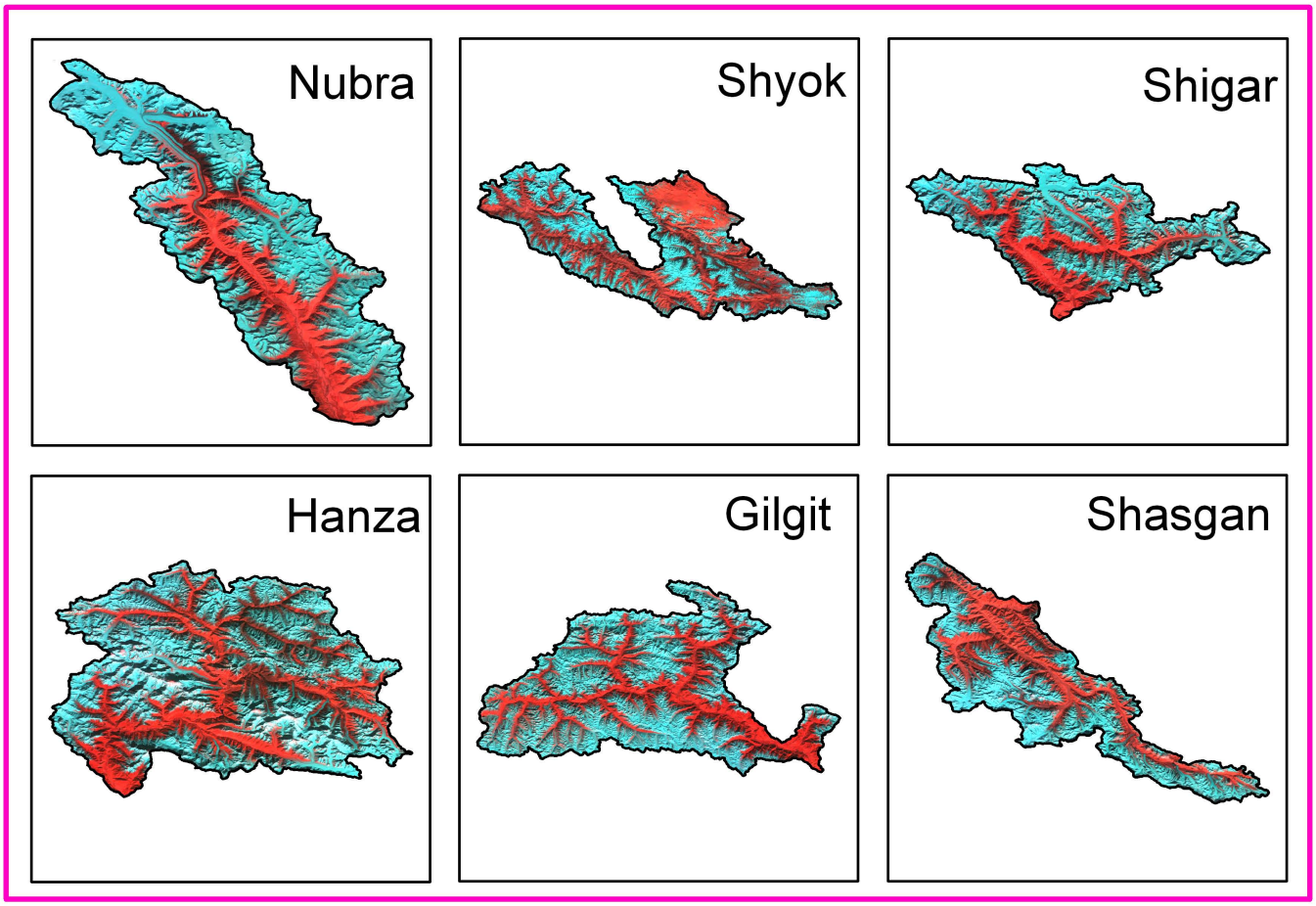
SNOW COVER ATLAS OF INDUS BASIN

Sub basins: Nubra, Shyok, Shigar, Hanza, Gilgit and Shasgan

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

Year : 2012-13



Volume II

Remote Sensing Applications Centre U. P.
Lucknow - 226021

and

Space Applications Centre (ISRO)
Ahmedabad - 380015

March, 2014

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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 Nubra, Shyok, Shigar, Hanza, Gilgit and Shasgan. 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, Nubra, Shyok, Shigar, Hanza, Gilgit and Shasgan basins.
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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 six subbasins of the Indus basin. These are Nubra, Shyok, Shigar, Hanza, Gilgit and Shasgan 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:

$$Normalized\ Difference\ Snow\ Index(NDSI) = (band2 - band5)/(band2 + band5) \quad ..(1)$$

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. Many of these sub-basins like Nubra, Shyok, Shasgan, Shigar and Hanza are highly glacierized, therefore large area under snow and glacier cover was observed even at the beginning and end of accumulation season. In case of Gilgit sub-basin, it is at lower altitude and is less Glacierized so lot of variation in areal extent of snow was observed.

Acknowledgements

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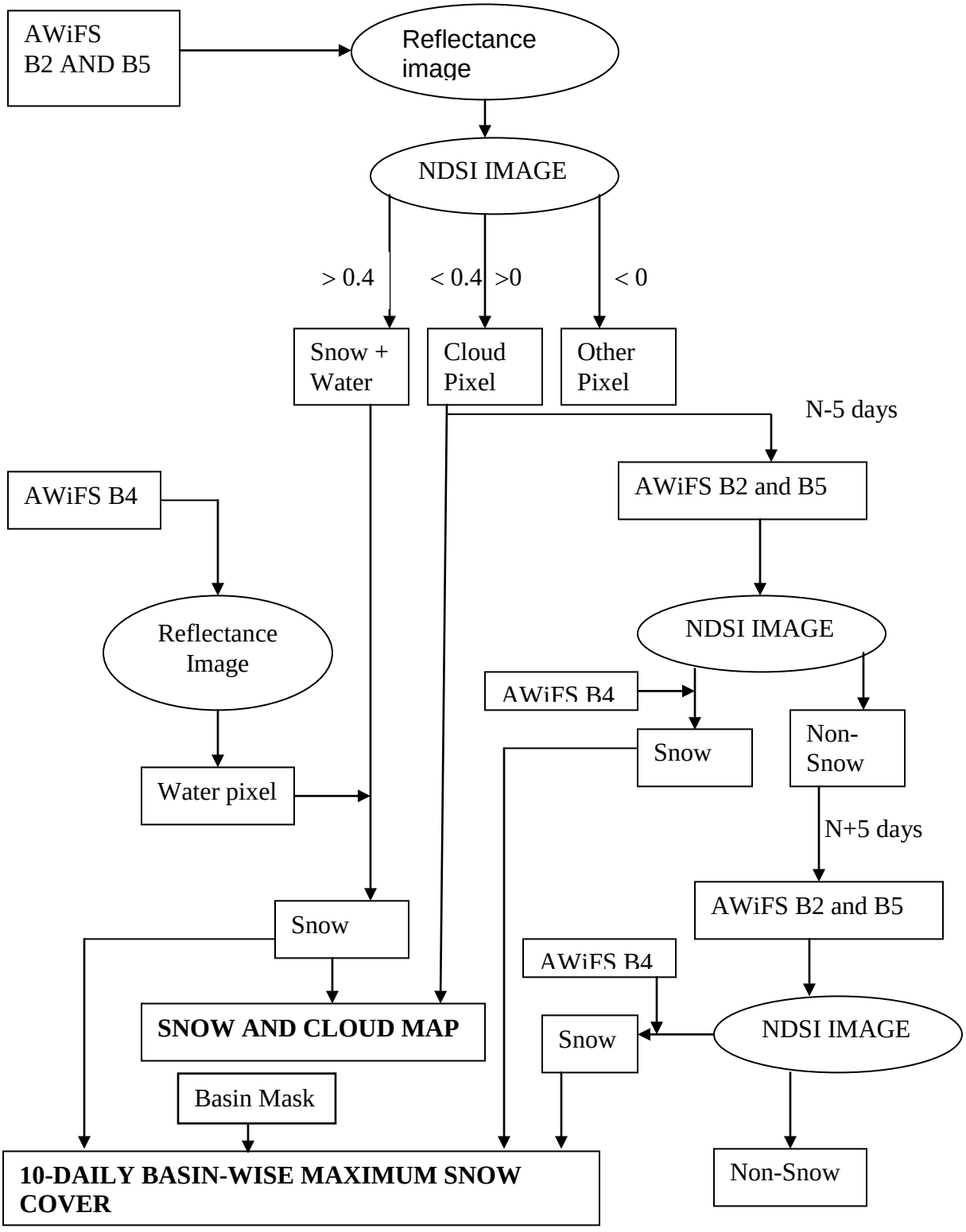


Figure 2: Algorithm for snow cover mapping using AWiFS data

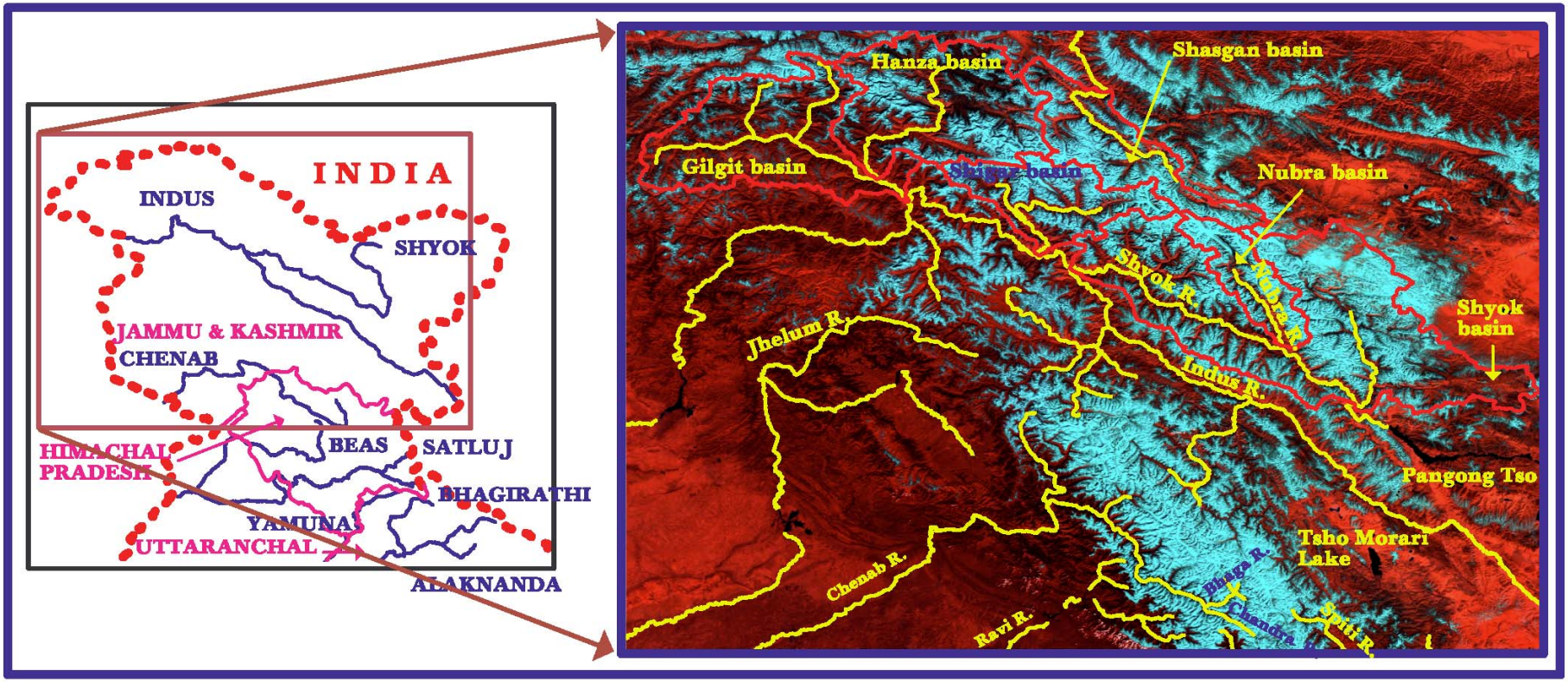


Figure 1: Location map of Nubra, Shyok, Shigar, Hanza, Gilgit and Shasgan sub-basins (Part of Indus basin)

NUBRA BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: NUBRA **BASIN AREA: 4258 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	2216	52	8	18-Oct-12	3867	91
2	2-Oct-12	2265	53	9	19-Oct-12	3811	90
3	4-Oct-12	3961	93	10	23-Oct-12	3920	92
4	6-Oct-12	1967	46	11	26-Oct-12	3032	71
5	9-Oct-12	3101	73	12	28-Oct-12	3238	76
6	11-Oct-12	2346	55	13	30-Oct-12	3017	71
7	14-Oct-12	3800	89				
November 2012							
14	2-Nov-12	3090	73	21	14-Nov-12	2731	64
15	4-Nov-12	2812	66	22	16-Nov-12	3548	83
16	6-Nov-12	3034	71	23	19-Nov-12	2817	66
17	7-Nov-12	2955	69	24	24-Nov-12	3562	84
18	9-Nov-12	2737	64	25	26-Nov-12	4103	96
19	11-Nov-12	2916	68	26	30-Nov-12	3832	90
20	12-Nov-12	2873	67				
December 2012							
27	1-Dec-12	3748	88	32	20-Dec-12	3575	84
28	3-Dec-12	2654	62	33	22-Dec-12	3568	84
29	5-Dec-12	4240	100	34	25-Dec-12	3775	89
30	6-Dec-12	4255	100	35	30-Dec-12	4191	98
31	10-Dec-12	3809	89				
January 2013							
36	5-Jan-13	3532	83	41	22-Jan-13	3837	90
37	8-Jan-13	3997	94	42	25-Jan-13	3879	91
38	10-Jan-13	3962	93	43	27-Jan-13	3213	75
39	13-Jan-13	4060	96	44	30-Jan-13	3327	78
40	20-Jan13	1978	46				
February 2013							
45	1-Feb-13	3743	88	48	20-Feb-05	3491	82
46	10-Feb-13	2399	56	49	25-Feb-13	3929	92
47	11-Feb-13	3588	84				
March 2013							
50	2-Mar-13	3607	85	55	16-Mar-13	3480	82

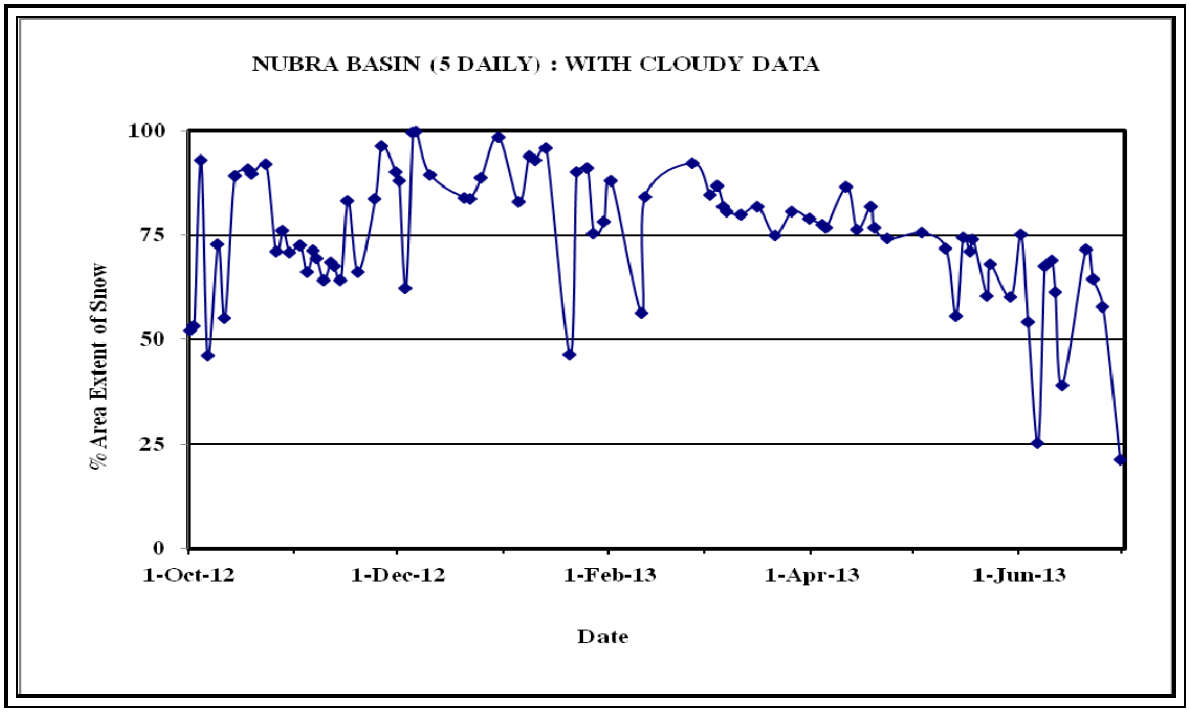
51	4-Mar-13	3695	87	56	21-Mar-13	3193	75
52	6-Mar-13	3483	82	57	26-Mar-13	3436	81
53	7-Mar-13	3432	81	58	31-Mar-13	3361	79
54	11-Mar-13	3401	80				
April 2013							
59	4-Apr-13	3301	78	63	18-Apr-13	3479	82
60	5-Apr-13	3275	77	64	19-Apr-13	3267	77
61	11-Apr-13	3681	86	65	23-Apr-13	3155	74
62	14-Apr-13	3252	76				
May 2013							
66	3-May-13	3216	76	71	18-May-13	3154	74
67	10-May-13	3061	72	72	22-May-13	2578	61
68	13-May-13	2367	56	73	23-May-13	2892	68
69	15-May-13	3171	74	74	29-May-13	2562	60
70	17-May-13	3031	71				
June 2013							
75	1-Jun-13	3198	75	81	13-Jun-13	1666	39
76	3-Jun-13	2311	54	82	20-Jun-13	3048	72
77	6-Jun-13	1074	25	83	22-Jun-13	2745	64
78	8-Jun-13	2874	67	84	25-Jun-13	2466	58
79	10-Jun-13	2938	69	85	30-Jun-13	908	21
80	11-Jun-13	2613	61				

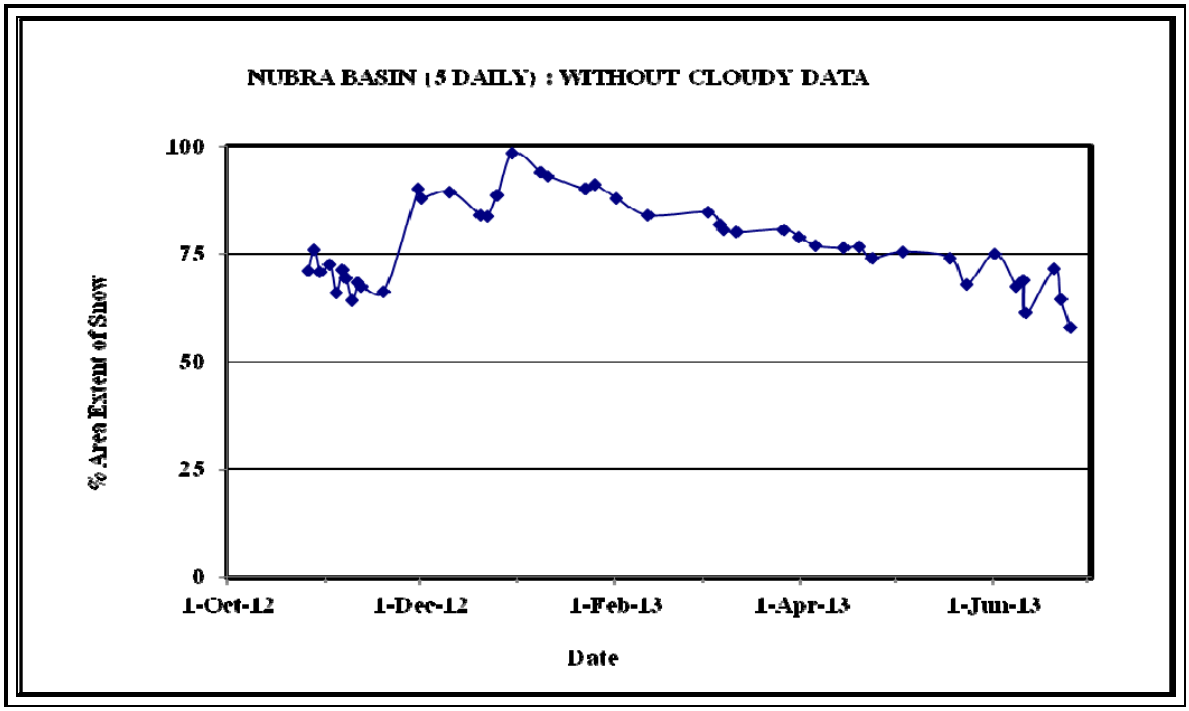
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: NUBRA **BASIN AREA: 4258 sq km**

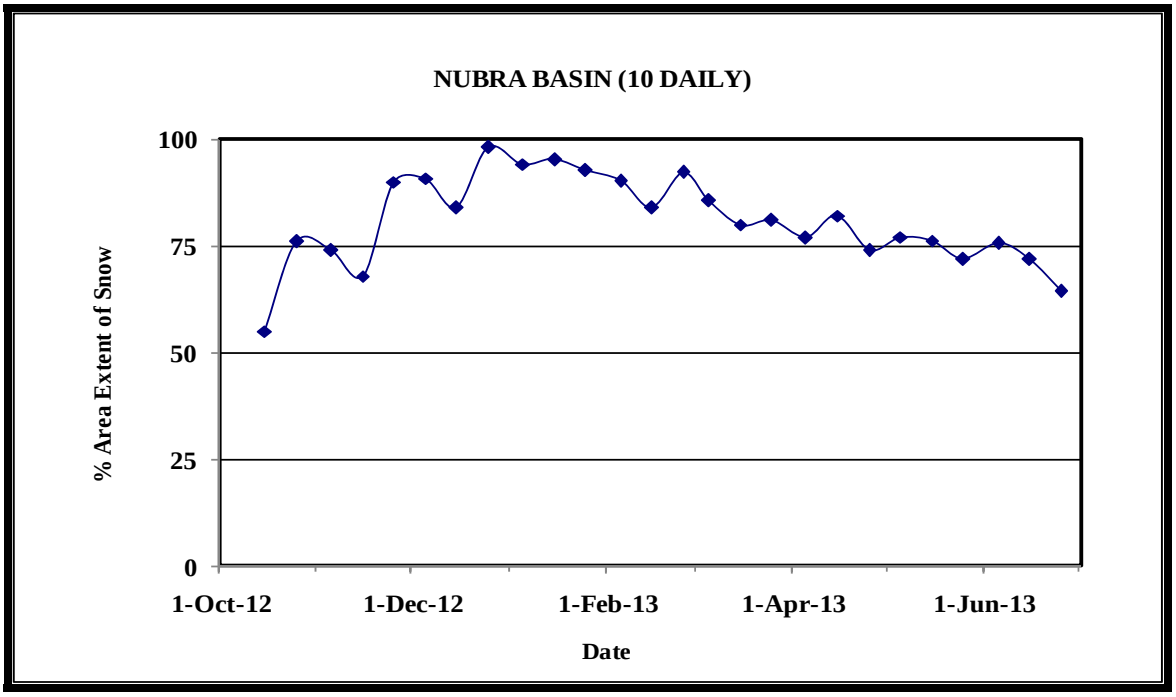
S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
				4	02-Nov-12	3144	74
2	11-Oct-12	2346	55	5	11-Nov-12	2895	68
3	28-Oct-12	3236	76	6	30-Nov-12	3832	90
December 2012				**January 2013**			
7	1-Dec-12	3865	91	10	10-Jan-13	4007	94
8	20-Dec-12	3575	84	11	20-Jan-13	4057	95
9	22-Dec-12	4173	98	12	25-Jan-13	3949	93
February 2013				**March 2013**			
13	01-Feb-13	3844	90	16	02-Mar-13	3645	86
14	11-Feb-13	3577	84	17	11-Mar-13	3406	80
15	25-Feb-13	3929	92	18	31-Mar-13	3448	81
April 2013				**May 2013**			
19	05-Apr-13	3279	77	22	03-May-13	3281	77
20	19-Apr-13	3496	82	23	18-May-13	3251	76
21	23-Apr-13	3151	74	24	23-May-13	3064	72
June 2013							
25	01-Jun-2013	3220	76				
26	20-Jun-2013	3065	72				
27	22-Jun-2013	2749	65				

Snow cover depletion curve



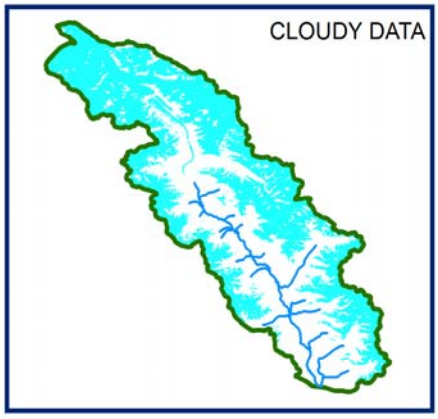


Snow cover depletion curve



SNOW COVER MAP

SNOW COVER MAP : NUBRA BASIN



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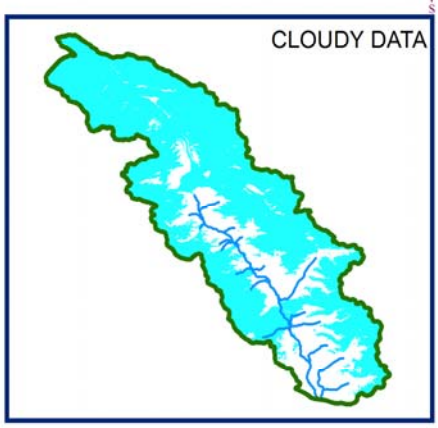

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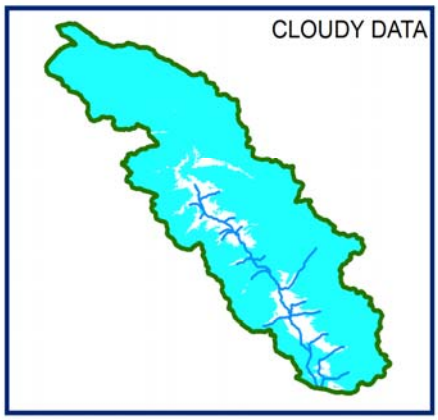

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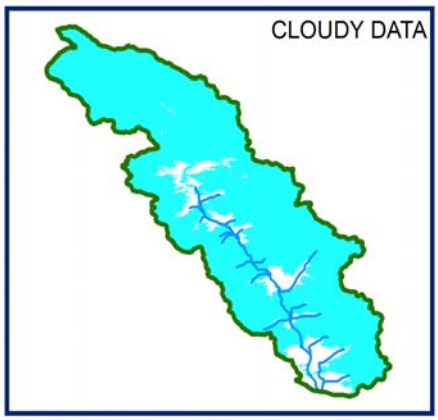

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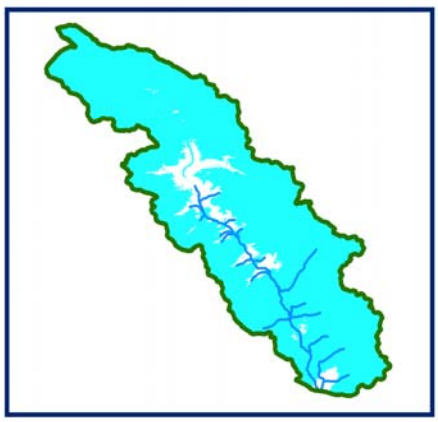

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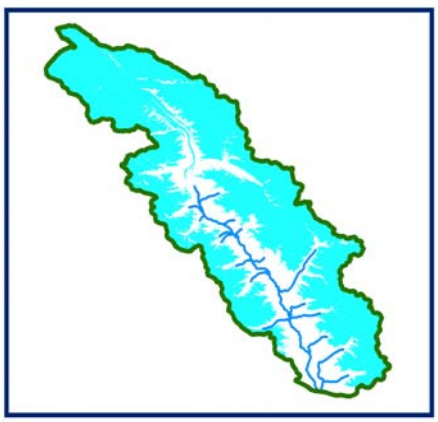


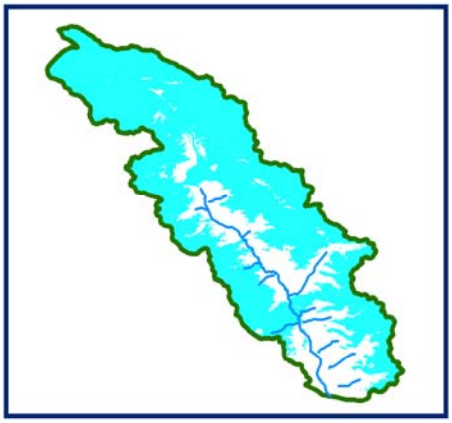
30 OCTOBER 2012

SNOW

0 15 30 60 90 120

Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED

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06 OCTOBER 2012
02 OCTOBER 2012

DATA USED

11 OCTOBER 2012
19 OCTOBER 2012
14 OCTOBER 2012

DATA USED

28 OCTOBER 2012
26 OCTOBER 2012
30 OCTOBER 2012

SNOW

0 15 30 60 90 120
Kilometers

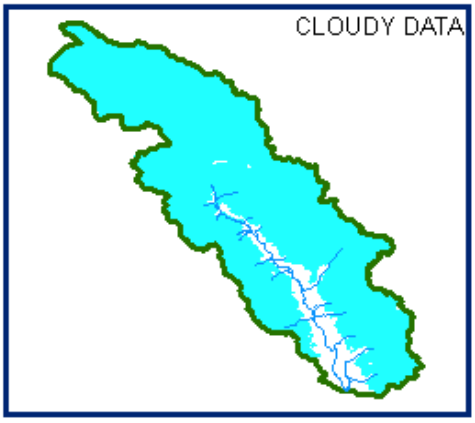
SNOW COVER MAP : NUBRA BASIN

02 NOVEMBER 2012

07 NOVEMBER 2012

11 NOVEMBER 2012

19 NOVEMBER 2012



26 NOVEMBER 2012

30 NOVEMBER 2012

SNOW

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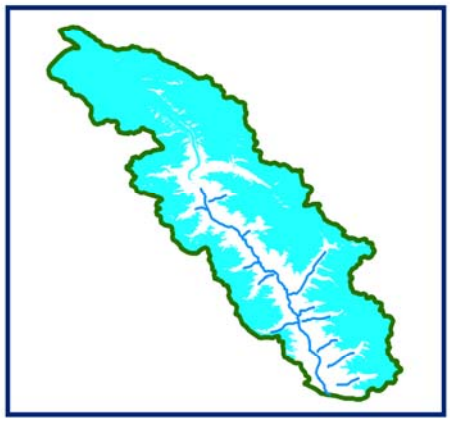
Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED

01 NOVEMBER 2012
07 NOVEMBER 2012
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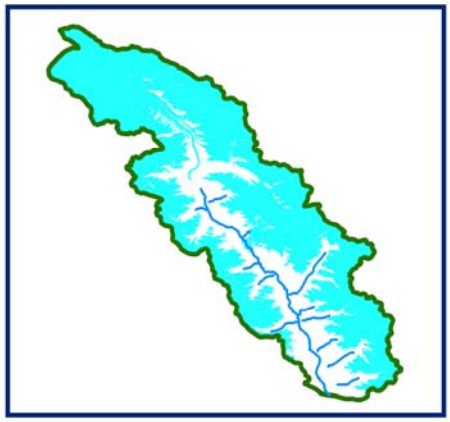

DATA USED

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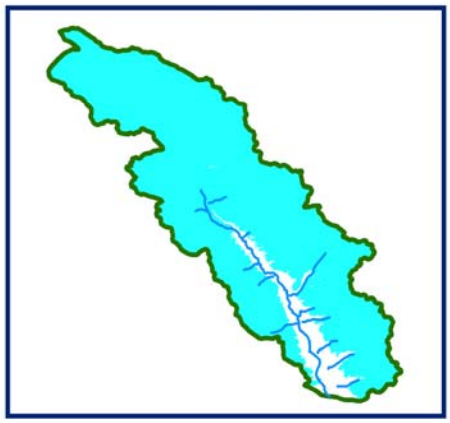
12 NOVEMBER 2012



DATA USED

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26 NOVEMBER 2012

SNOW

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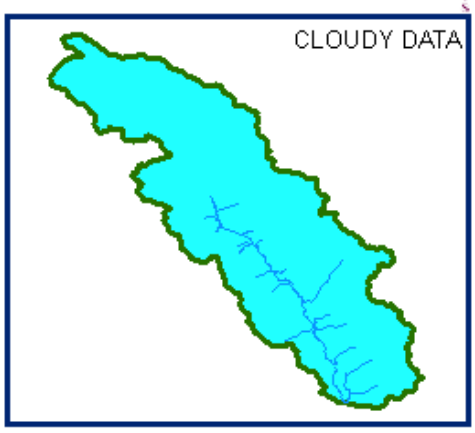
Kilometers

SNOW COVER MAP : NUBRA BASIN

01 DECEMBER 2012



06 DECEMBER 2012

10 DECEMBER 2012

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25 DECEMBER 2012

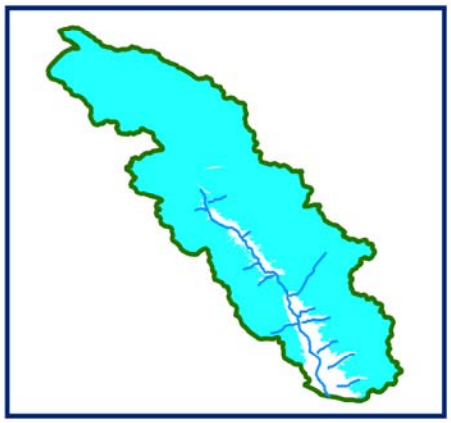
30 DECEMBER 2012

SNOW

0 15 30 60 90 120

Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED

01 DECEMBER 2012
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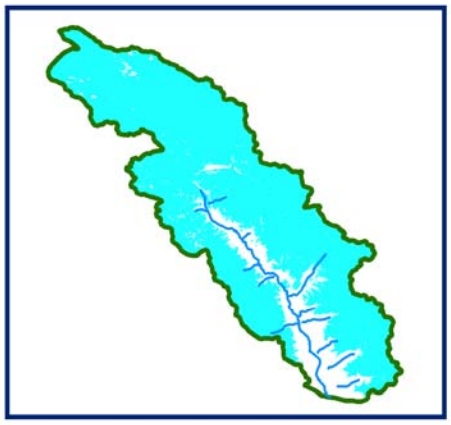
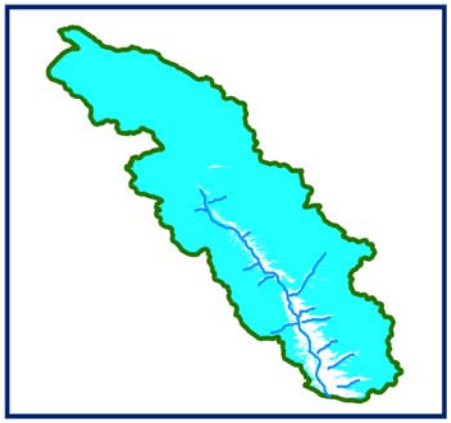
06 DECEMBER 2012



DATA USED

20 DECEMBER 2012



DATA USED

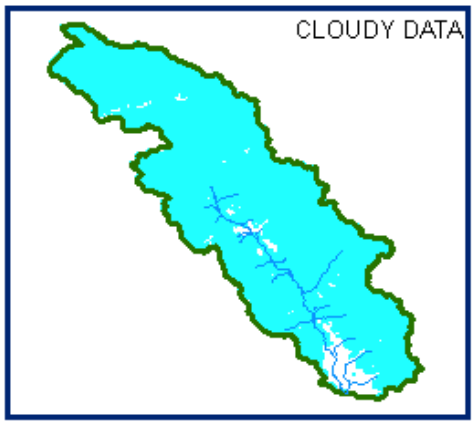
22 DECEMBER 2012
30 DECEMBER 2012
25 DECEMBER 2012

SNOW

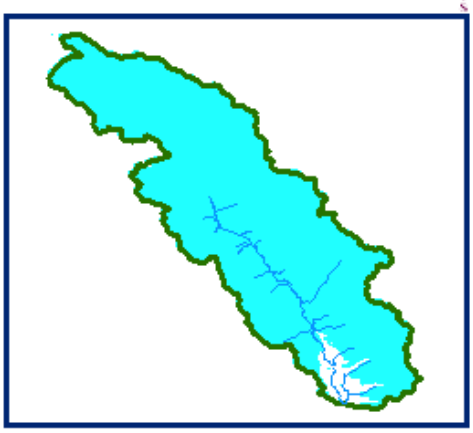
0 15 30 60 90 120

Kilometers

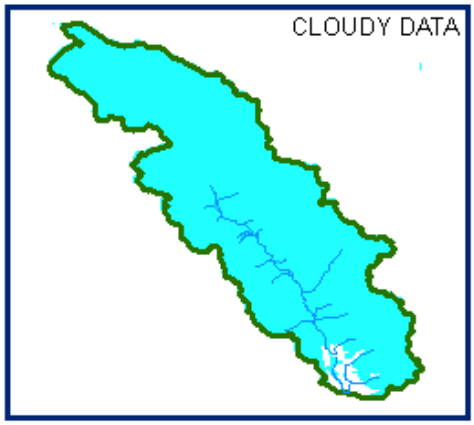
SNOW COVER MAP : NUBRA BASIN



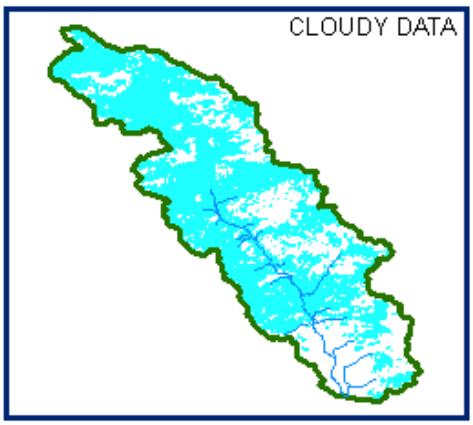
05 JANUARY 2013



10 JANUARY 2013

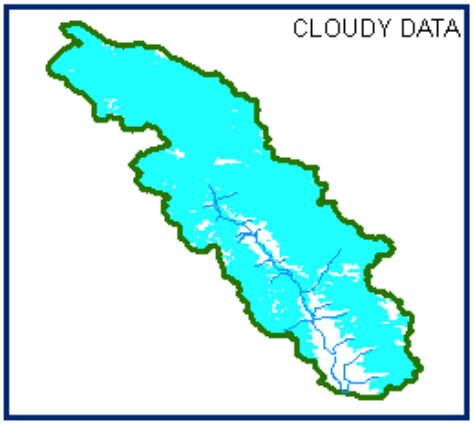


13 JANUARY 2013



20 JANUARY 2013

25 JANUARY 2013



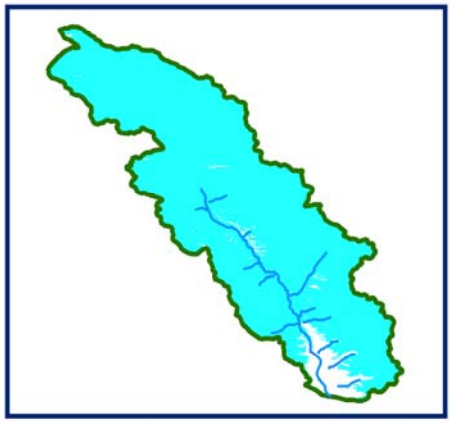
30 JANUARY 2013

SNOW

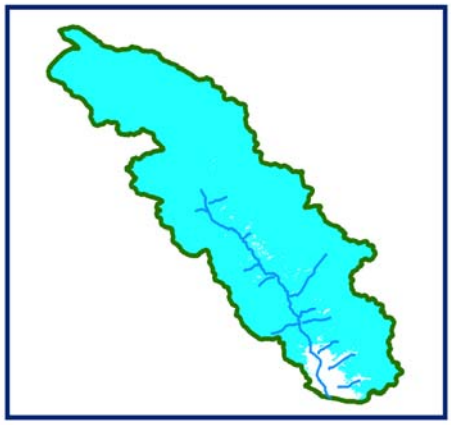
0 15 30 60 90 120

Kilometers

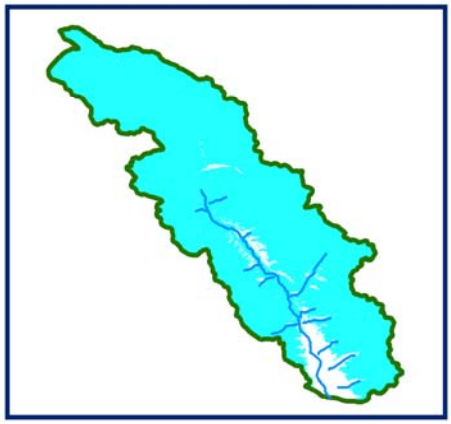
10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED
10 JANUARY 2013
05 JANUARY 2013
08 JANUARY 2013



DATA USED
20 JANUARY 2013
13 JANUARY 2013



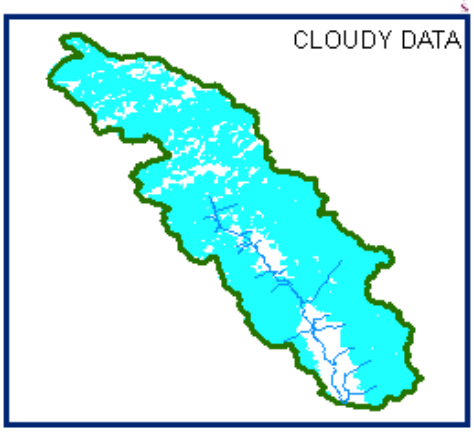
DATA USED
25 JANUARY 2013
22 JANUARY 2013
30 JANUARY 2013

SNOW

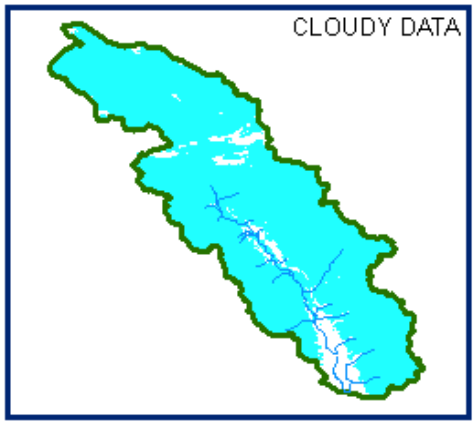
0 15 30 60 90 120
Kilometers

SNOW COVER MAP : NUBRA BASIN

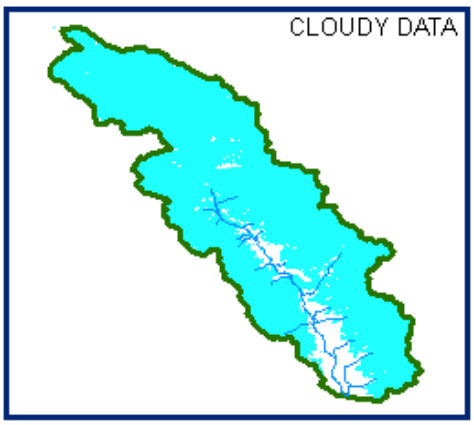
01 FEBRUARY 2013



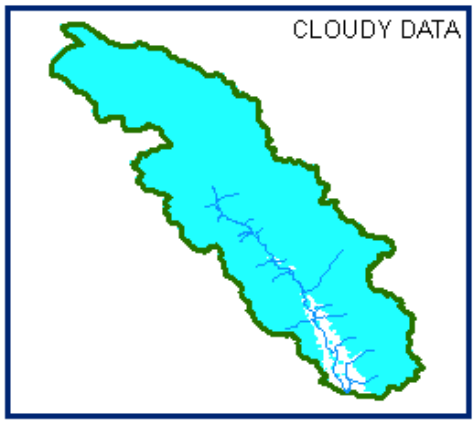
10 FEBRUARY 2013



11 FEBRUARY 2013



20 FEBRUARY 2013



25 FEBRUARY 2013

DATA NOT AVAILABLE

SNOW

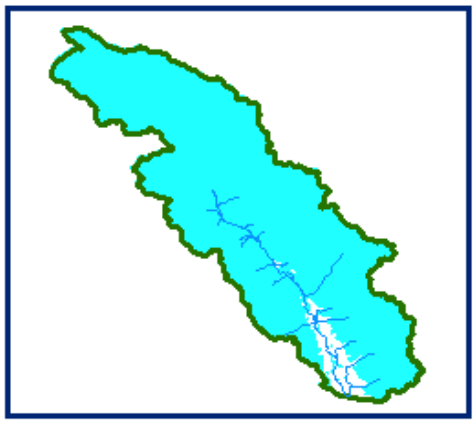
0 15 30 60 90 120

Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN

DATA USED
01 FEBRUARY 2013
10 FEBRUARY 2013

DATA USED
11 FEBRUARY 2013
20 FEBRUARY 2013



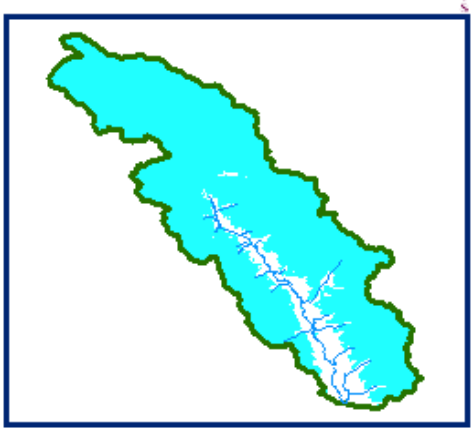
DATA USED
25 FEBRUARY 2013

SNOW

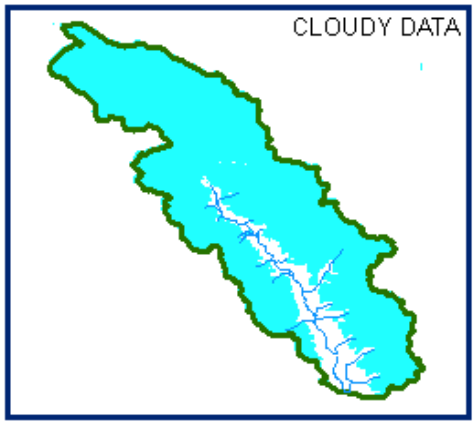
0 15 30 60 90 120
Kilometers

SNOW COVER MAP : NUBRA BASIN

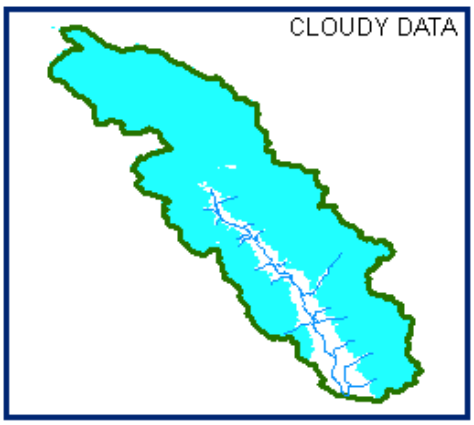
02 MARCH 2013



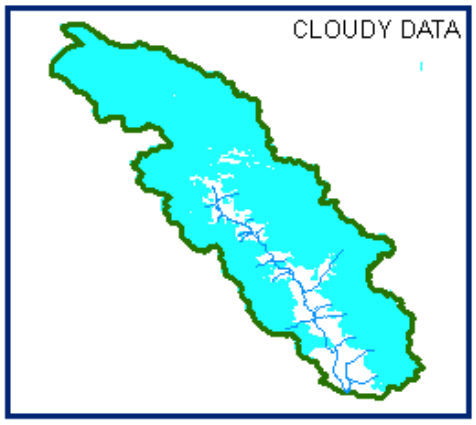
06 MARCH 2013



11 MARCH 2013



16 MARCH 2013



21 MARCH 2013

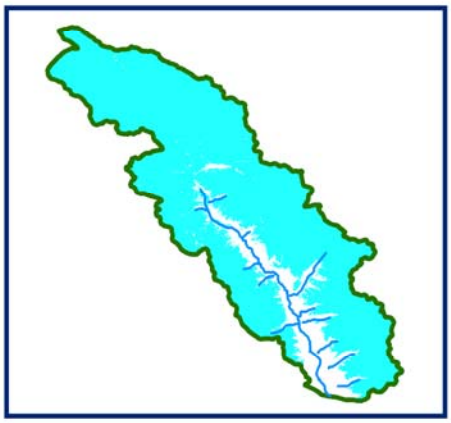
26 MARCH 2013

SNOW

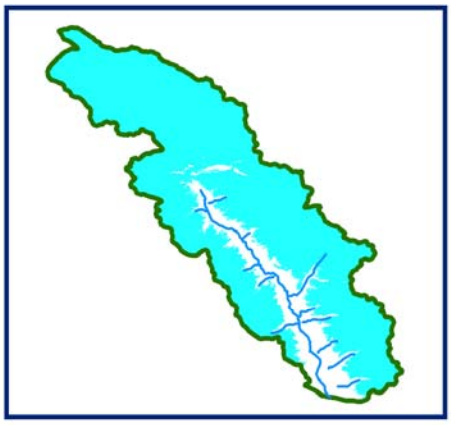
0 15 30 60 90 120

Kilometers

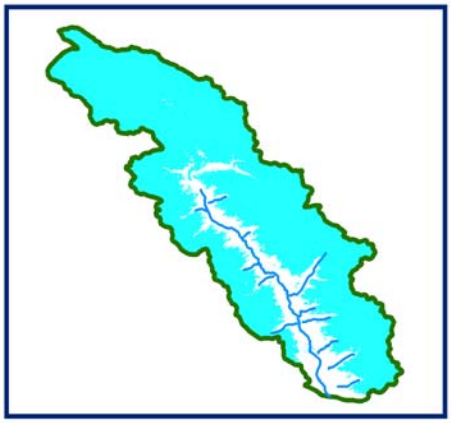
10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED
02 MARCH 2013
07 MARCH 2013
06 MARCH 2013



DATA USED
11 MARCH 2013
16 MARCH 2013

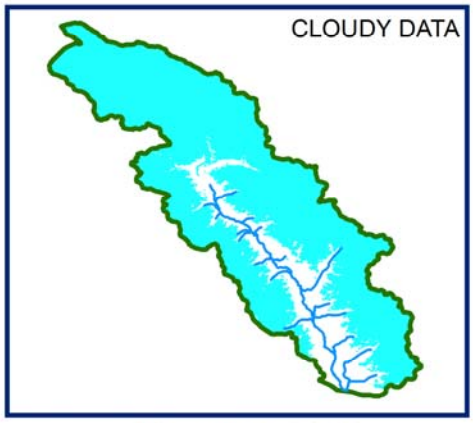


DATA USED
31 MARCH 2013
21 MARCH 2013
26 MARCH 2013

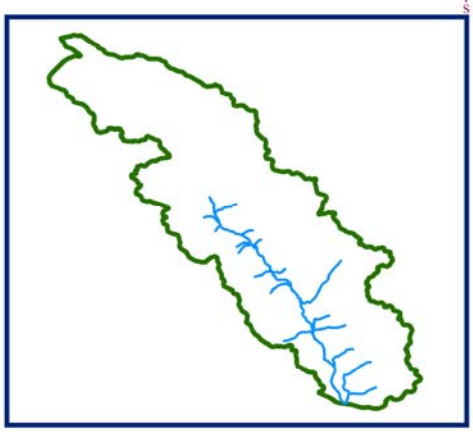
SNOW

0 15 30 60 90 120
Kilometers

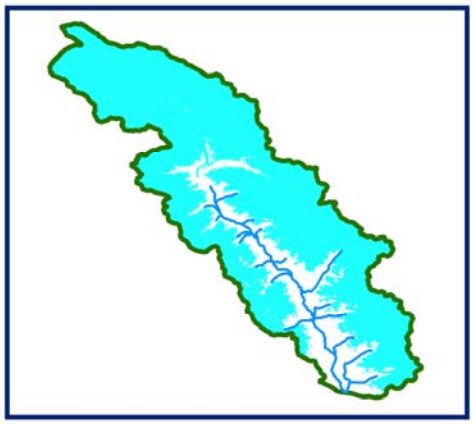
SNOW COVER MAP : NUBRA BASIN



04 APRIL 2013



DATA NOT AVAILABLE



14 APRIL 2013

19 APRIL 2013

23 APRIL 2013

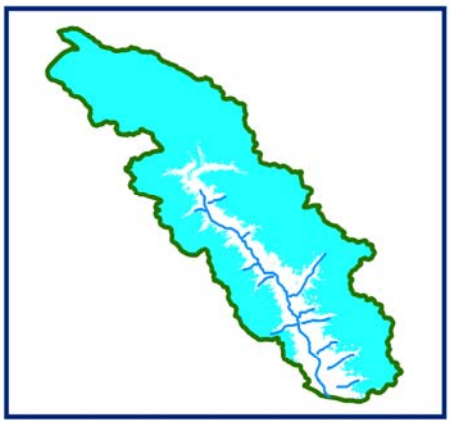
DATA NOT AVAILABLE

SNOW

0 15 30 60 90 120

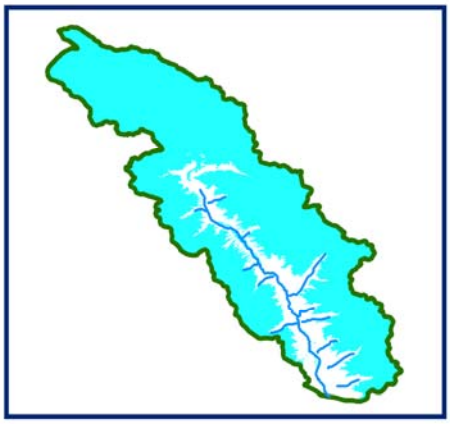
Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN



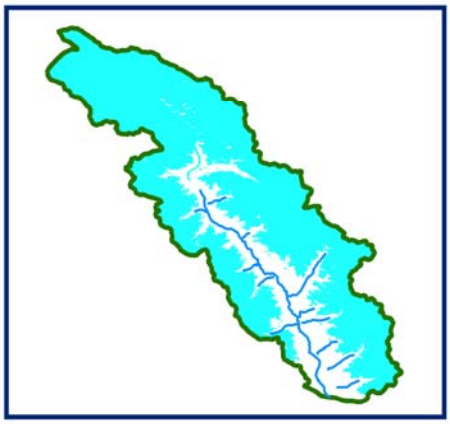
DATA USED

05 APRIL 2013
04 APRIL 2013



DATA USED

19 APRIL 2013
11 APRIL 2013
14 APRIL 2013



DATA USED

23 APRIL 2013

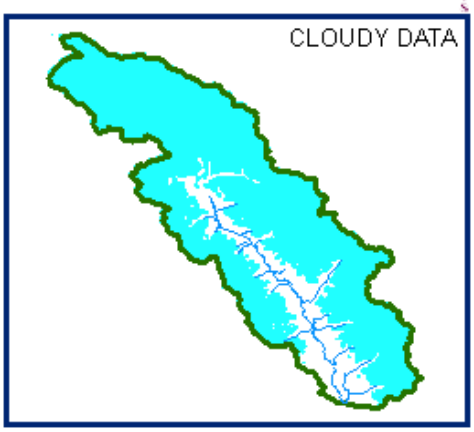
SNOW

0 15 30 60 90 120

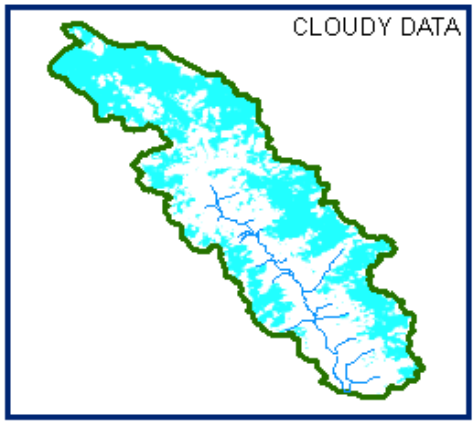
Kilometers

SNOW COVER MAP : NUBRA BASIN

03 MAY 2013



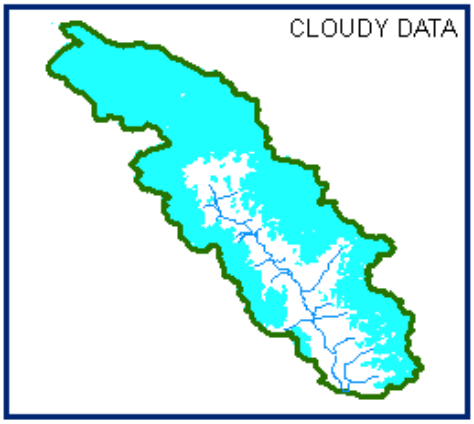
10 MAY 2013



13 MAY 2013

18 MAY 2013

23 MAY 2013



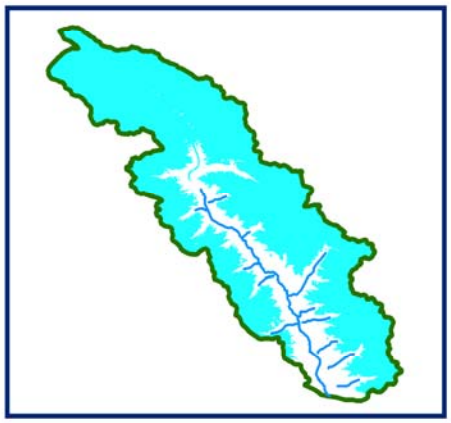
29 MAY 2013

SNOW

0 15 30 60 90 120

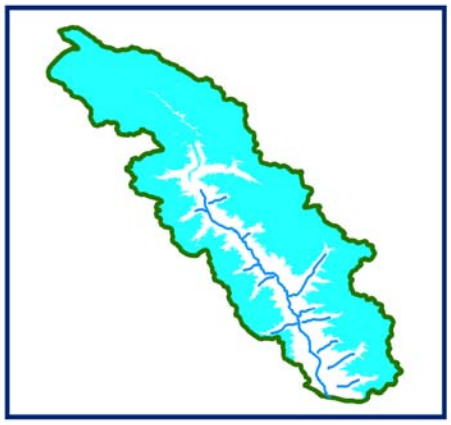
Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN



DATA USED

03 MAY 2013
10 MAY 2013



DATA USED

18 MAY 2013
17 MAY 2013
15 MAY 2013

DATA USED

22 MAY 2013
23 MAY 2013
29 MAY 2013

SNOW

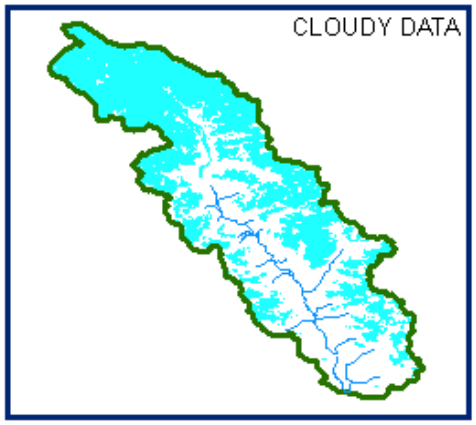
0 15 30 60 90 120

Kilometers

SNOW COVER MAP : NUBRA BASIN

01 JUNE 2013

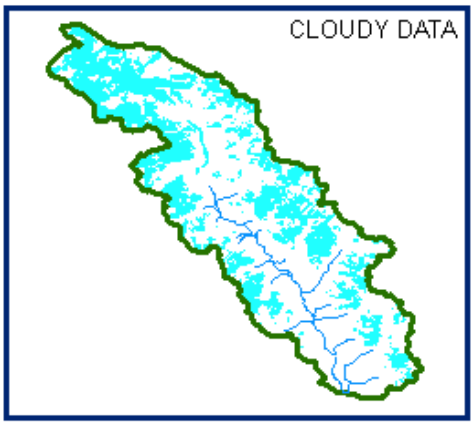
08 JUNE 2013



13 JUNE 2013

20 JUNE 2013

25 JUNE 2013



30 JUNE 2013

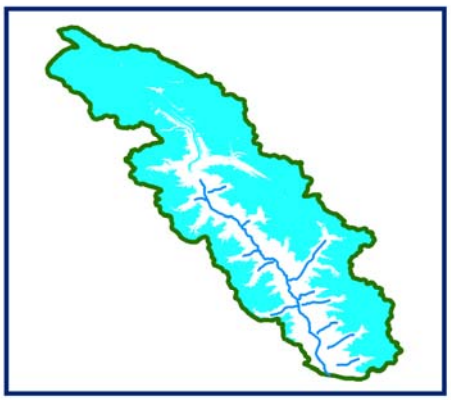
SNOW

0 15 30 60 90 120

Kilometers

10 DAILY SNOW COVER MAP: NUBRA BASIN

DATA USED
01 JUNE 2013
10 JUNE 2013
08 JUNE 2013



DATA USED
20 JUNE 2013
13 JUNE 2013
11 JUNE 2013

DATA USED
22 JUNE 2013
30 JUNE 2013
25 JUNE 2013

SNOW

0 15 30 60 90 120
Kilometers

SHYOK BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SHYOK **BASIN AREA: 27120 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	6266	23	8	18-Oct-12	20059	74
2	2-Oct-12	6451	28	9	19-Oct-12	18506	68
3	4-Oct-12	13845	51	10	23-Oct-12	21366	79
4	6-Oct-12	5989	22	11	26-Oct-12	12934	48
5	9-Oct-12	13694	50	12	28-Oct-12	14660	54
6	11-Oct-12	7792	29	13	30-Oct-12	17488	64
7	14-Oct-12	19327	71	14	31-Oct-12	16681	62
November 2012							
15	2-Nov-12	13013	48	22	14-Nov-12	10263	38
16	4-Nov-12	10766	40	23	16-Nov-12	12305	45
17	6-Nov-12	15315	56	24	19-Nov-12	13329	49
18	7-Nov-12	11922	44	25	24-Nov-12	23416	86
19	9-Nov-12	9982	37	26	26-Nov-12	21743	80
20	11-Nov-12	14828	55	27	30-Nov-12	23258	86
21	12-Nov-12	15023	56				
December 2012							
28	1-Dec-12	22119	82	32	20-Dec-12	16505	61
29	3-Dec-12	12956	48	33	22-Dec-12	16268	60
30	6-Dec-12	21396	79	34	25-Dec-12	21121	78
31	10-Dec-12	18821	69	35	30-Dec-12	23692	87
January 2013							
36	08-Jan-13	20063	74	40	22-Jan-13	19413	72
37	10-Jan-13	21573	80	41	25-Jan-13	21557	79
38	13-Jan-13	24596	91	42	27-Jan-13	17555	65
39	20-Jan13	12107	45	43	30-Jan-13	16504	61
February 2013							
44	1-Feb-13	17787	66	47	11-Feb-13	20759	77
45	8-Feb-13	23634	87	48	20-Feb-05	18538	68
46	10-Feb-13	14061	52	49	25-Feb-13	23715	87
March 2013							
50	2-Mar-13	19885	73	53	16-Mar-13	18446	68
51	4-Mar-13	18981	70	54	21-Mar-13	15995	59
52	6-Mar-13	18098	67	55	26-Mar-13	17160	63

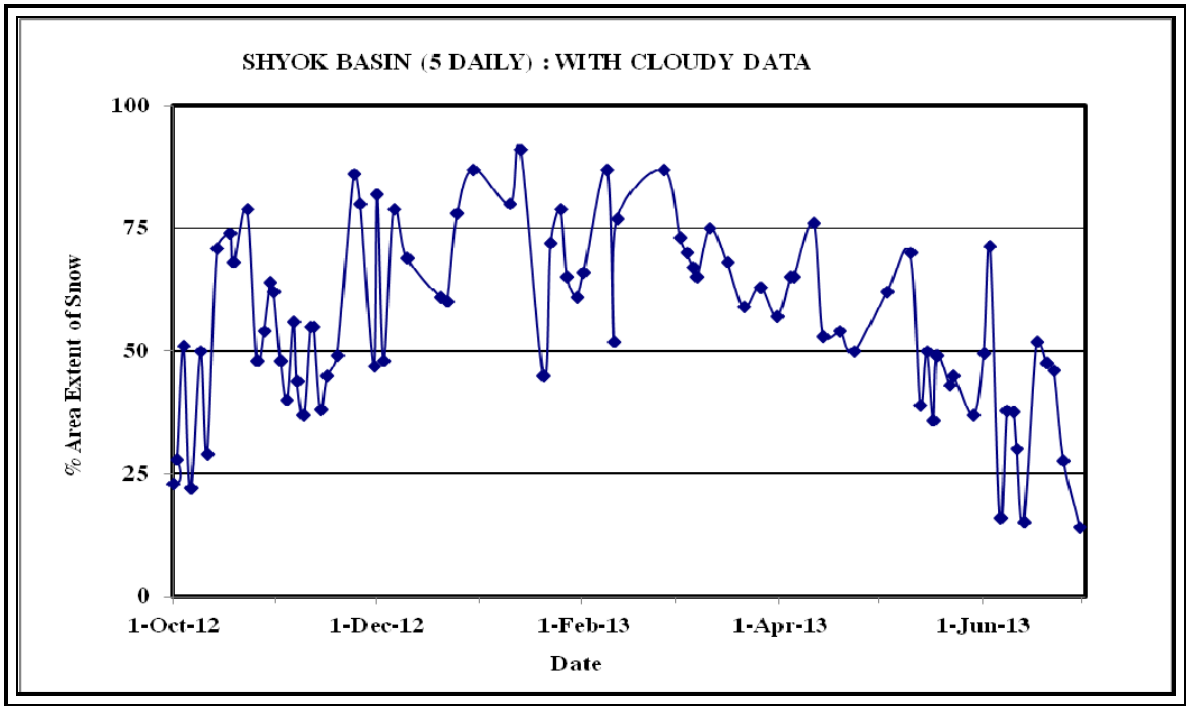
56	7-Mar-13	17521	65	58	31-Mar-13	15577	57
57	11-Mar-13	20416	75				
April 2013							
59	4-Apr-13	17718	65	62	14-Apr-13	14393	53
60	5-Apr-13	17553	65	63	19-Apr-13	14689	54
61	11-Apr-13	20595	76	64	23-Apr-13	13600	50
May 2013							
65	3-May-13	16702	62	70	18-May-13	13176	49
66	10-May-13	18882	70	71	22-May-13	11595	43
67	13-May-13	10645	39	72	23-May-13	12233	45
68	15-May-13	13660	50	73	29-May-13	10033	37
69	17-May-13	9655	36				
June 2013							
74	1-Jun-13	13458	50	80	13-Jun-13	4133	15
75	3-Jun-13	19367	71	81	20-Jun-13	12905	48
76	6-Jun-13	4326	16	82	22-Jun-13	12490	46
77	8-Jun-13	10245	38	83	25-Jun-13	7532	28
78	10-Jun-13	10186	38	84	30-Jun-13	3824	14
79	11-Jun-13	8180	30				

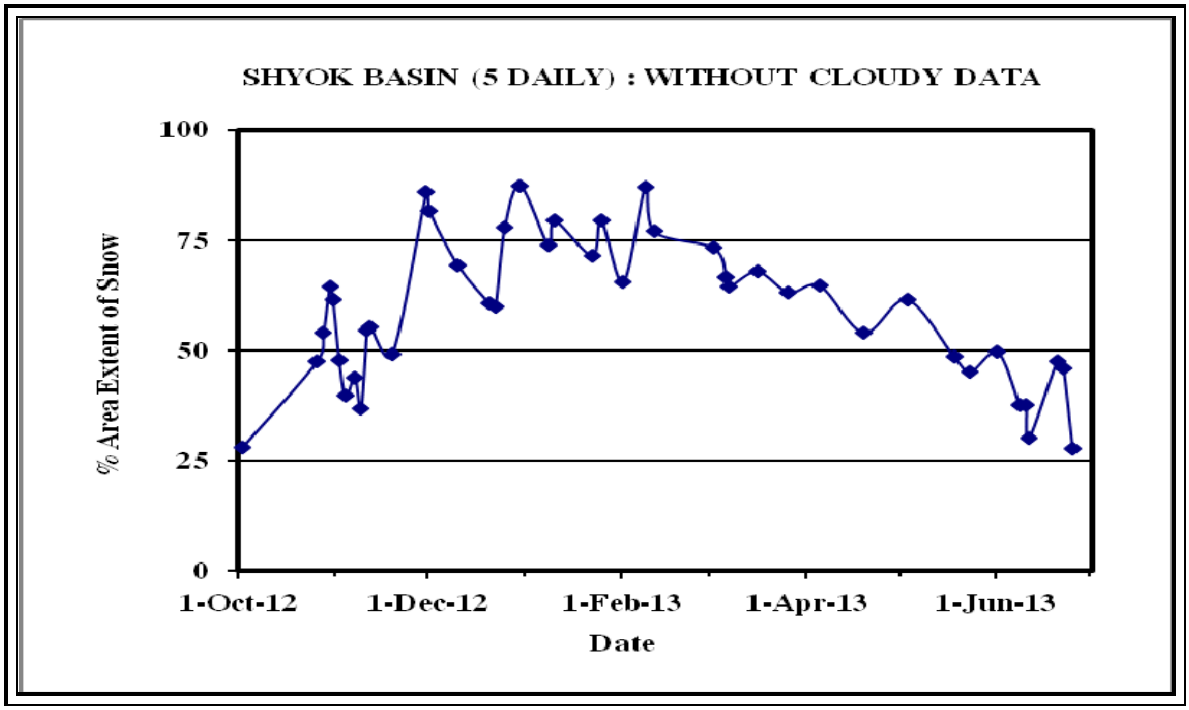
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: SHYOK **BASIN AREA: 27120 sq km**

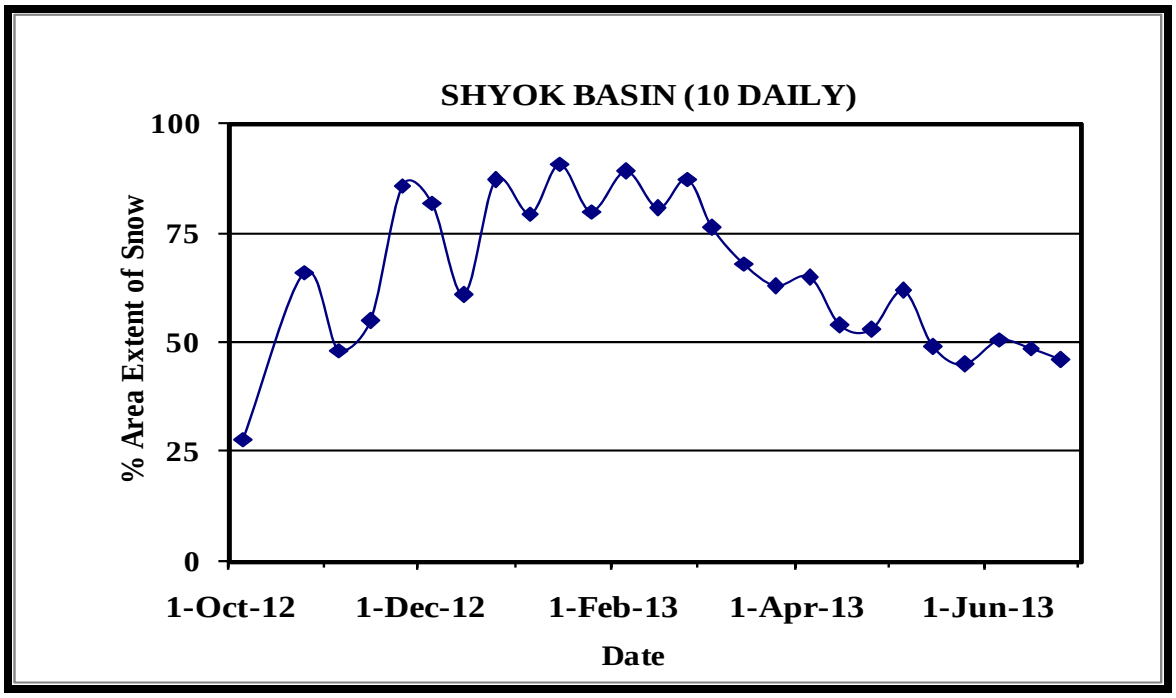
S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
1	2-Oct-12	7594	28	4	02-Nov-12	13081	48
				5	12-Nov-12	14916	55
3	28-Oct-12	17907	66	6	24-Nov-12	23323	86
December 2012				**January 2013**			
7	1-Dec-12	22238	82	10	10-Jan-13	21573	80
8	20-Dec-12	16505	61	11	20-Jan-13	24644	91
9	22-Dec-12	23594	87	12	25-Jan-13	21682	80
February 2013				**March 2013**			
13	08-Feb-13	24156	87	16	02-Mar-13	20661	76
14	20-Feb-13	21861	77	17	11-Mar-13	18442	68
15	25-Feb-13	23715	87	18	26-Mar-13	17086	63
April 2013				**May 2013**			
19	05-Apr-13	17628	65	22	03-May-13	16814	62
20	19-Apr-13	14645	54	23	18-May-13	13289	49
21	23-Apr-13	14374	53	24	23-May-13	12204	45
June 2013							
25	01-Jun-2013	13744	51				
26	20-Jun-2013	13196	49				
27	22-Jun-2013	12524	46				

Snow cover depletion curve



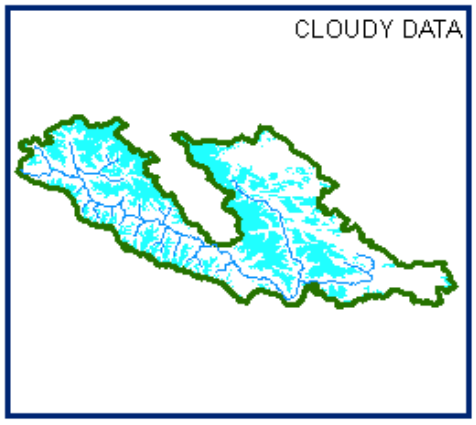


Snow cover depletion curve

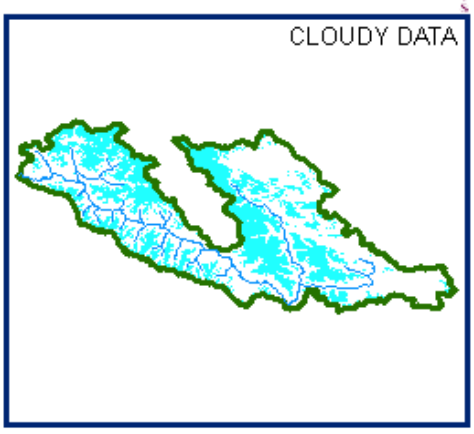


SNOW COVER MAP

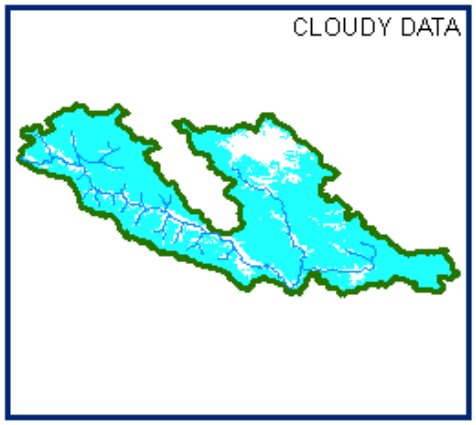
SNOW COVER MAP : SHYOK BASIN



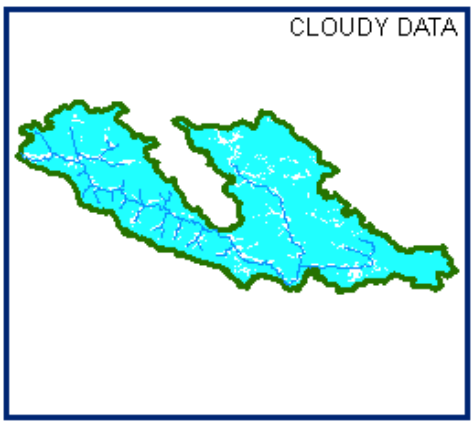
02 OCTOBER 2012



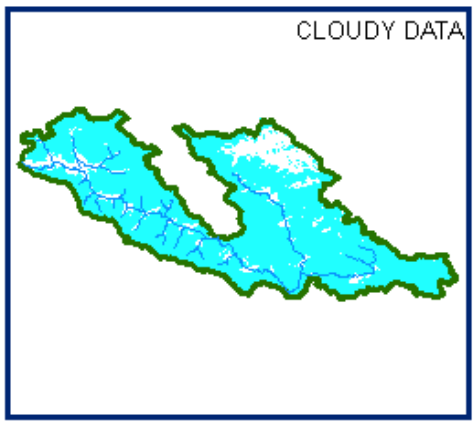
06 OCTOBER 2012



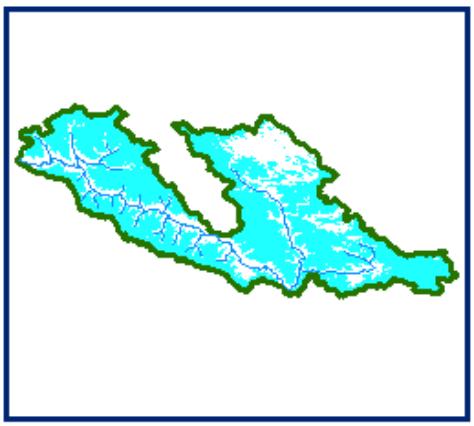
14 OCTOBER 2012



18 OCTOBER 2012



23 OCTOBER 2012



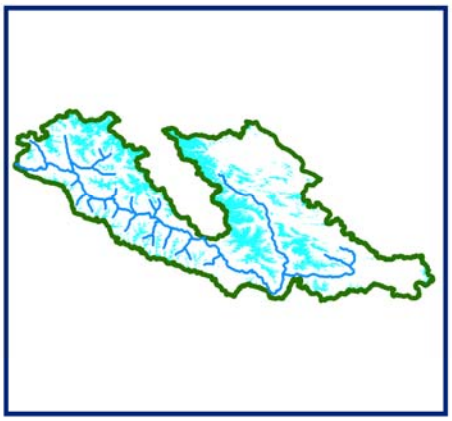
28 OCTOBER 2012

SNOW

0 45 90 180 270 360

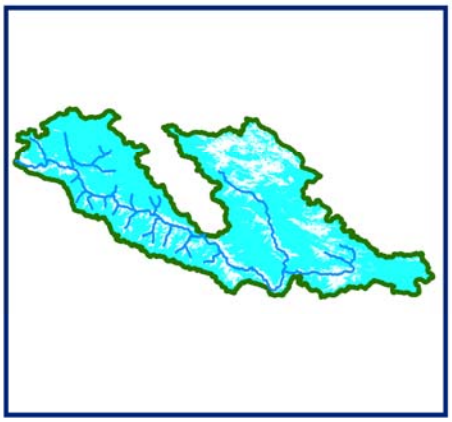
Kilometers

10 DAILY SNOW COVER MAP: SHYOK BASIN



DATA USED

02 OCTOBER 2012
09 OCTOBER 2012
01 OCTOBER 2012



DATA USED

14 OCTOBER 2012
19 OCTOBER 2012
11 OCTOBER 2012

DATA USED

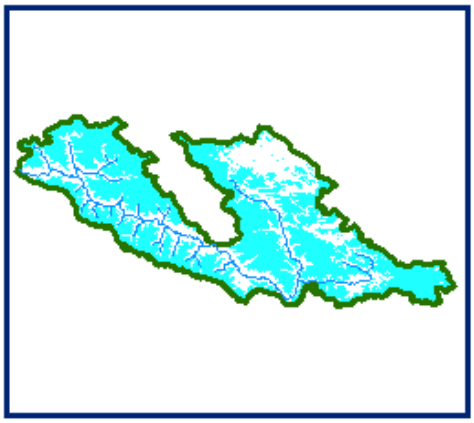
28 OCTOBER 2012
30 OCTOBER 2012
26 OCTOBER 2012

SNOW

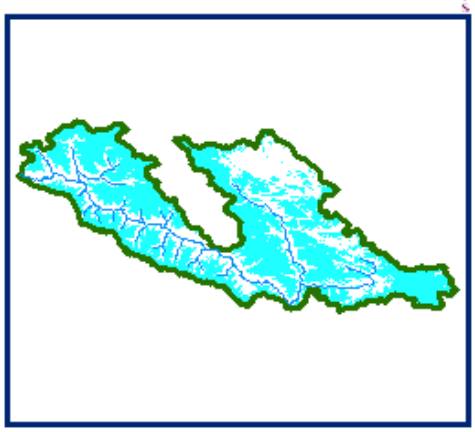
0 45 90 180 270 360

Kilometers

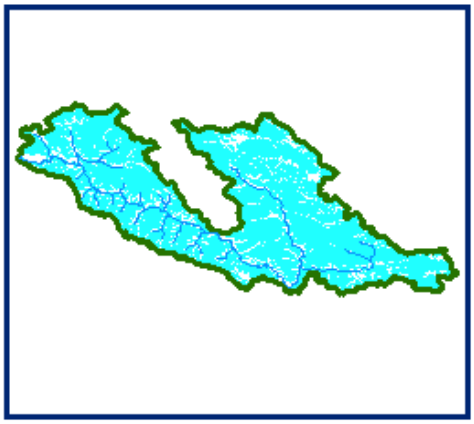
SNOW COVER MAP : SHYOK BASIN



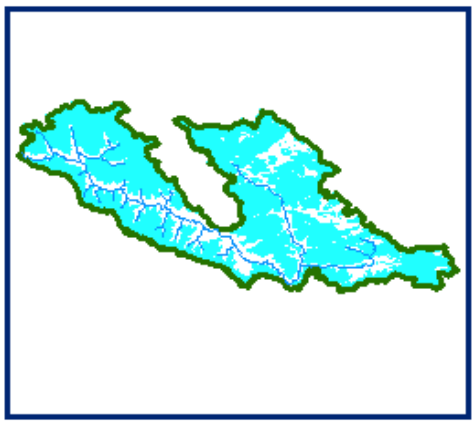
02 NOVEMBER 2012



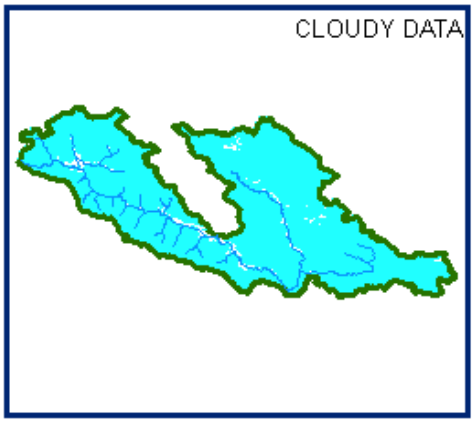
07 NOVEMBER 2012



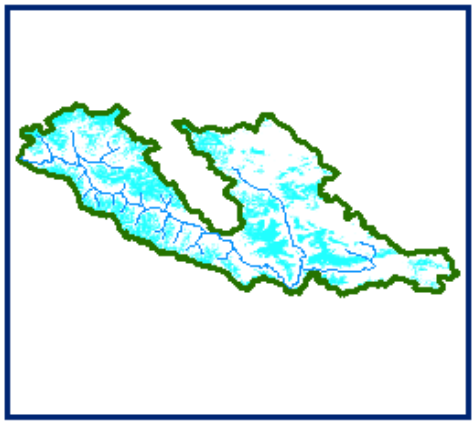
12 NOVEMBER 2012



19 NOVEMBER 2012



24 NOVEMBER 2012



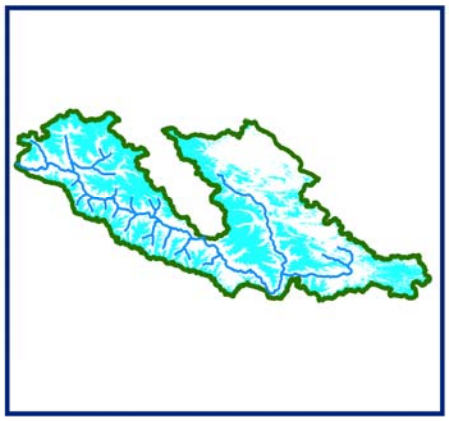
30 NOVEMBER 2012

SNOW

0 45 90 180 270 360

Kilometers

10 DAILY SNOW COVER MAP: SHYOK BASIN

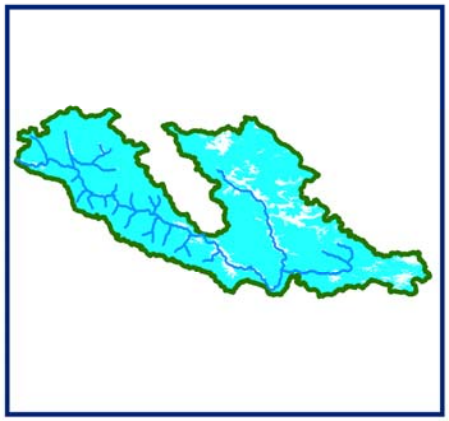


DATA USED

02 NOVEMBER 2012
09 NOVEMBER 2012
04 NOVEMBER 2012

DATA USED

12 NOVEMBER 2012
19 NOVEMBER 2012
11 NOVEMBER 2012



DATA USED

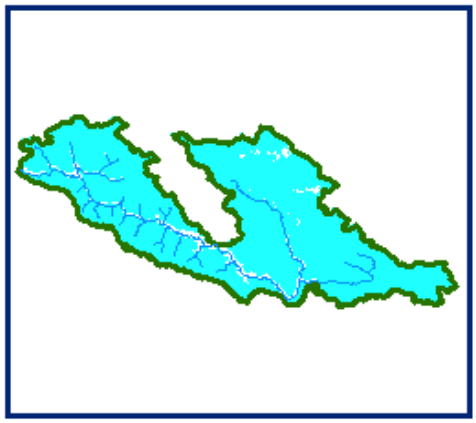
24 NOVEMBER 2012
26 NOVEMBER 2012
30 NOVEMBER 2012

SNOW

0 45 90 180 270 360

Kilometers

SNOW COVER MAP : SHYOK BASIN



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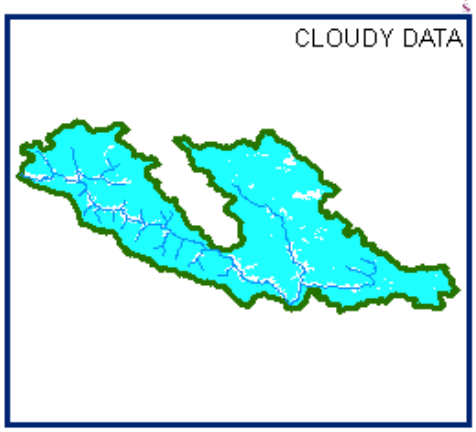
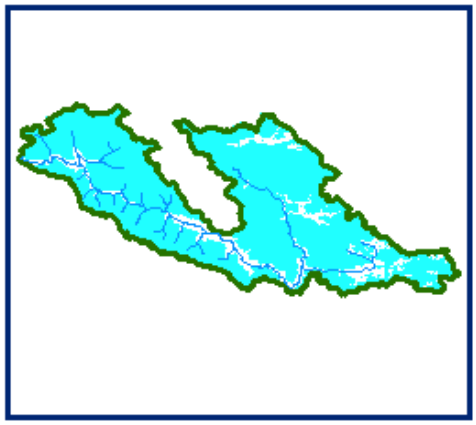
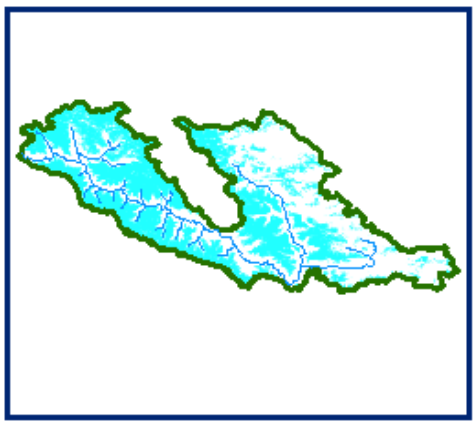


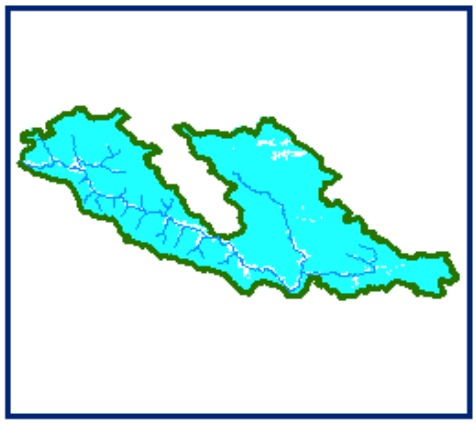
06 DECEMBER 2012



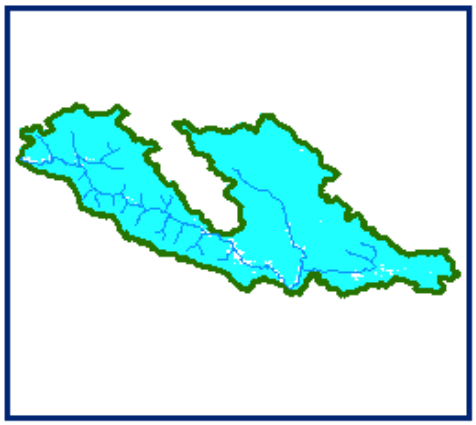
10 DECEMBER 2012



20 DECEMBER 2012



25 DECEMBER 2012



30 DECEMBER 2012

SNOW

0 45 90 180 270 360

Kilometers

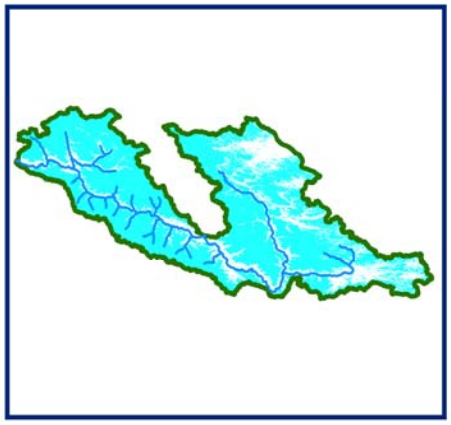
10 DAILY SNOW COVER MAP: SHYOK BASIN

DATA USED

01 DECEMBER 2012
03 DECEMBER 2012
10 DECEMBER 2012

DATA USED

20 DECEMBER 2012



DATA USED

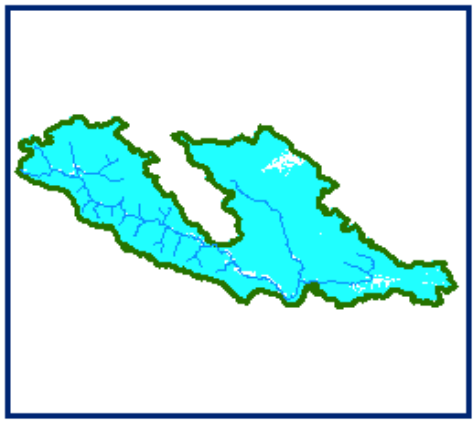
22 DECEMBER 2012
30 DECEMBER 2012
25 DECEMBER 2012

SNOW

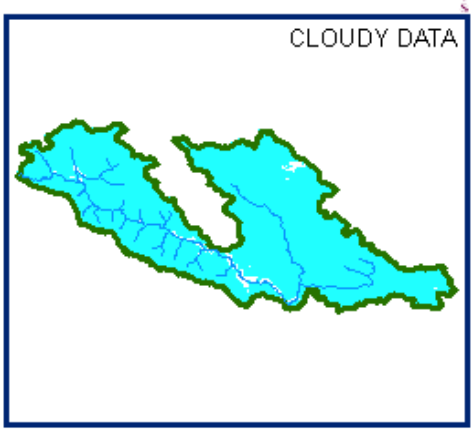
0 45 90 180 270 360

Kilometers

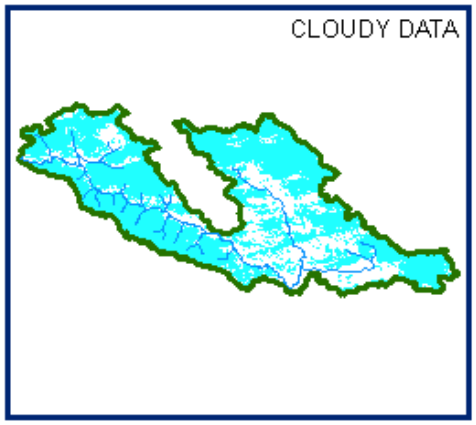
SNOW COVER MAP : SHYOK BASIN



10 JANUARY 2013



13 JANUARY 2013



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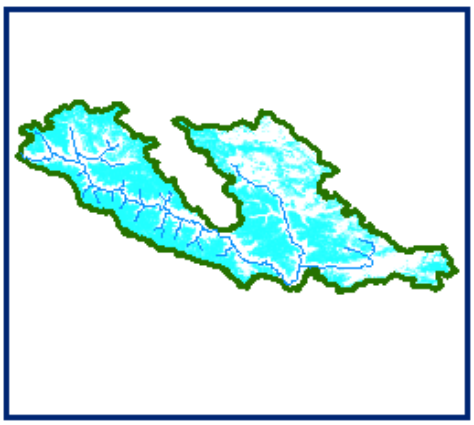
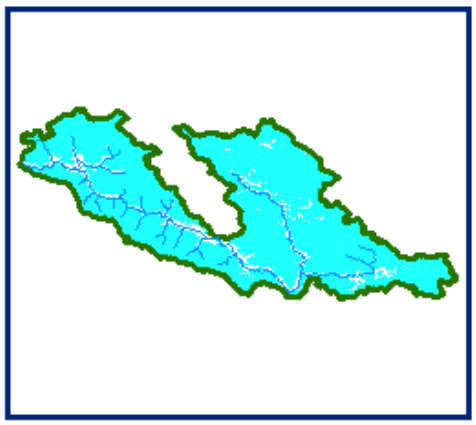


22 JANUARY 2013



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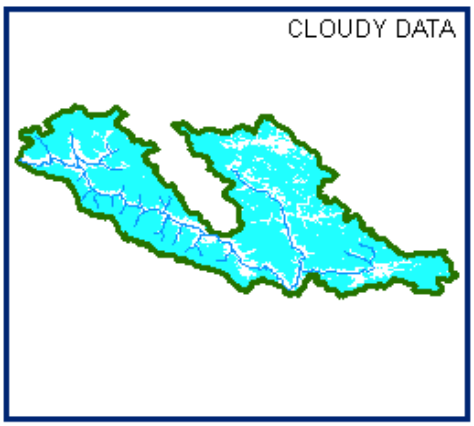


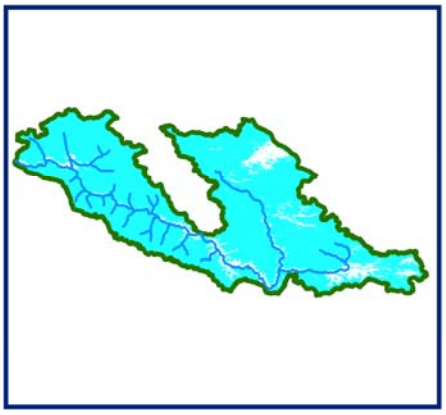
30 JANUARY 2013

SNOW

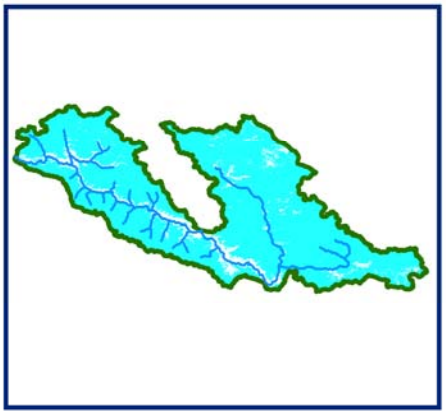
0 45 90 180 270 360

Kilometers

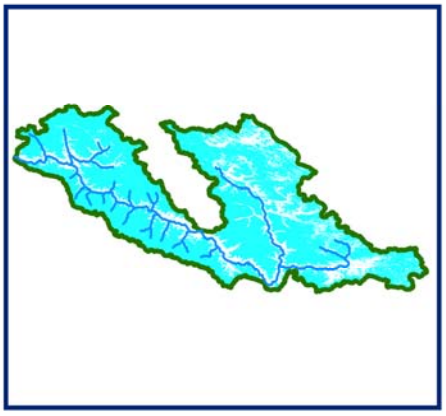
10 DAILY SNOW COVER MAP: SHYOK BASIN



DATA USED
10 JANUARY 2013



DATA USED
20 JANUARY 2013
13 JANUARY 2013

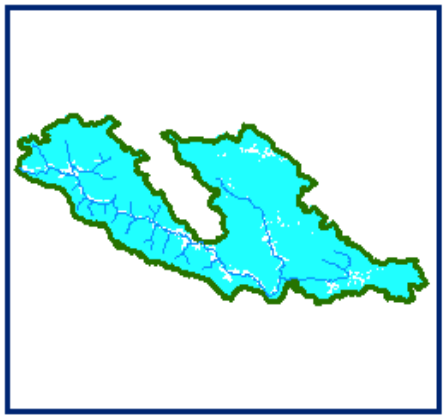


DATA USED
25 JANUARY 2013
30 JANUARY 2013
22 JANUARY 2013

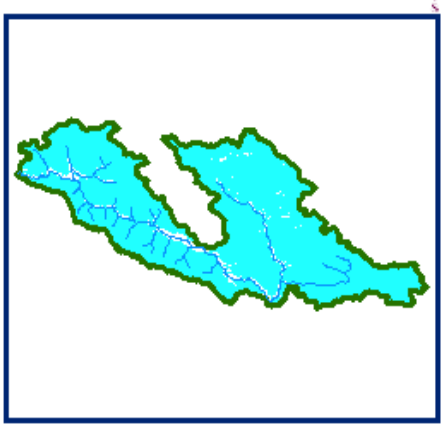
SNOW

0 45 90 180 270 360
Kilometers

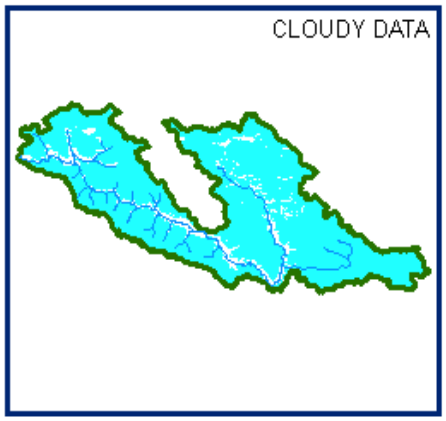
SNOW COVER MAP : SHYOK BASIN



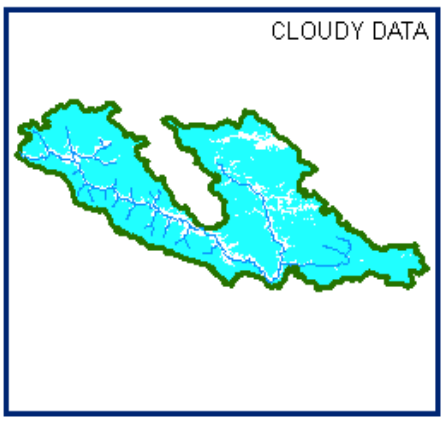
01 FEBRUARY 2013



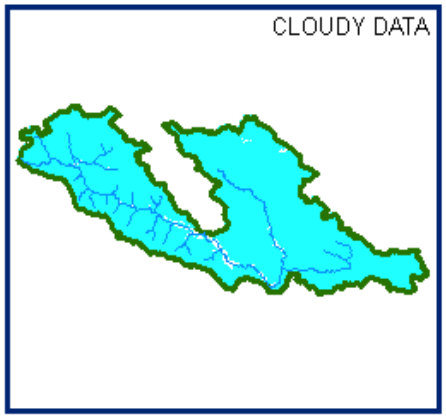
08 FEBRUARY 2013



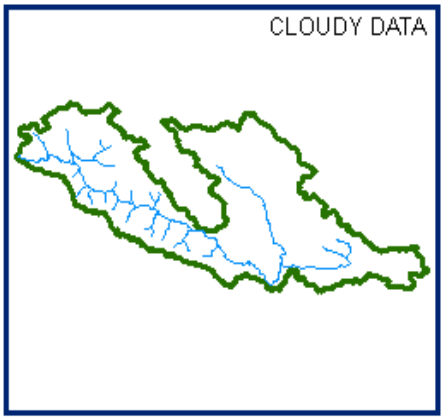
11 FEBRUARY 2013



20 FEBRUARY 2013



25 FEBRUARY 2013



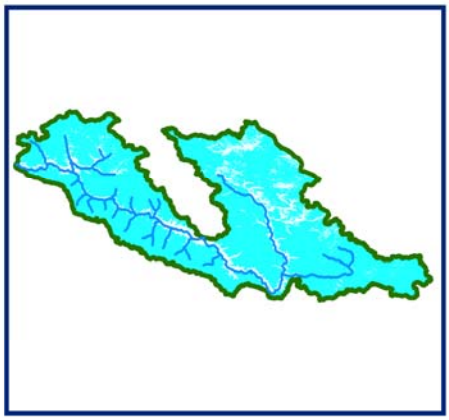
DATA NOT AVAILABLE

SNOW

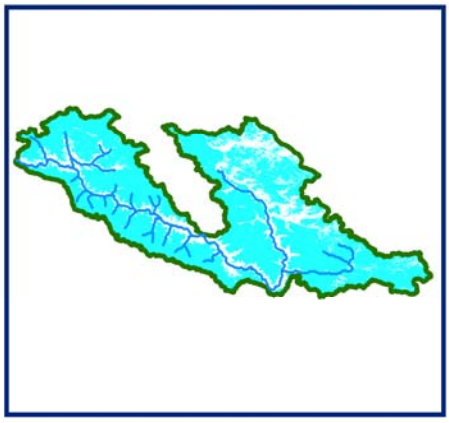
0 45 90 180 270 360

Kilometers

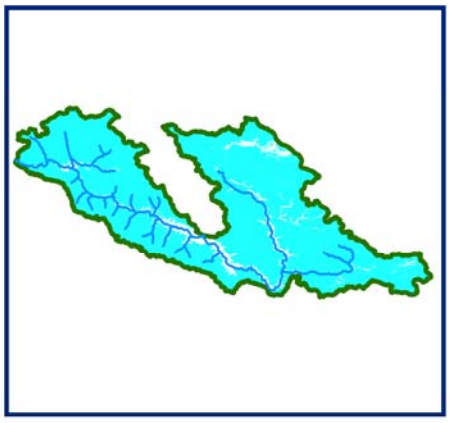
10 DAILY SNOW COVER MAP: SHYOK BASIN



DATA USED
08 FEBRUARY 2013
10 FEBRUARY 2013
01 FEBRUARY 2013



DATA USED
20 FEBRUARY 2013
11 FEBRUARY 2013

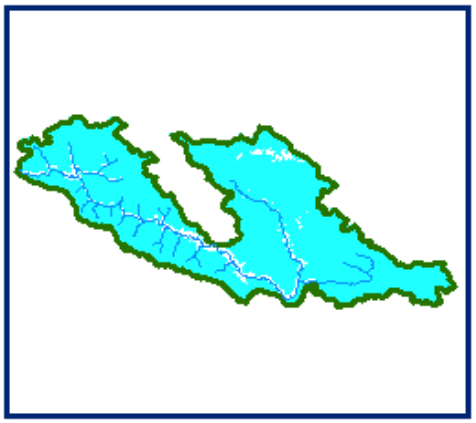


DATA USED
25 FEBRUARY 2013

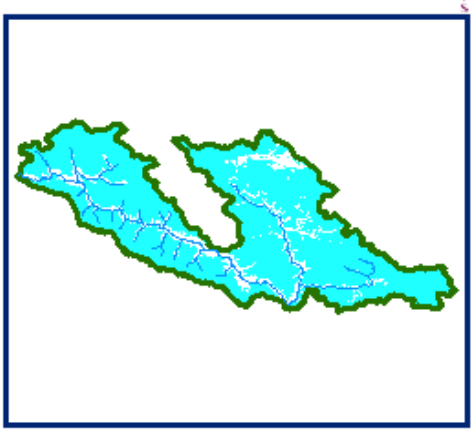
SNOW

0 45 90 180 270 360
Kilometers

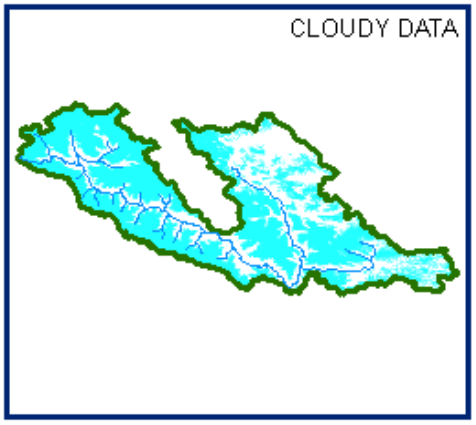
SNOW COVER MAP : SHYOK BASIN



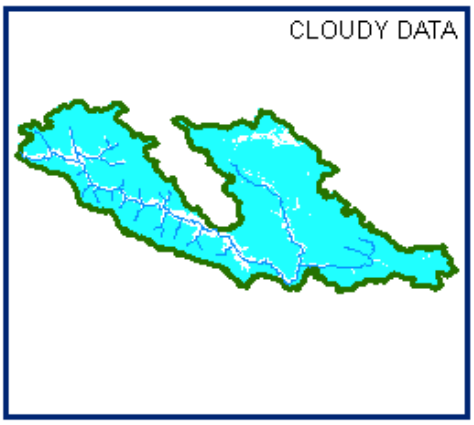
02 MARCH 2013



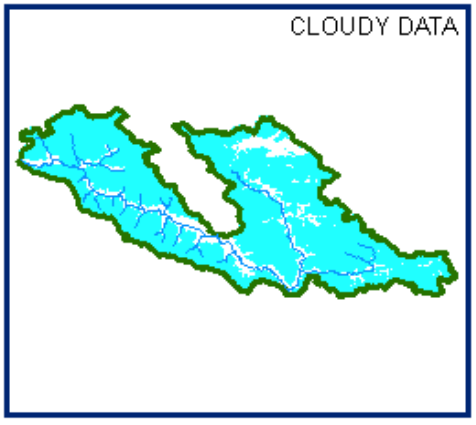
07 MARCH 2013



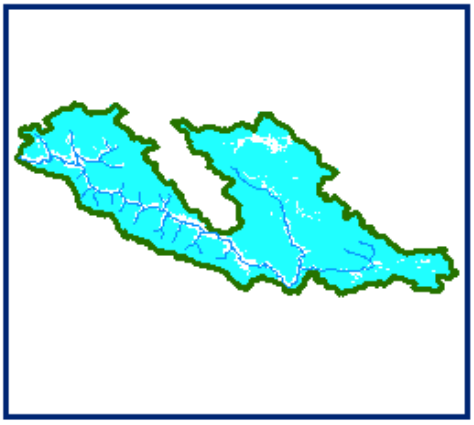
11 MARCH 2013



16 MARCH 2013



21 MARCH 2013



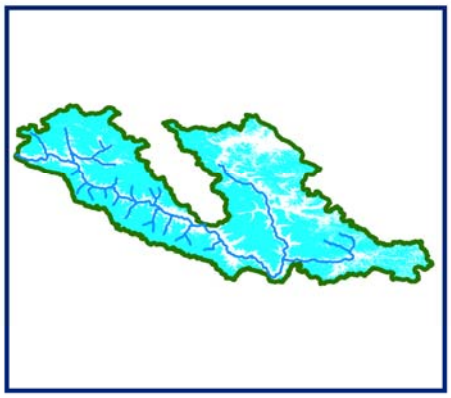
26 MARCH 2013

SNOW

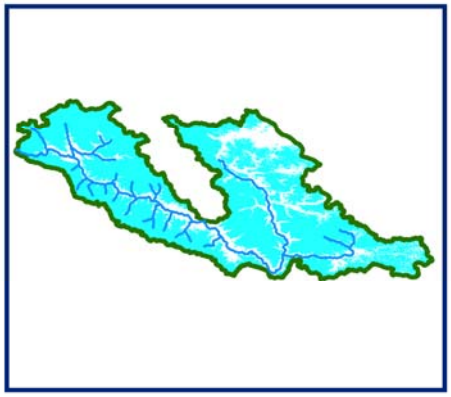
0 45 90 180 270 360

Kilometers

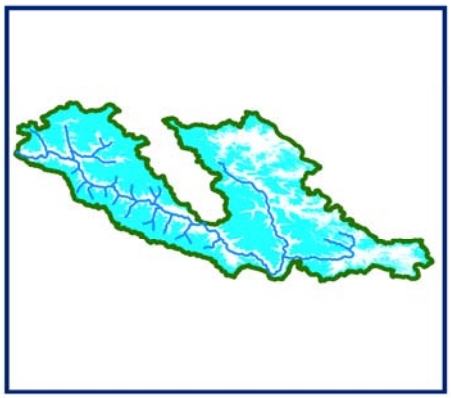
10 DAILY SNOW COVER MAP: SHYOK BASIN



DATA USED
02 MARCH 2013
06 MARCH 2013
07 MARCH 2013



DATA USED
11 MARCH 2013
16 MARCH 2013

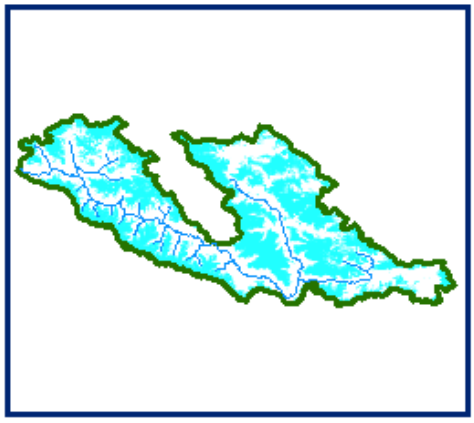


DATA USED
26 MARCH 2013
21 MARCH 2013
31 MARCH 2013

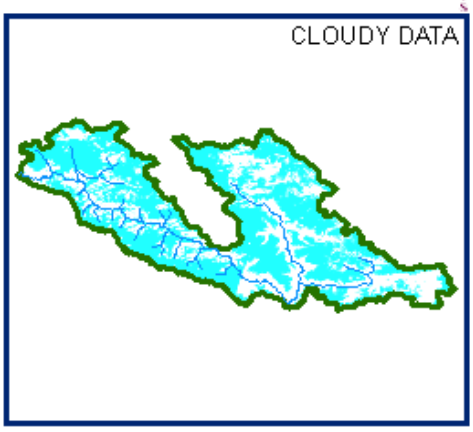
SNOW

0 45 90 180 270 360
Kilometers

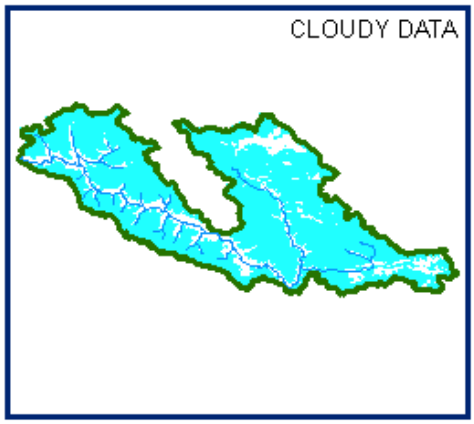
SNOW COVER MAP : SHYOK BASIN



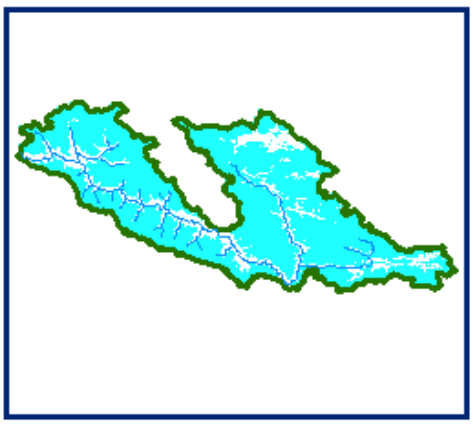
05 APRIL 2013



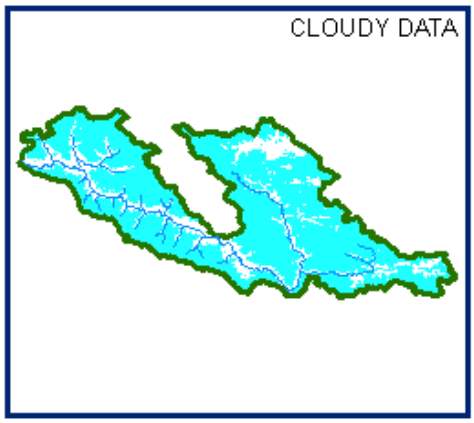
11 APRIL 2013



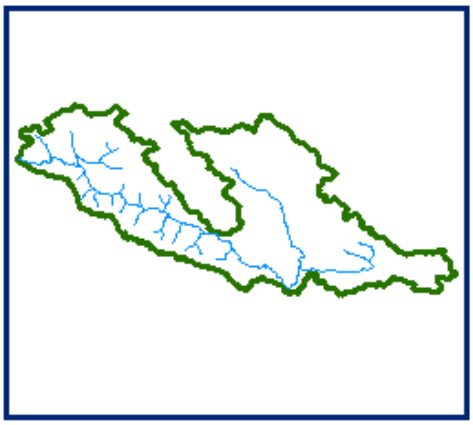
14 APRIL 2013



19 APRIL 2013



23 APRIL 2013



DATA NOT AVAILABLE

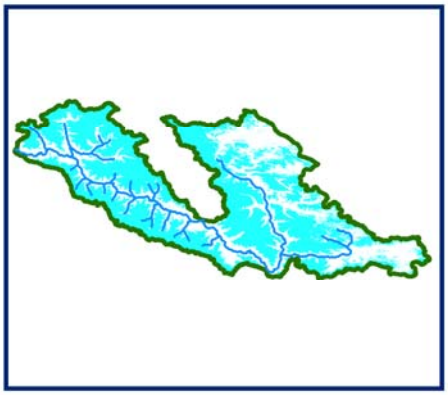
SNOW

0 45 90 180 270 360

Kilometers

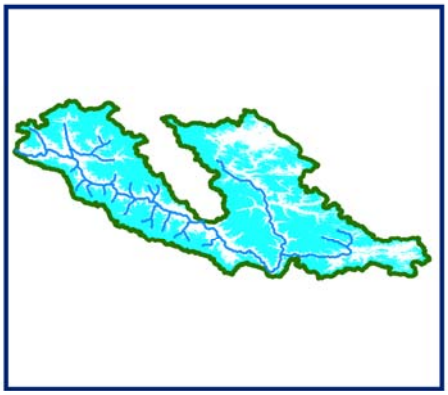
10 DAILY SNOW COVER MAP: SHYOK BASIN

DATA USED
05 APRIL 2013
04 APRIL 2013



DATA USED

19 APRIL 2013
11 APRIL 2013
14 APRIL 2013



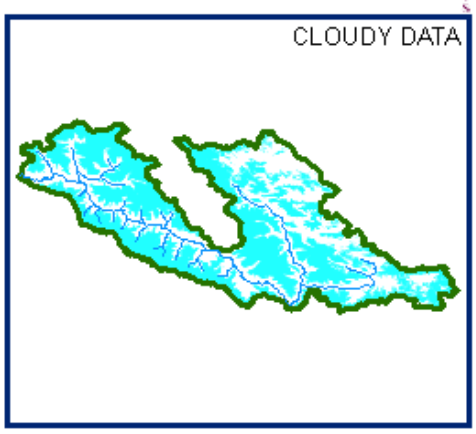
DATA USED
23 APRIL 2013

SNOW

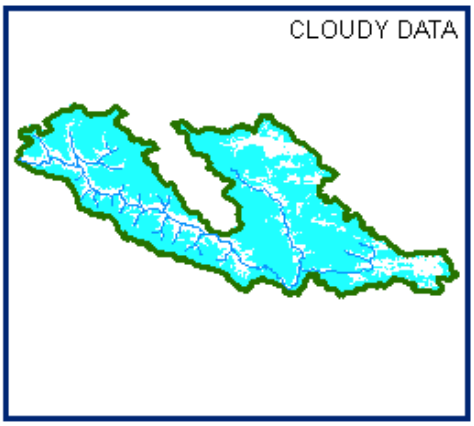
0 45 90 180 270 360
Kilometers

SNOW COVER MAP : SHYOK BASIN

03 MAY 2013



10 MAY 2013



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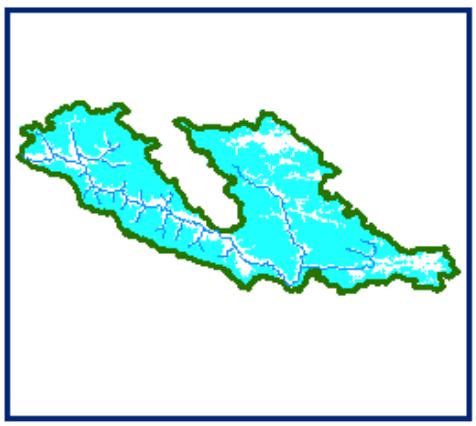
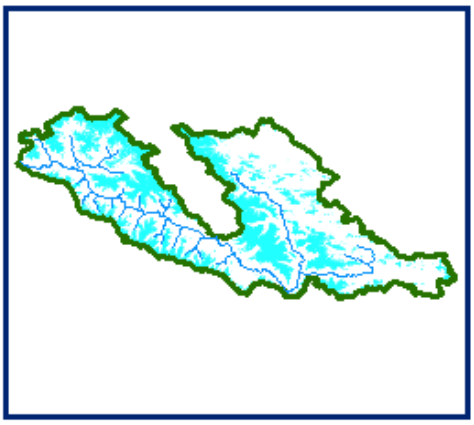
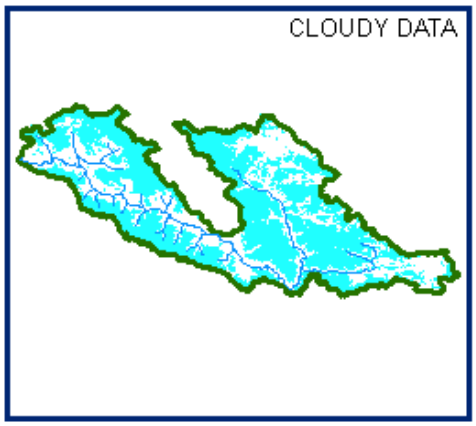


18 MAY 2013



23 MAY 2013



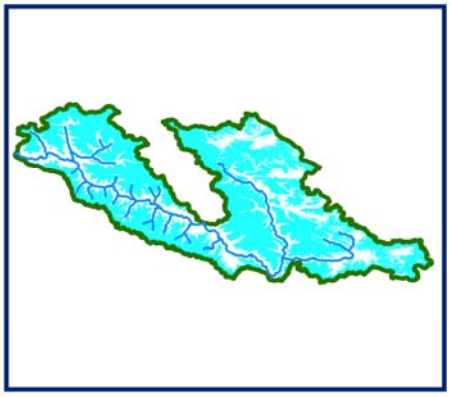
29 MAY 2013

SNOW

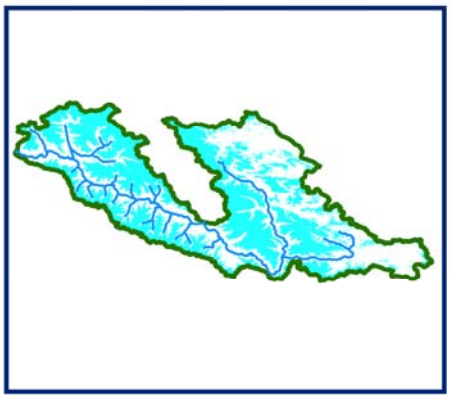
0 45 90 180 270 360

Kilometers

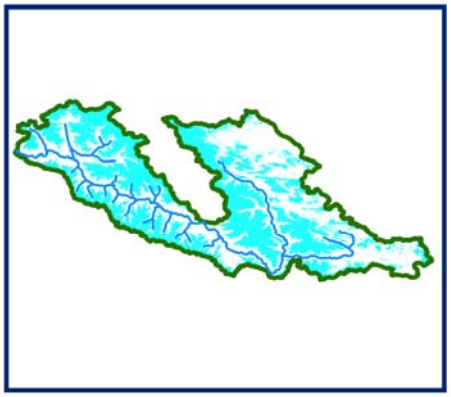
10 DAILY SNOW COVER MAP: SHYOK BASIN



DATA USED
03 MAY 2013
10 MAY 2013



DATA USED
18 MAY 2013
15 MAY 2013
17 MAY 2013



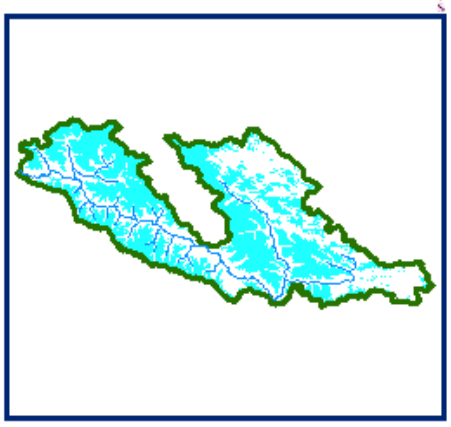
DATA USED
23 MAY 2013
22 MAY 2013
29 MAY 2013

SNOW

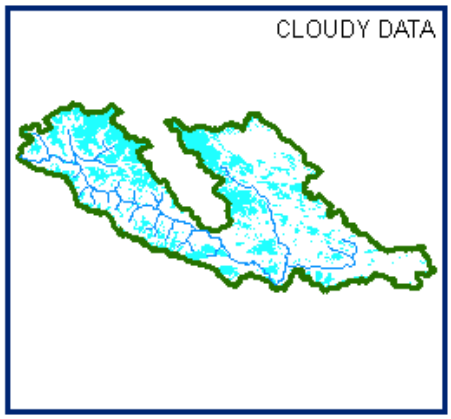
0 45 90 180 270 360
Kilometers

SNOW COVER MAP : SHYOK BASIN

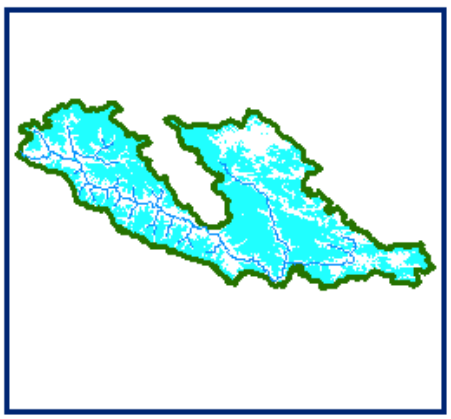
01 JUNE 2013



08 JUNE 2013

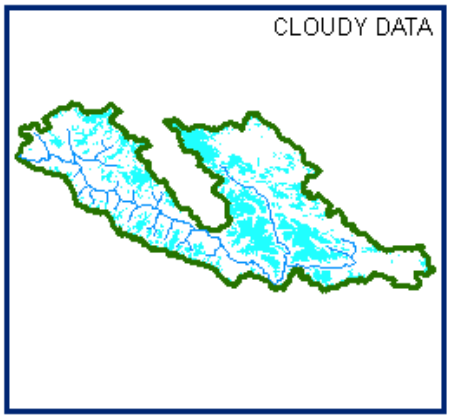


13 JUNE 2013



20 JUNE 2013

25 JUNE 2013



30 JUNE 2013

SNOW

0 45 90 180 270 360

Kilometers

10 DAILY SNOW COVER MAP: SHYOK BASIN

DATA USED
01 JUNE 2013
10 JUNE 2013
08 JUNE 2013

DATA USED
20 JUNE 2013
13 JUNE 2013
11 JUNE 2013

DATA USED
22 JUNE 2013
30 JUNE 2013
25 JUNE 2013

SNOW

0 45 90 180 270 360
Kilometers

SHIGAR BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SHIGAR **BASIN AREA: 7050 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	3597	51	8	14-Oct-12	6434	91
2	2-Oct-12	3346	47	9	18-Oct-12	6091	86
3	4-Oct-12	4899	69.	10	23-Oct-12	5785	82
4	6-Oct-12	3029	43	11	26-Oct-12	5126	73
5	8-Oct-12	4399	62	12	27-Oct-12	5659	80
6	9-Oct-12	4186	59.	13	28-Oct-12	5415	77
7	11-Oct-12	3930	56	14	30-Oct-12	4891	69
November 2012							
15	1-Nov-12	5127	73	22	14-Nov-12	4414	63
16	2-Nov-12	5010	71	23	16-Nov-12	6591	94
17	4-Nov-12	4596	65	24	19-Nov-12	6951	99
18	6-Nov-12	4898	69	26	20-Nov-12	5806	82
19	9-Nov-12	4400	62	27	25-Nov-12	5687	81
20	11-Nov-12	4754	67	28	26-Nov-12	6234	88
21	13-Nov-12	4006	57	29	30-Nov-12	6259	89
December 2012							
30	1-Dec-12	6782	96	35	10-Dec-12	6210	88
31	2-Dec-12	5941	84	36	20-Dec-12	5739	81
32	3-Dec-12	3623	51	37	22-Dec-12	5882	83
33	5-Dec-12	6852	97	38	25-Dec-12	6110	87
34	7-Dec-12	5624	80	39	31-Dec-12	6836	97
January 2013							
40	5-Jan-13	6008	85	45	20-Jan13	5370	76
41	7-Jan-13	6184	88	46	22-Jan-13	6364	90
42	8-Jan-13	6638	94	47	24-Jan-13	6649	94
43	10-Jan-13	6379	90	48	27-Jan-13	6268	89
44	13-Jan-13	6950	99				
February 2013							
49	1-Feb-13	6371	90.	52	17-Feb-13	6470	92
50	8-Feb-13	6530	93	53	20-Feb-05	5416	77
51	10-Feb-13	3814	54	54	25-Feb-13	7066	100
March 2013							
55	1-Mar-13	6160	87	61	16-Mar-13	5642	80

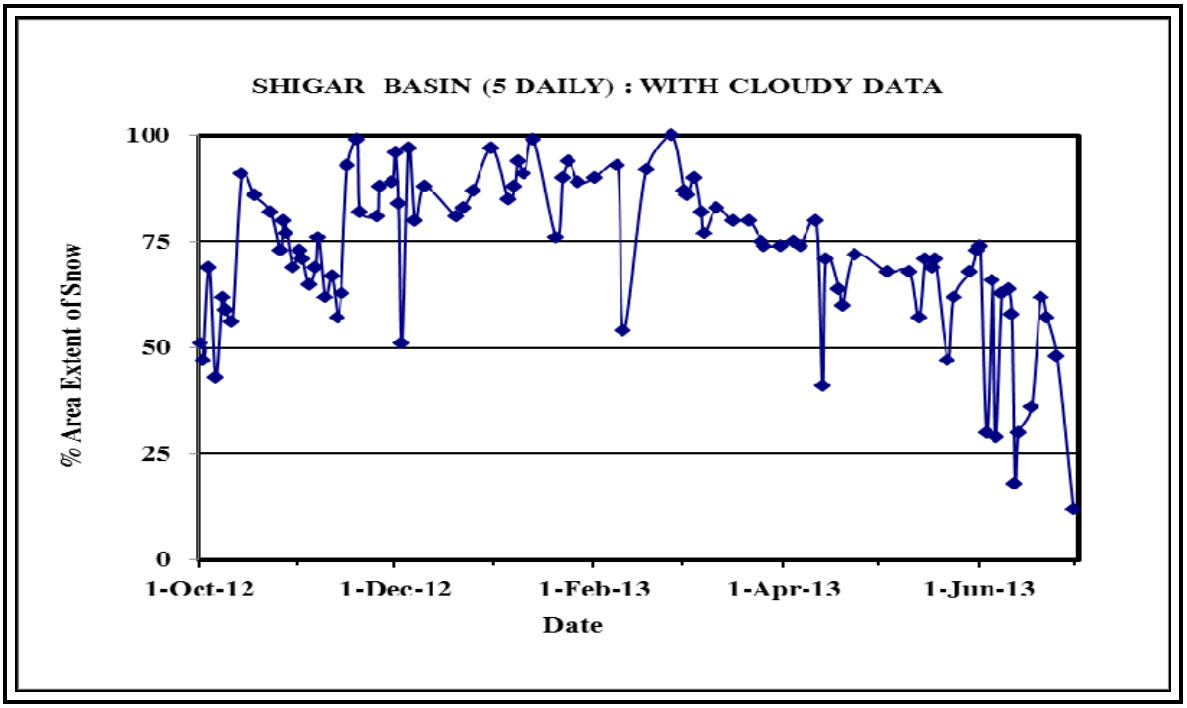
56	2-Mar-13	6076	86	62	21-Mar-13	5675	80
57	4-Mar-13	6347	90	63	25-Mar-13	5280	75
58	6-Mar-13	5780	82	64	26-Mar-13	5248	74
59	7-Mar-13	5428	77	65	31-Mar-13	5237	74
60	11-Mar-13	5830	83				
April 2013							
66	4-Apr-13	5321	75	70	14-Apr-13	5009	71
67	6-Apr-13	5191	74	71	18-Apr-13	4478	64
68	11-Apr-13	5628	80	72	19-Apr-13	4226	60
69	13-Apr-13	2865	41	73	23-Apr-13	5058	72
May 2013							
74	3-May-13	4822	68	79	18-May-13	4999	71
75	10-May-13	4803	68	80	22-May-13	3317	47
76	13-May-13	3629	57	81	24-May-13	4341	62
77	15-May-13	5014	71	82	29-May-13	4807	68
78	17-May-13	4881	69	83	31-May-13	5164	73
June 2013							
84	1-Jun-13	5233	74	91	12-Jun-13	1302	18
85	3-Jun-13	2103	30	92	13-Jun-13	2092	30
86	5-Jun-13	4680	66	93	17-Jun-13	2538	36
87	6-Jun-13	2044	29	94	20-Jun-13	4388	62
88	8-Jun-13	4460	63	95	22-Jun-13	3989	57
89	10-Jun-13	4519	64	96	25-Jun-13	3365	48
90	11-Jun-13	4078	58	97	30-Jun-13	844	12

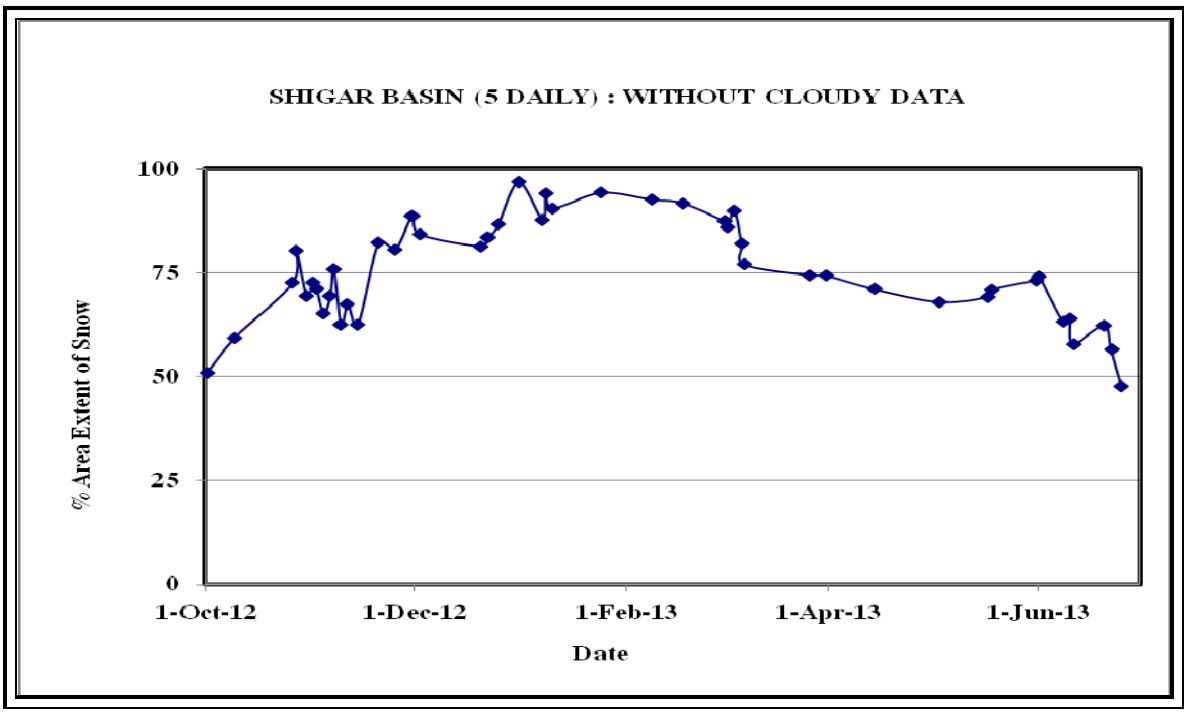
AREAL EXTENT OF SNOW (10 DAILY)

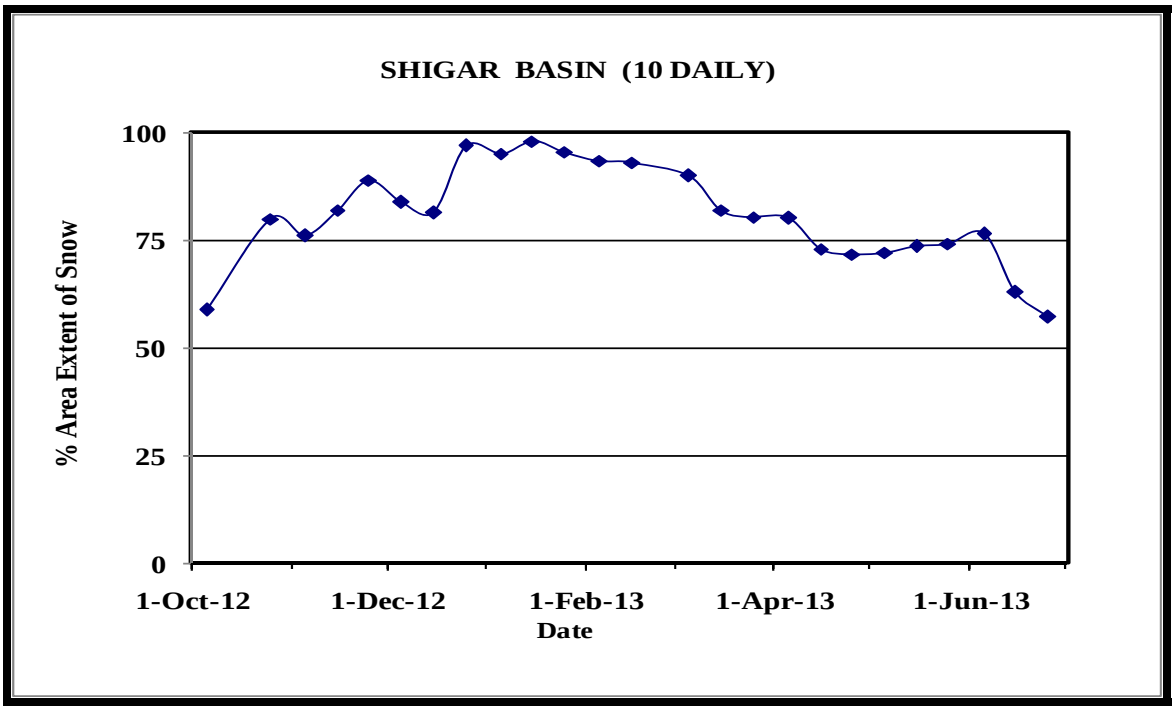
BASIN NAME: SHIGAR **BASIN AREA: 7050 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
1	09-Oct-12	4160	59	3	04-Nov-12	5358	76
2	30-Oct-12	5640	80	4	11-Nov-12	5781	82
				5	30-Nov-12		89
December 2012				**January 2013**			
6	02-Dec-12	5922	84	9	08-Jan-13	6703	95
7	20-Dec-12	5739	81	10	20-Jan-13	6909	98
8	31-Dec-12	6839	97	11	24-Jan-13	6740	96
February 2013				**March 2013**			
12	08-Feb-13	6591	93	14	06-Mar-13	6345	90
13	17-Feb-13	6567	93	15	11-Mar-13	5781	82
				16	31-Mar-13	5671	80
April 2013				**May 2013**			
17	04-Apr-13	5648	80	20	03-May-13	5088	72
18	14-Apr-13	5149	73	21	18-May-13	5196	74
19	23-Apr-13	5058	72	22	31-May-13	5235	74
June 2013							
23	01-Jun-12	5396	77				
24	20-Jun-12	4440	63				
25	22-Jun-12	4044	57				

Snow cover depletion curve

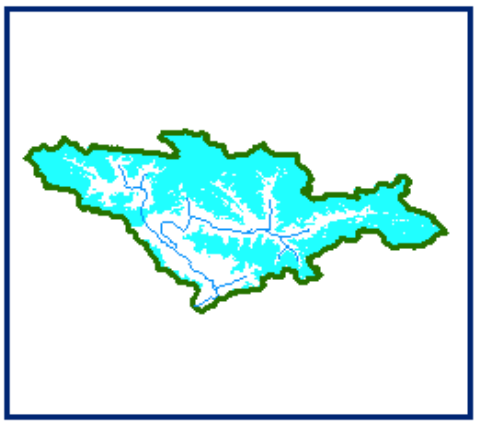




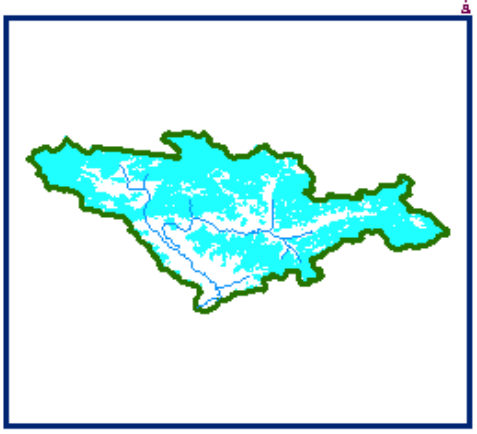

SHIGAR BASIN (10 DAILY)
% Area Extent of Snow
100
75
50
25
0
1-Oct-12
1-Dec-12
1-Feb-13
1-Apr-13
1-Jun-13
Date

SNOW COVER MAP

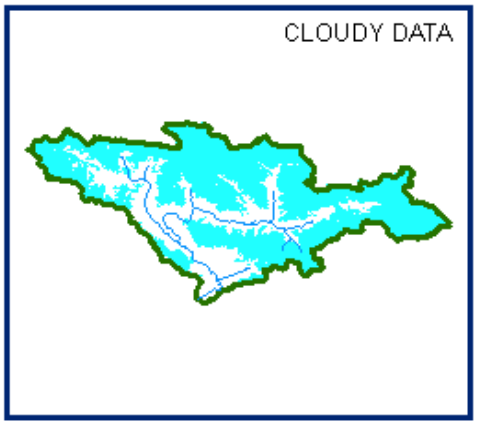
SNOW COVER MAP : SHIGAR BASIN



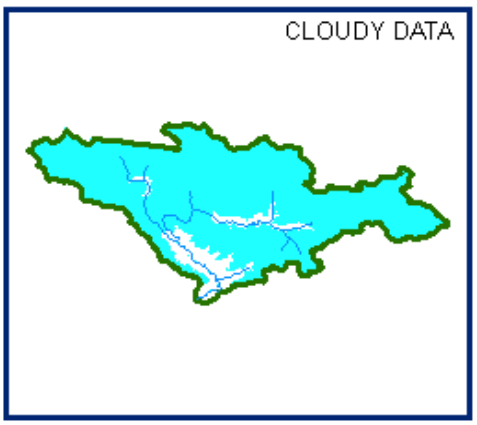
01 OCTOBER 2013



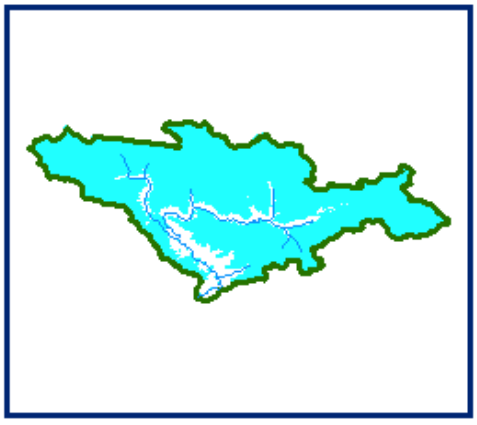
06 OCTOBER 2013



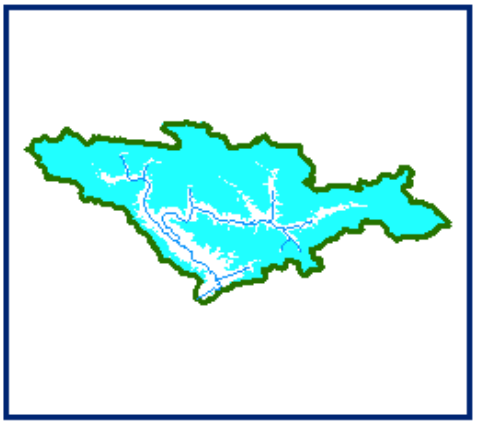
11 OCTOBER 2013



18 OCTOBER 2013



23 OCTOBER 2013



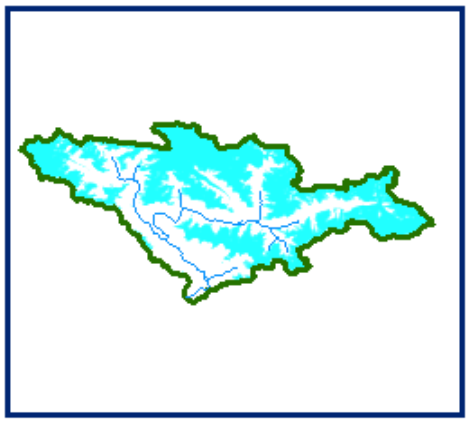
30 OCTOBER 2013

SNOW

0 25 50 100 150 200

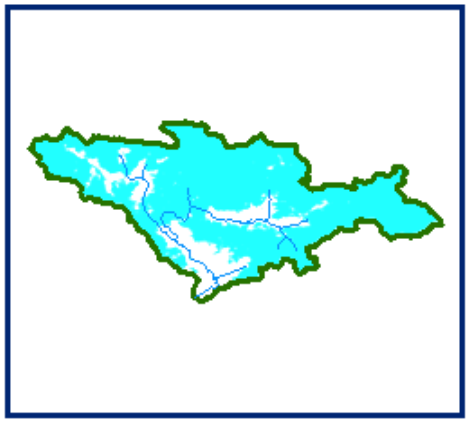
Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



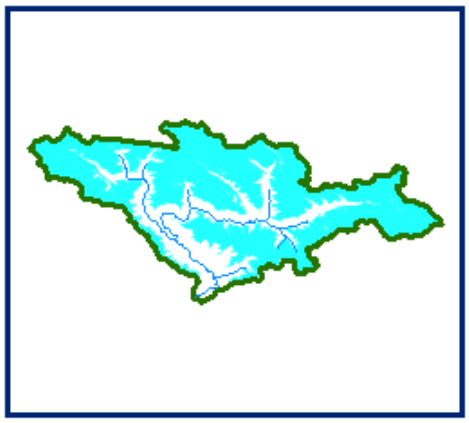
DATA USED

03 OCTOBER 2012
02 OCTOBER 2012
01 OCTOBER 2012



DATA USED

11 OCTOBER 2012
18 OCTOBER 2012
14 OCTOBER 2012



DATA USED

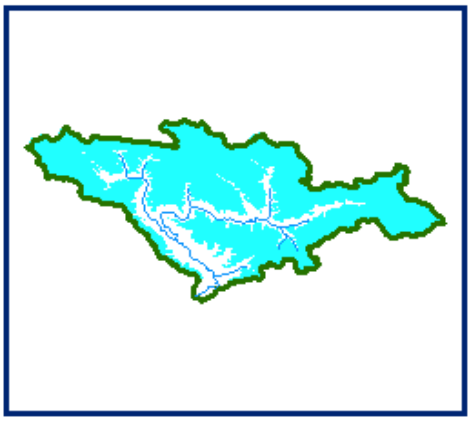
30 OCTOBER 2012
26 OCTOBER 2012
23 OCTOBER 2012

SNOW

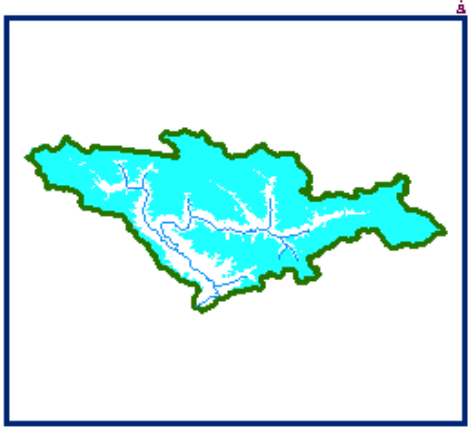
0 25 50 100 150 200

Kilometers

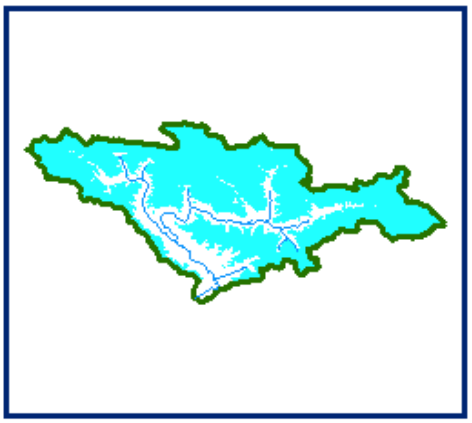
SNOW COVER MAP : SHIGAR BASIN



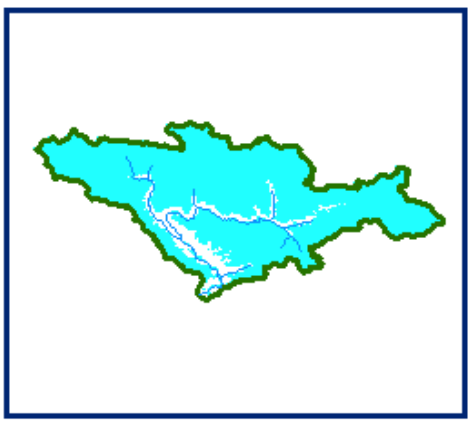
04 NOVEMBER 2012



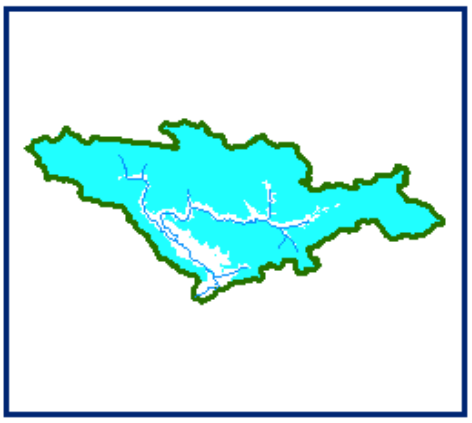
09 NOVEMBER 2012



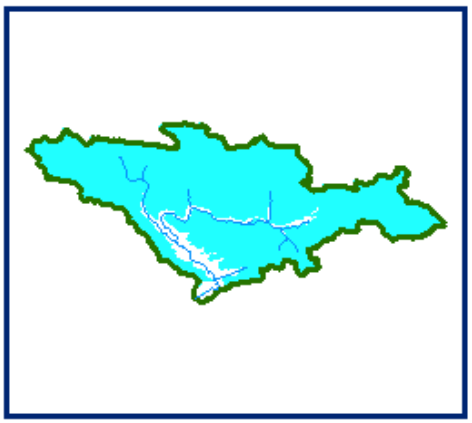
14 NOVEMBER 2012



20 NOVEMBER 2012
25 NOVEMBER 2012



25 NOVEMBER 2012



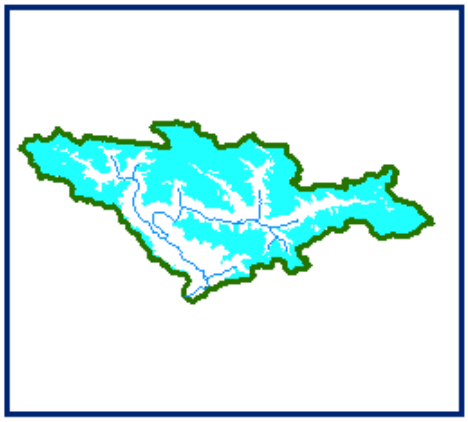
30 NOVEMBER 2012

SNOW

0 25 50 100 150 200

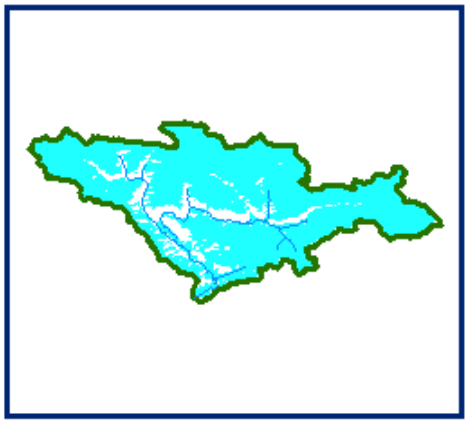
Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



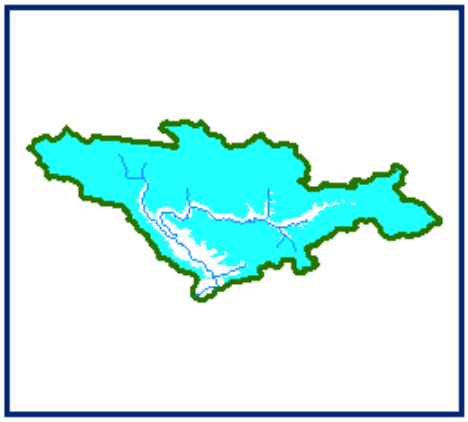
DATA USED

04 NOVEMBER 2012
02 NOVEMBER 2012
09 NOVEMBER 2012



DATA USED

11 NOVEMBER 2012
19 NOVEMBER 2012
14 NOVEMBER 2012



DATA USED

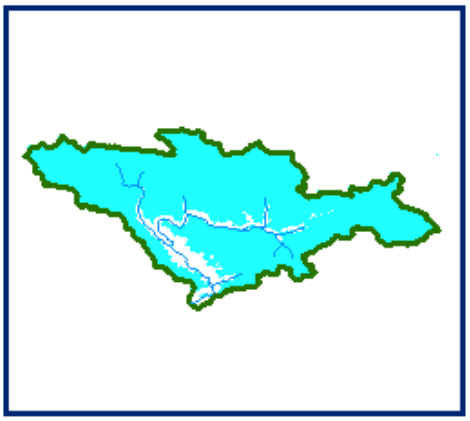
30 NOVEMBER 2012
26 NOVEMBER 2012
25 NOVEMBER 2012

SNOW

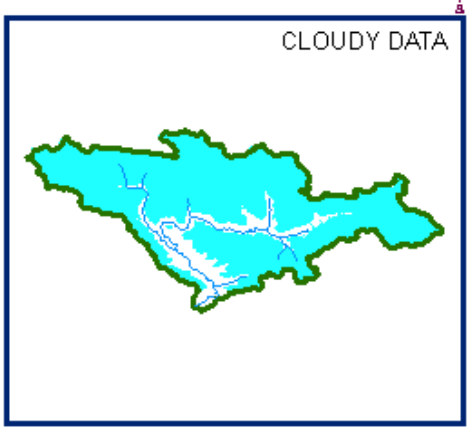
0 25 50 100 150 200

Kilometers

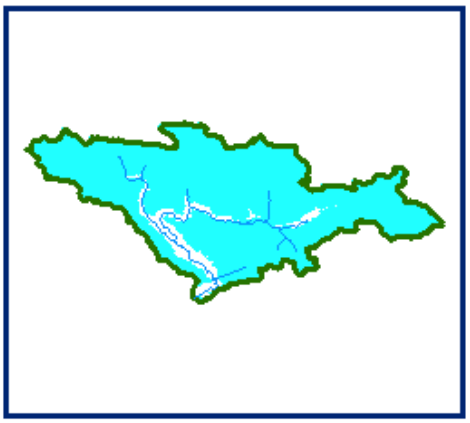
SNOW COVER MAP : SHIGAR BASIN



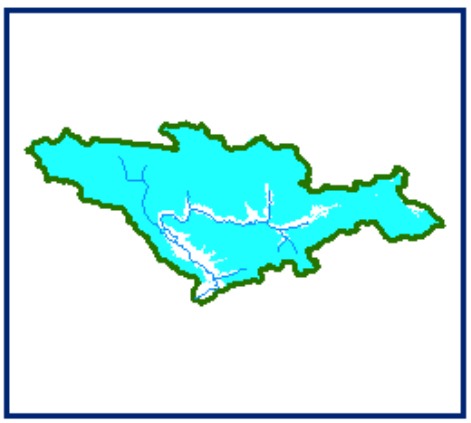
02 DECEMBER 2012
01 DECEMBER 2012



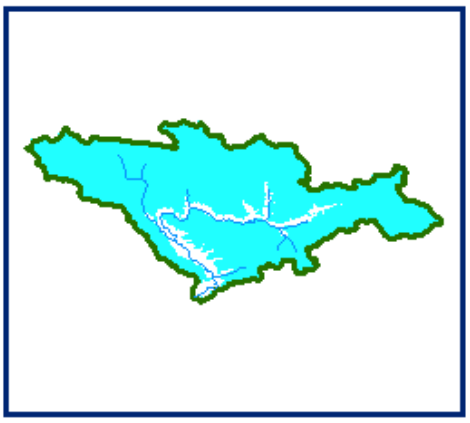
07 DECEMBER 2012



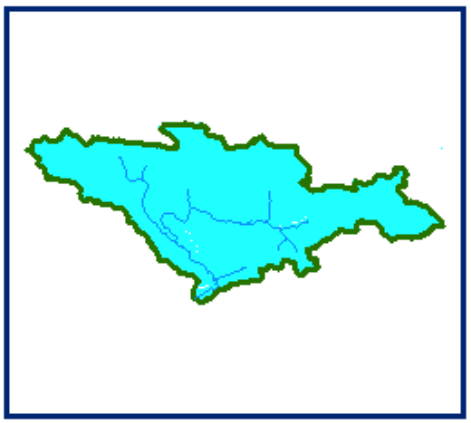
10 DECEMBER 2012



20 DECEMBER 2012



22 DECEMBER 2012



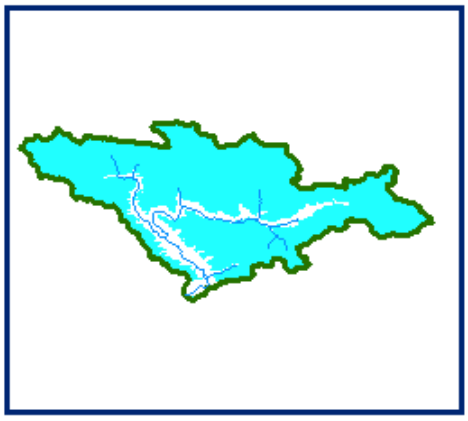
31 DECEMBER 2012

SNOW

0 25 50 100 150 200

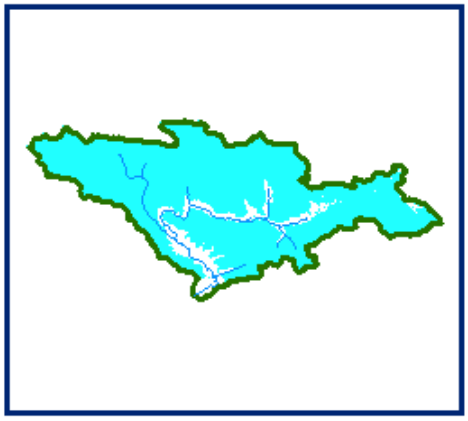
Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



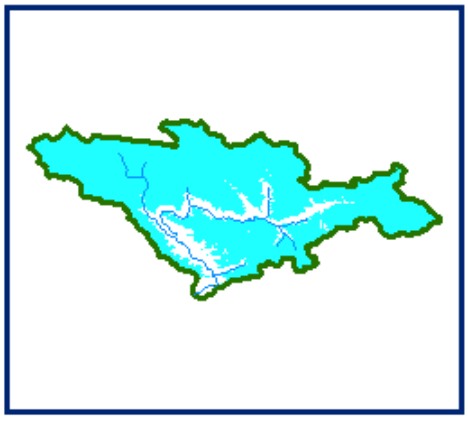
DATA USED

02 DECEMBER 2012
10 DECEMBER 2012
01 DECEMBER 2012



DATA USED

20 DECEMBER 2012



DATA USED

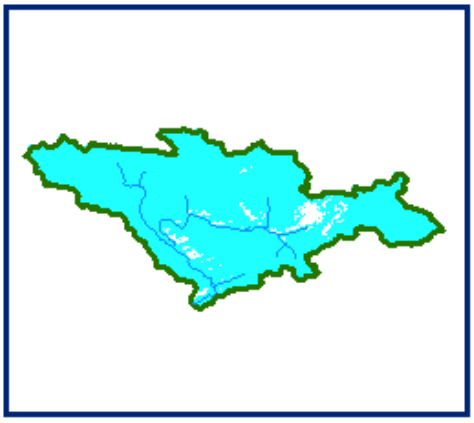
22 DECEMBER 2012
25 DECEMBER 2012
31 DECEMBER 2012

SNOW

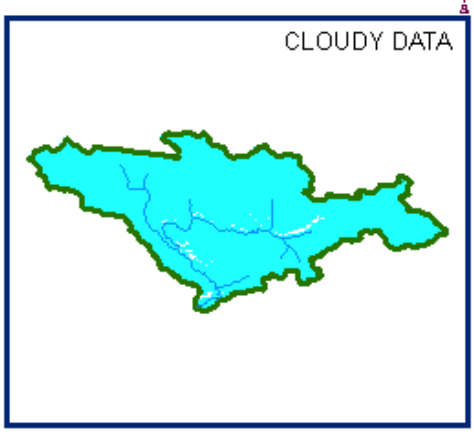
0 25 50 100 150 200

Kilometers

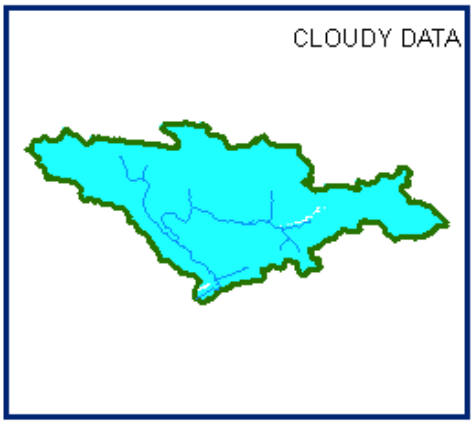
SNOW COVER MAP : SHIGAR BASIN



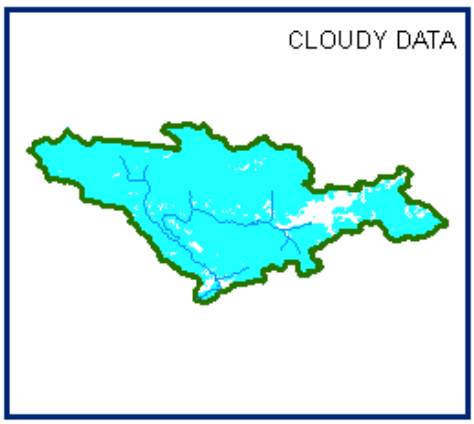
05 JANUARY 2013



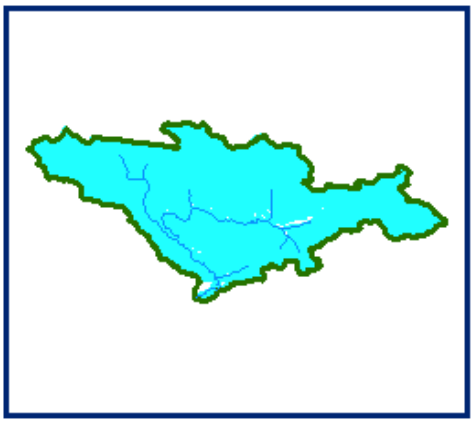
08 JANUARY 2013



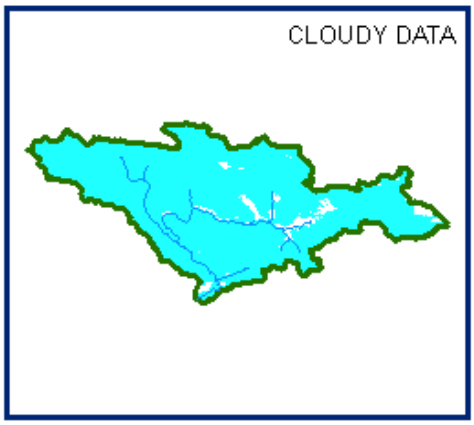
13 JANUARY 2013



20 JANUARY 2013



24 JANUARY 2013



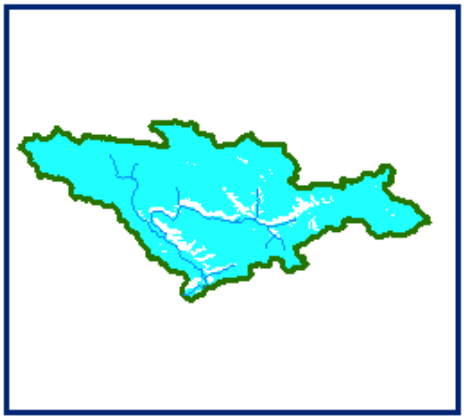
27 JANUARY 2013

SNOW

0 25 50 100 150 200

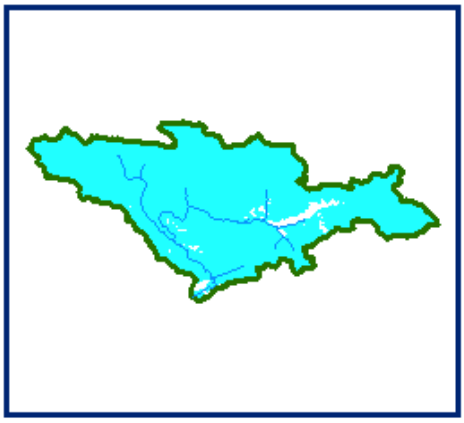
Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



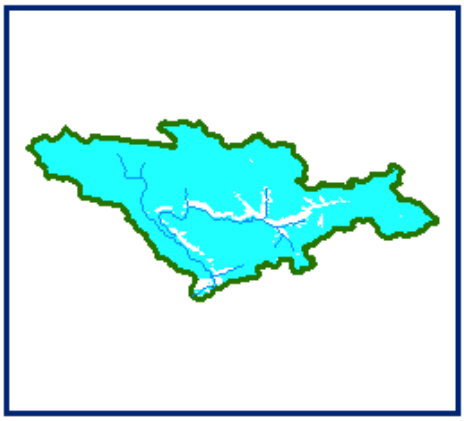
DATA USED

10 JANUARY 2012
05 JANUARY 2012
08 JANUARY 2012



DATA USED

20 JANUARY 2012
13 JANUARY 2012



DATA USED

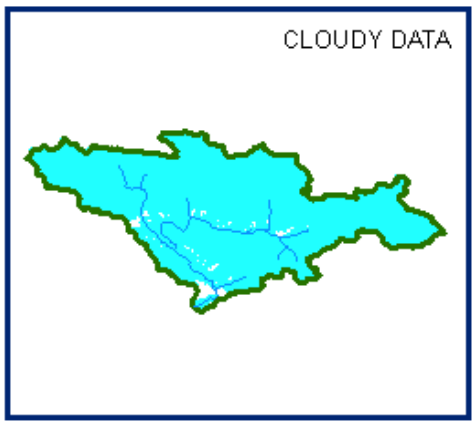
24 JANUARY 2012
27 JANUARY 2012
22 JANUARY 2012

SNOW

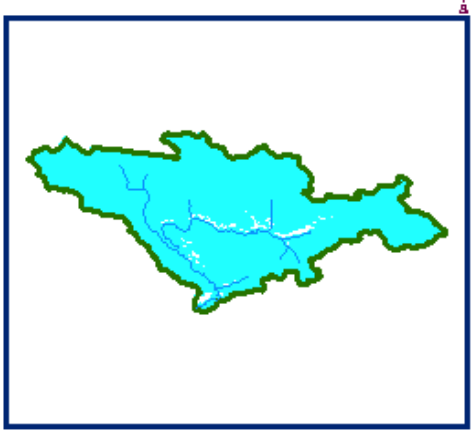
0 25 50 100 150 200

Kilometers

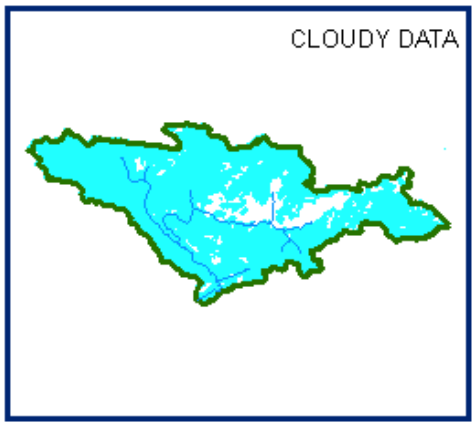
SNOW COVER MAP : SHIGAR BASIN



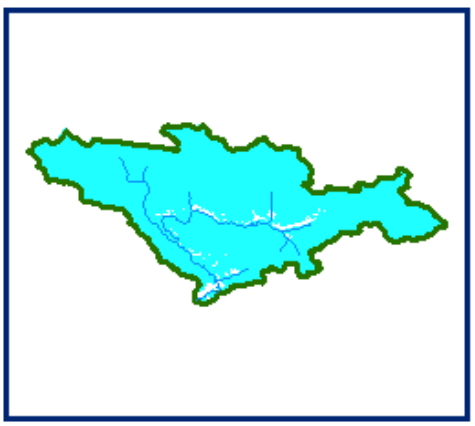
01 FEBRUARY 2013



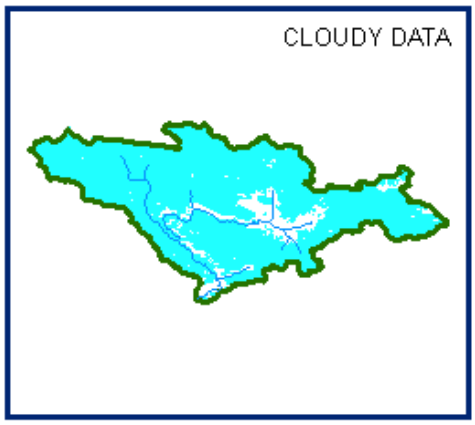
08 FEBRUARY 2013



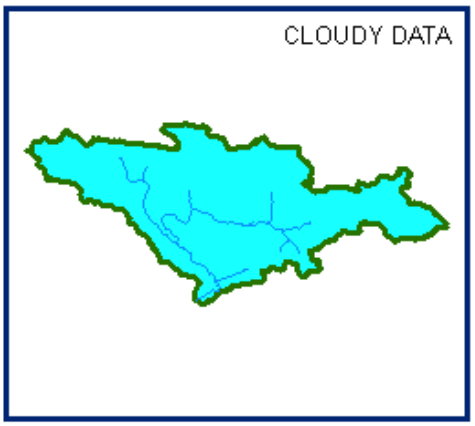
10 FEBRUARY 2013



17 FEBRUARY 2013



20 FEBRUARY 2013



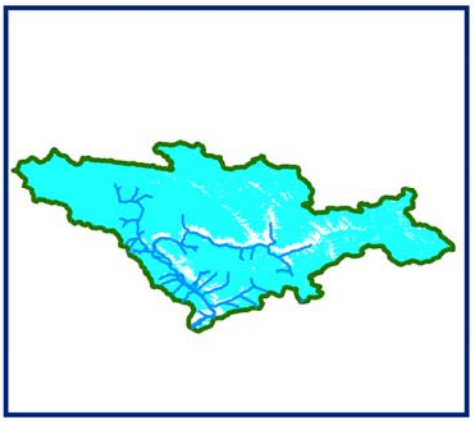
25 FEBRUARY 2013

SNOW

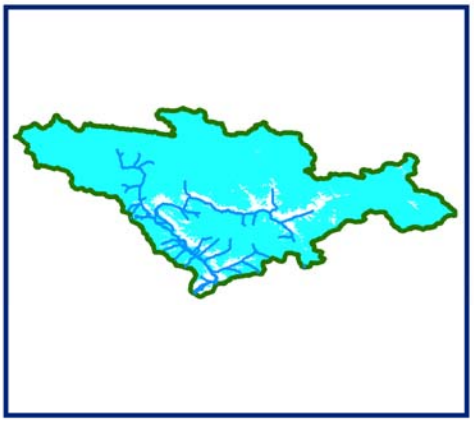
0 25 50 100 150 200

Kilometers

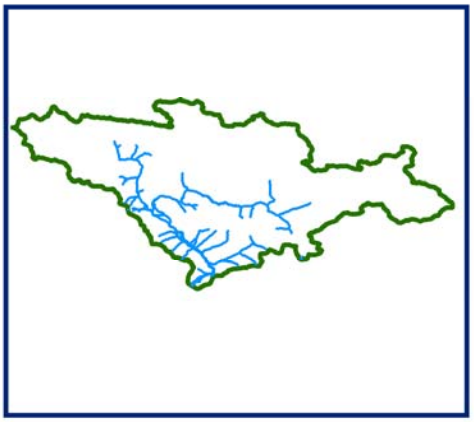
10 DAILY SNOW COVER MAP: SHIGAR BASIN



DATA USED
08 FEBRUARY 2013
10 FEBRUARY 2013
01 FEBRUARY 2013



DATA USED
17 FEBRUARY 2013
20 FEBRUARY 2013

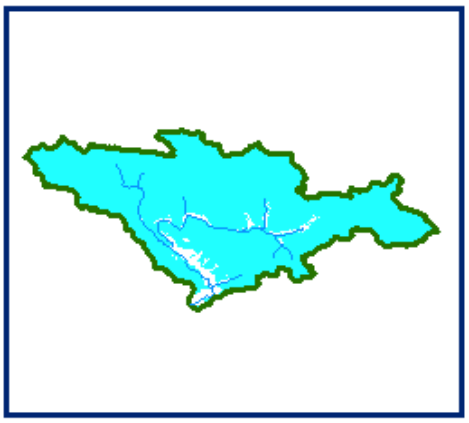


DATA USED
DATA NOT AVAILABLE

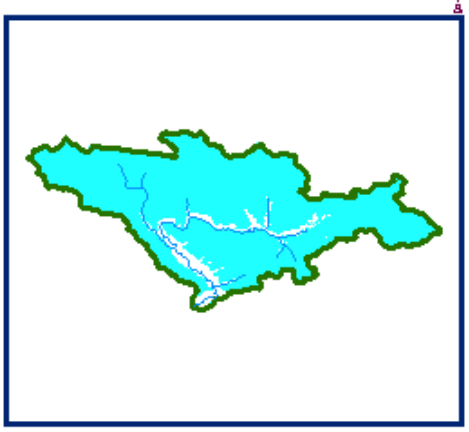
SNOW

0 25 50 100 150 200
Kilometers

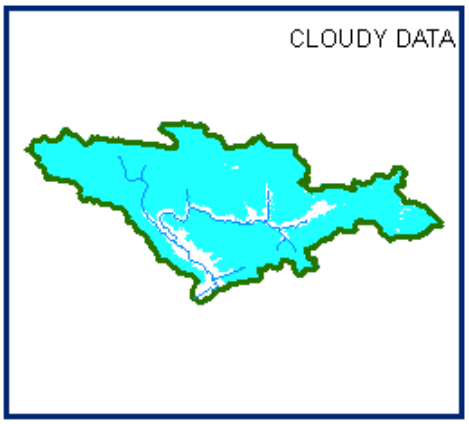
SNOW COVER MAP : SHIGAR BASIN



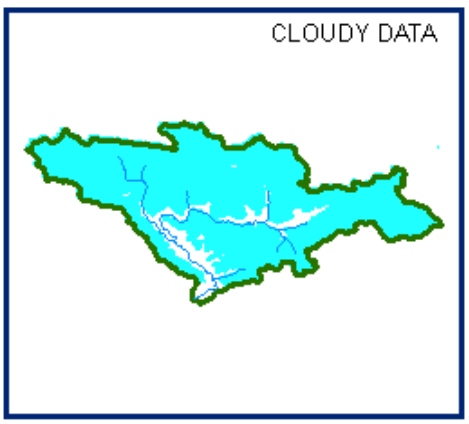
01 MARCH 2013



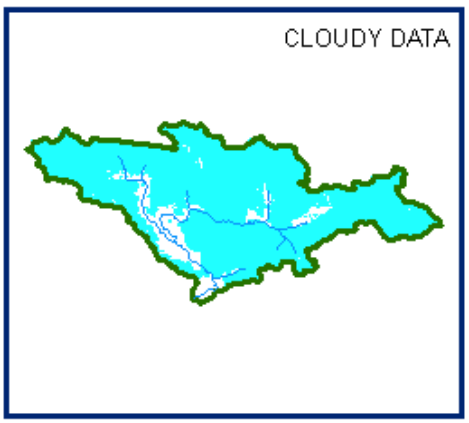
06 MARCH 2013



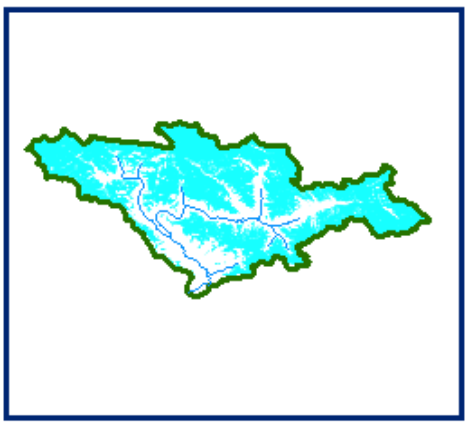
11 MARCH 2013



16 MARCH 2013



21 MARCH 2013



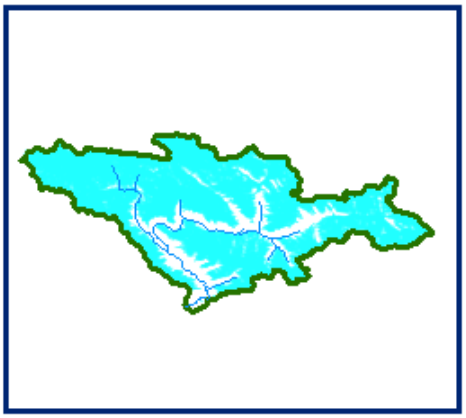
31 MARCH 2013
25 MARCH 2013

SNOW

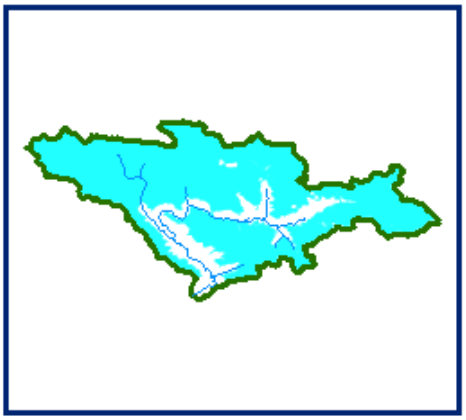
0 25 50 100 150 200

Kilometers

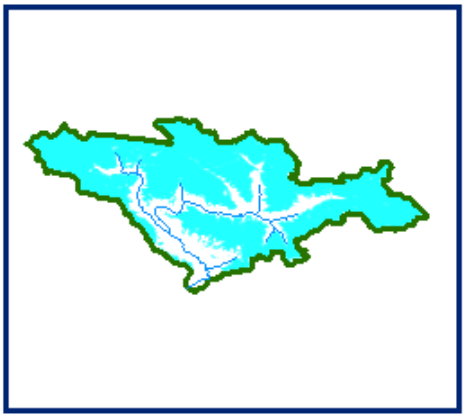
10 DAILY SNOW COVER MAP: SHIGAR BASIN



DATA USED
06 MARCH 2013
07 MARCH 2013
04 MARCH 2013



DATA USED
11 MARCH 2013
16 MARCH 2013

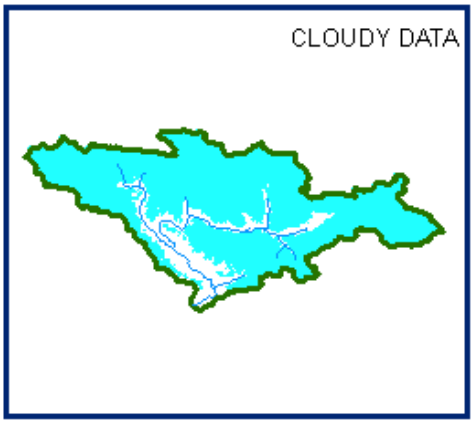


DATA USED
31 MARCH 2013
25 MARCH 2013
26 MARCH 2013

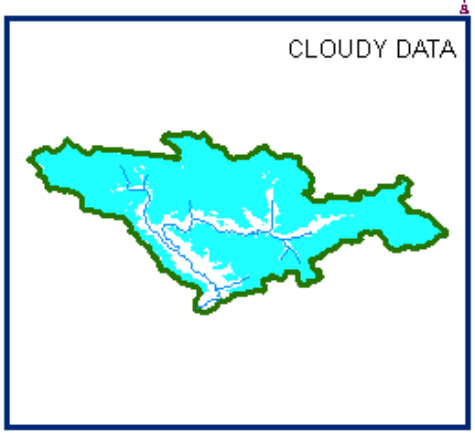
SNOW

0 25 50 100 150 200
Kilometers

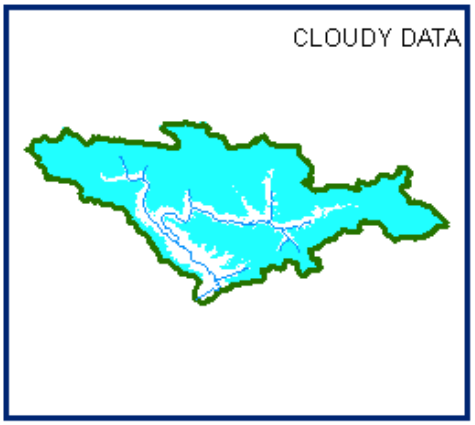
SNOW COVER MAP : SHIGAR BASIN



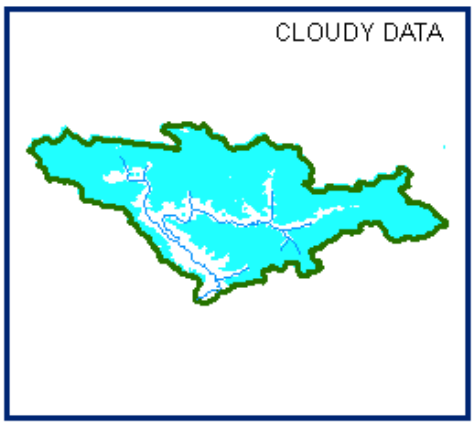
04 APRIL 2013



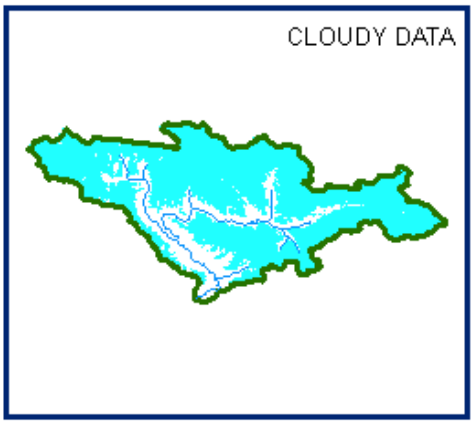
06 APRIL 2013



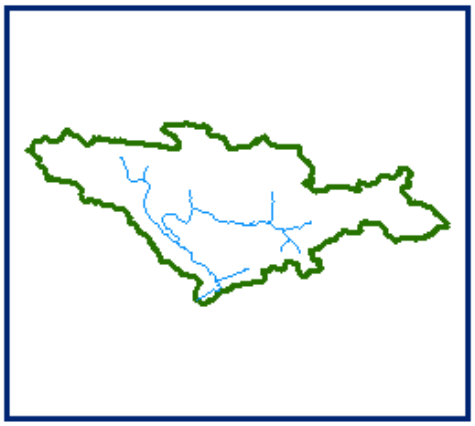
11 APRIL 2013



19 APRIL 2013



23 APRIL 2013



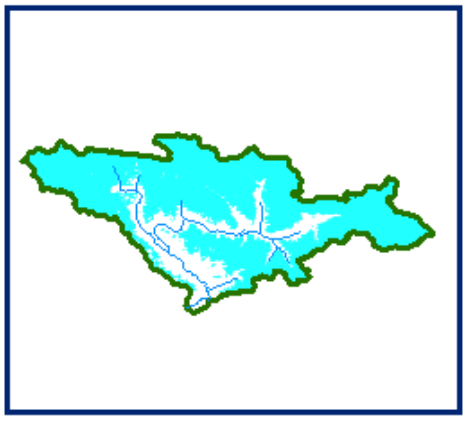
DATA NOT AVAILABLE

SNOW

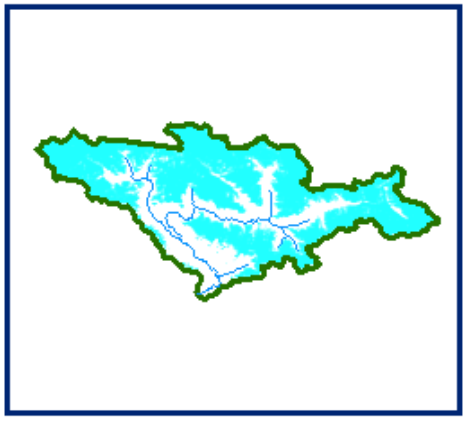
0 25 50 100 150 200

Kilometers

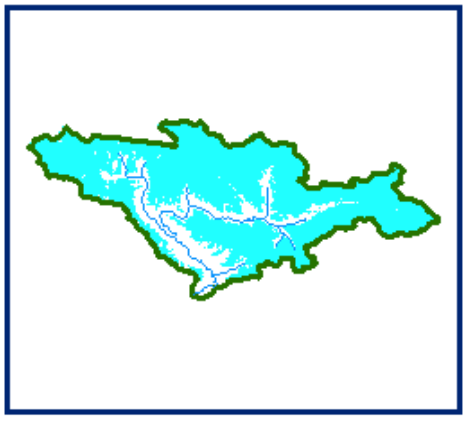
10 DAILY SNOW COVER MAP: SHIGAR BASIN



DATA USED
04 APRIL 2013
06 APRIL 2013



DATA USED
14 APRIL 2013
13 APRIL 2013
18 APRIL 2013

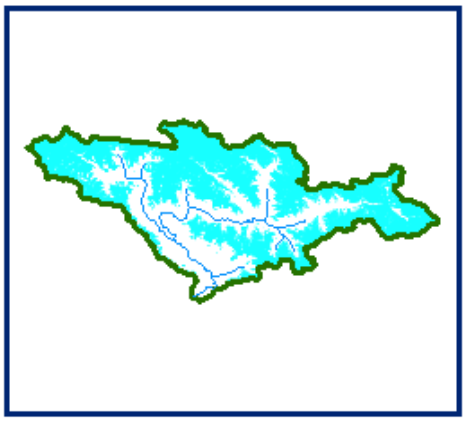


DATA USED
23 APRIL 2013

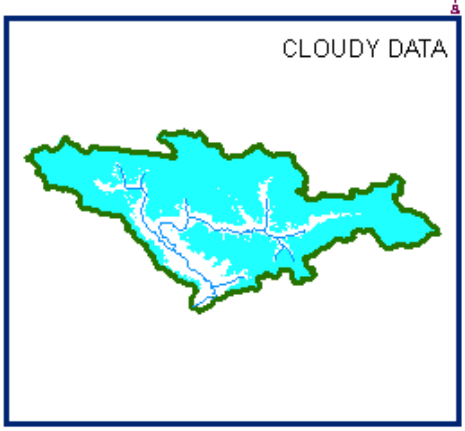
SNOW

0 25 50 100 150 200
Kilometers

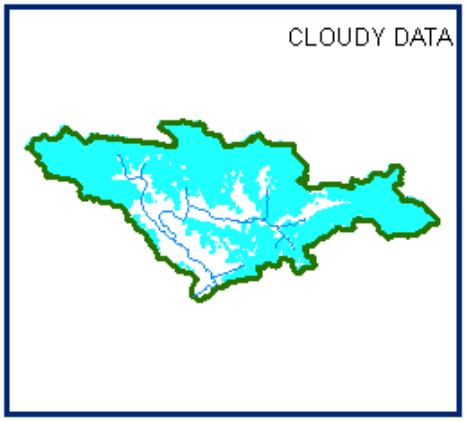
SNOW COVER MAP : SHIGAR BASIN



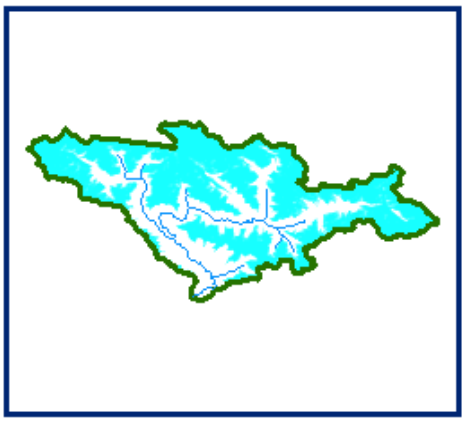
03 MAY 2013



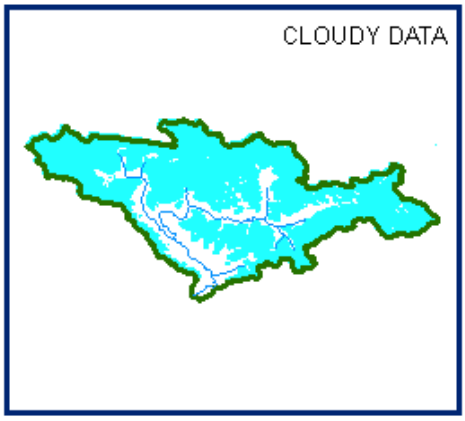
10 MAY 2013



13 MAY 2013



18 MAY 2013
17 MAY 2013



22 MAY 2013

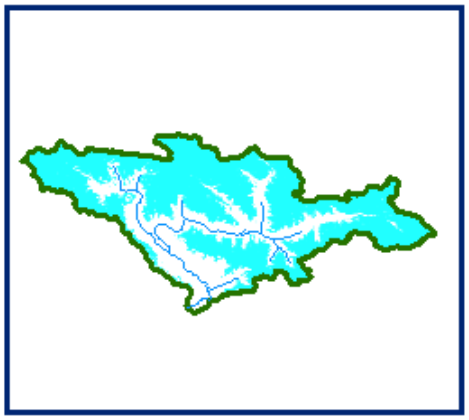
31 MAY 2013
17 MAY 2013

SNOW

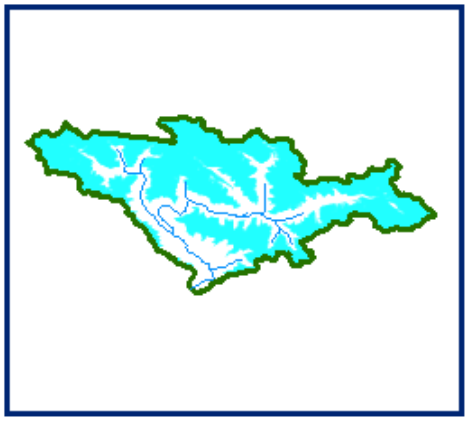
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



DATA USED
03 MAY 2013
10 MAY 2013



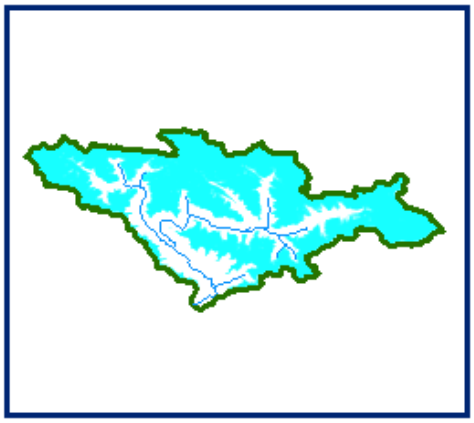
DATA USED
18 MAY 2013
15 MAY 2013
17 MAY 2013

DATA USED
31 MAY 2013
22 MAY 2013
29 MAY 2013

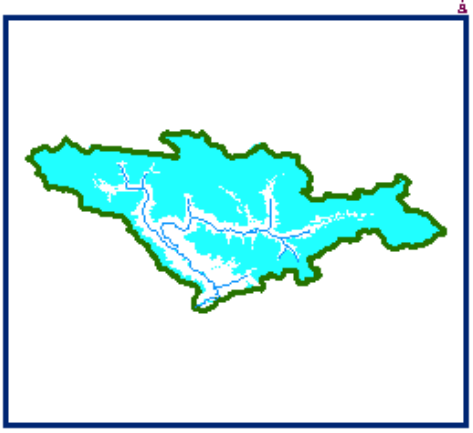
SNOW

0 25 50 100 150 200
Kilometers

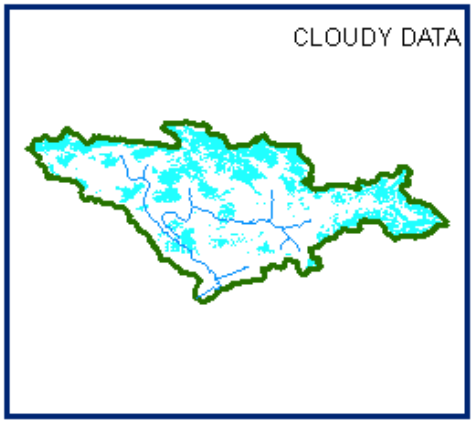
SNOW COVER MAP : SHIGAR BASIN



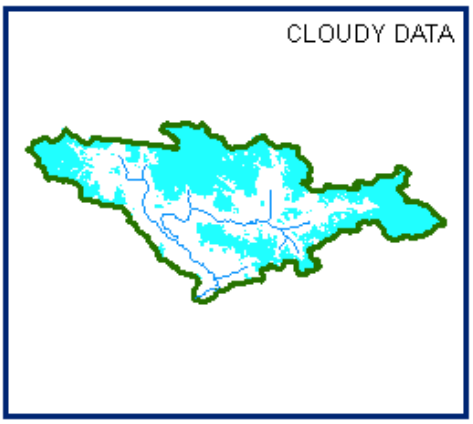
01 JUNE 2013



10 JUNE 2013



12 JUNE 2013



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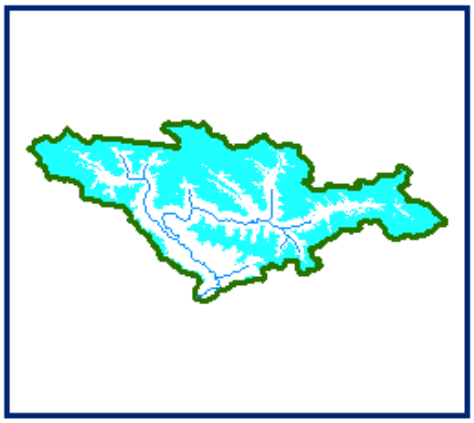
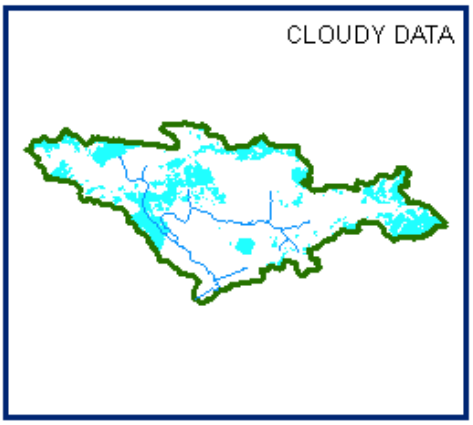


22 JUNE 2013



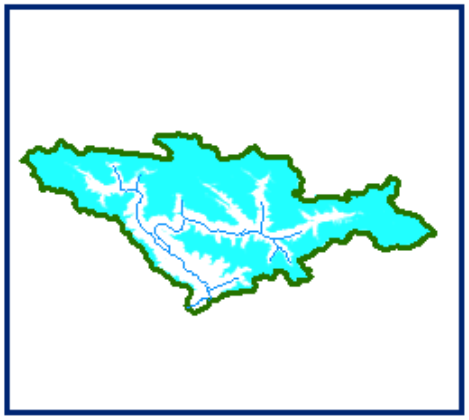
30 JUNE 2013

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHIGAR BASIN



DATA USED
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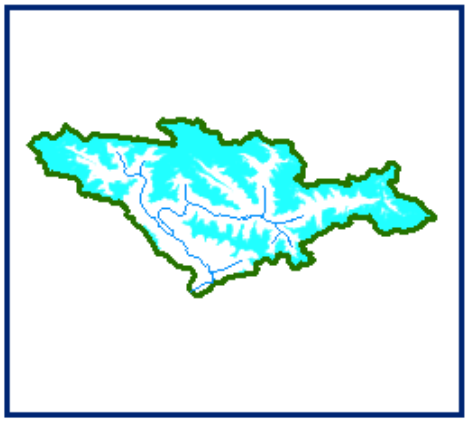
05 JUNE 2013
10 JUNE 2013



DATA USED
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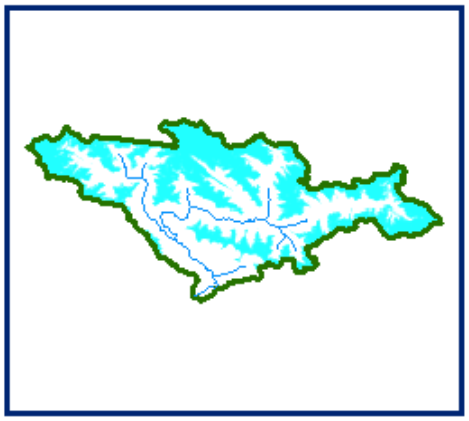
13 JUNE 2013
11 JUNE 2013



DATA USED
22 JUNE 2013
30 JUNE 2013
25 JUNE 2013

SNOW

0 25 50 100 150 200
Kilometers

HANZA BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: HANZA **BASIN AREA: 13711 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	6971	51	7	18-Oct-12	12109	88
2	4-Oct-12	8532	62	8	23-Oct-12	11206	82
3	6-Oct-12	5938	43	9	27-Oct-12	10492	77
4	8-Oct-12	7677	56	10	28-Oct-12	10824	79
5	9-Oct-12	7514	55	11	30-Oct-12	9230	67
6	11-Oct-12	7043	51				
November 2012							
12	1-Nov-12	9607	70	19	14-Nov-12	8328	61
13	2-Nov-12	10809	79	20	16-Nov-12	10561	77
14	4-Nov-12	8347	61	21	20-Nov-12	11275	82
15	6-Nov-12	9106	66	22	25-Nov-12	10776	79
16	9-Nov-12	7932	58	23	26-Nov-12	12255	89
17	11-Nov-12	8809	64	24	30-Nov-12	12218	89
18	13-Nov-12	7541	55				
December 2012							
25	2-Dec-12	10843	79	29	10-Dec-12	9498	69
26	3-Dec-12	10077	73	30	22-Dec-12	10075	73
27	5-Dec-12	12684	93	31	31-Dec-12	12567	92
28	7-Dec-12	9975	73				
January 2013							
32	5-Jan-13	11212	82	37	19-Jan-13	11623	85
33	7-Jan-13	11878	87	38	20-Jan13	8910	65
34	8-Jan-13	11723	86	39	22-Jan-13	9388	68
35	10-Jan-13	10905	80	40	24-Jan-13	11715	85
36	13-Jan-13	12381	90	41	27-Jan-13	8465	62
February 2013							
42	1-Feb-13	9341	68	45	17-Feb-13	11950	87
43	8-Feb-13	11182	82	46	20-Feb-05	8544	62
44	10-Feb-13	5747	42	47	25-Feb-13	13496	98
March 2013							
49	1-Mar-13	10763	79	54	16-Mar-13	9652	70
50	2-Mar-13	9383	68	55	21-Mar-13	7089	52
51	4-Mar-13	10875	79	56	25-Mar-13	8366	61

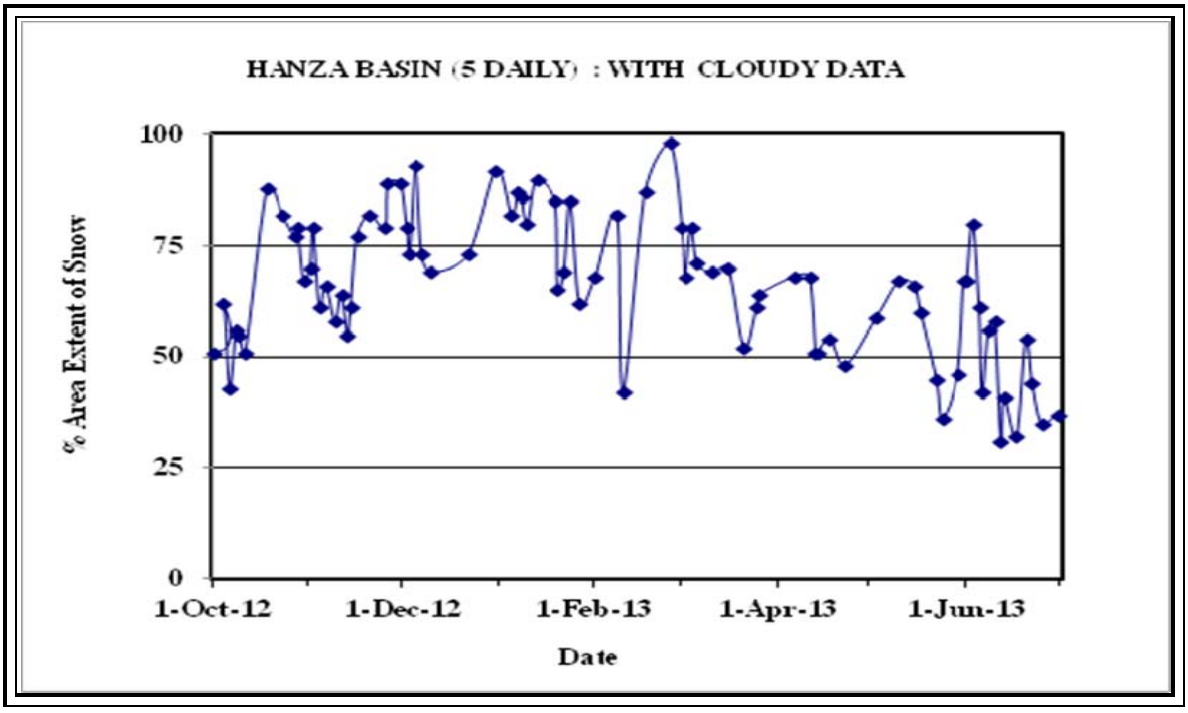
52	6-Mar-13	9780	71	57	26-Mar-13	8822	64
53	11-Mar-13	9433	69				
April 2013							
58	6-Apr-13	9273	68	67	14-Apr-13	6953	51
59	11-Apr-13	9288	68	68	18-Apr-13	7470	54
60	13-Apr-13	7005	51	69	23-Apr-13	6587	48
May 2013							
70	3-May-13	8078	59	74	22-May-13	6225	45
71	10-May-13	9197	67	75	24-May-13	4910	36
72	15-May-13	8991	66	76	29-May-13	6336	46
73	17-May-13	8250	60	77	31-May-13	9185	67
June 2013							
78	1-Jun-13	9247	67	85	13-Jun-13	5669	41
79	3-Jun-13	10923	80	86	17-Jun-13	4452	32
80	5-Jun-13	8398	61	87	20-Jun-13	7422	54
81	6-Jun-13	5759	42	88	22-Jun-13	6004	44
82	8-Jun-13	7612	56	89	25-Jun-13	4760	35
83	10-Jun-13	7938	58	90	30-Jun-13	5074	37
84	12-Jun-13	4213	31				

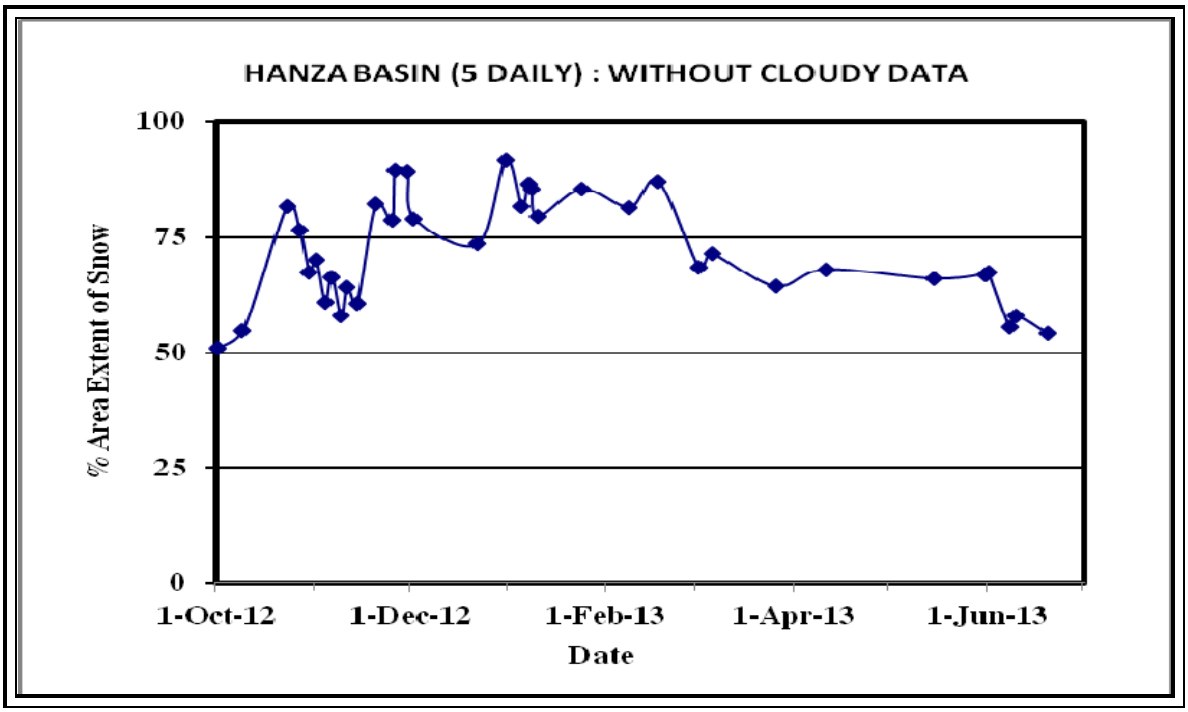
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: HANZA **BASIN AREA: 13711 sq km**

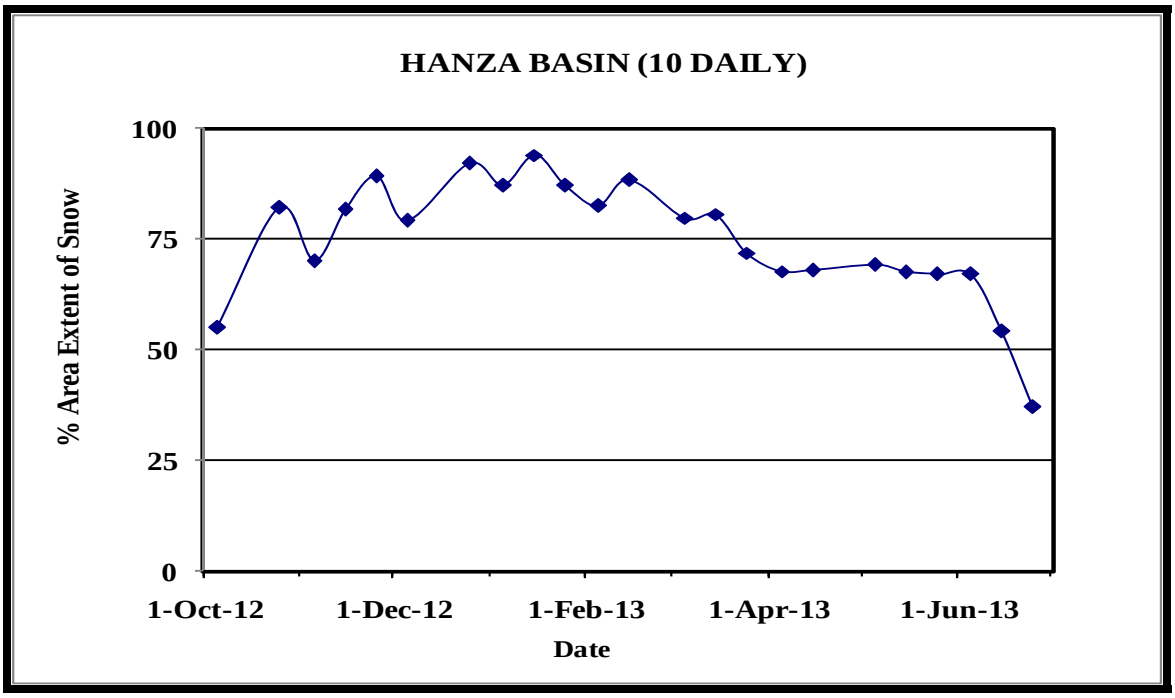
S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
1	09-Oct-12	7541	55	3	09-Nov-12	9598	70
2	30-Oct-12	11243	82	4	11-Nov-12	11197	82
				5	30-Nov-12	12202	89
December 2012				**January 2013**			
6	02-Dec-12	10832	79	8	05-Jan-13	11925	87
7	22-Dec-12	12614	92	9	13-Jan-13	12886	94
				10	24-Jan-13	11937	87
February 2013				**March 2013**			
11	08-Feb-13	11290	82	13	06-Mar-13	10945	80
12	17-Feb-13	12097	88	14	16-Mar-13	11047	81
				15	26-Mar-13	9842	72
April 2013				**May 2013**			
16	06-Apr-13	9273	68	18	10-May-13	9474	69
17	11-Apr-13	9323	68	19	15-May-13	9264	68
				20	31-May-13	9186	67
June 2013							
21	01-Jun-12	9186	67				
22	17-Jun-12	7404	54				
23	30-Jun-12	5073	37				

Snow cover depletion curve



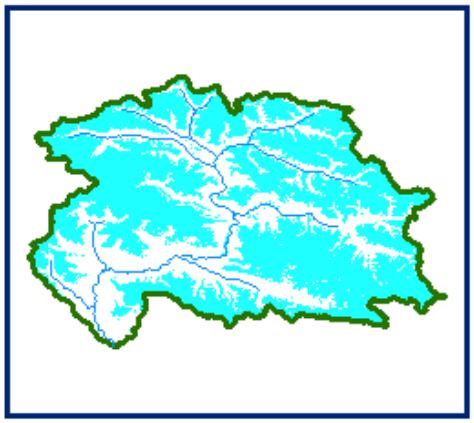


Snow cover depletion curve

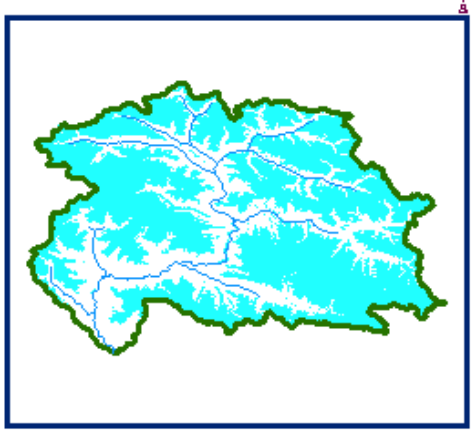


SNOW COVER MAP

SNOW COVER MAP : HANZA BASIN



01 OCTOBER 2012



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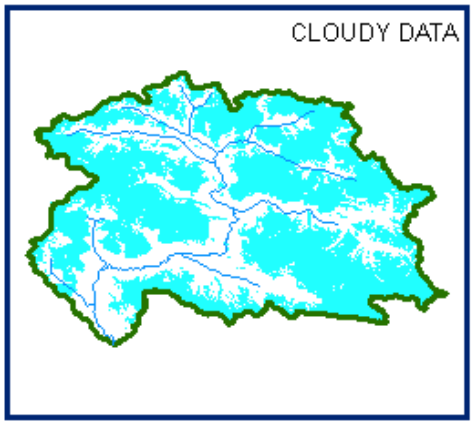
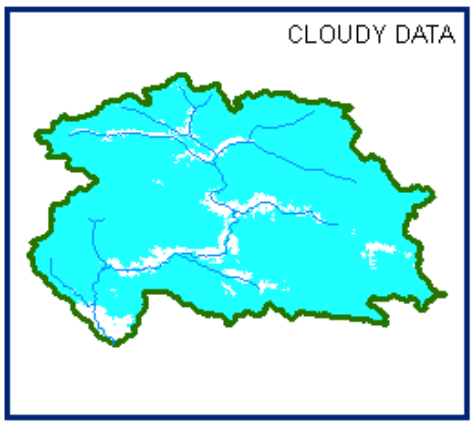


11 OCTOBER 2012



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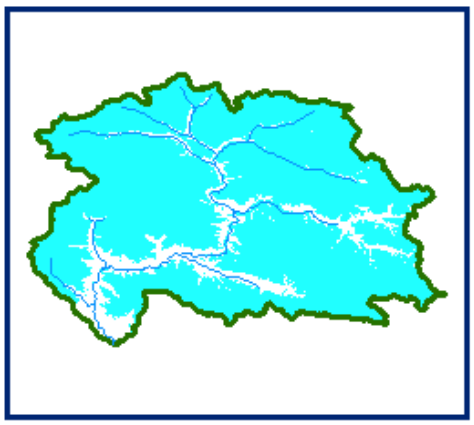
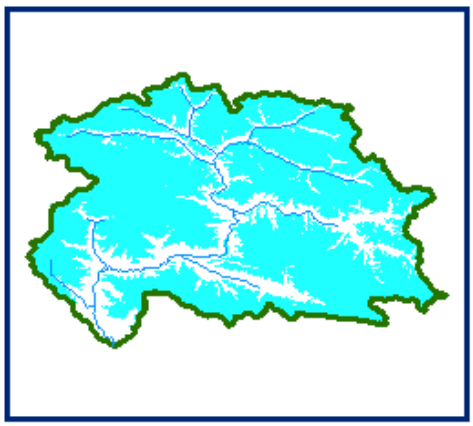


23 OCTOBER 2012



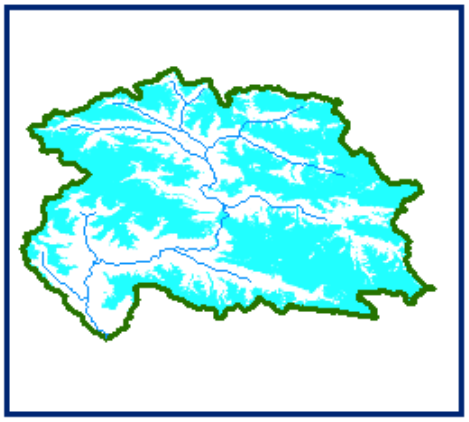
30 OCTOBER 2012

SNOW

0 20 40 80 120 160

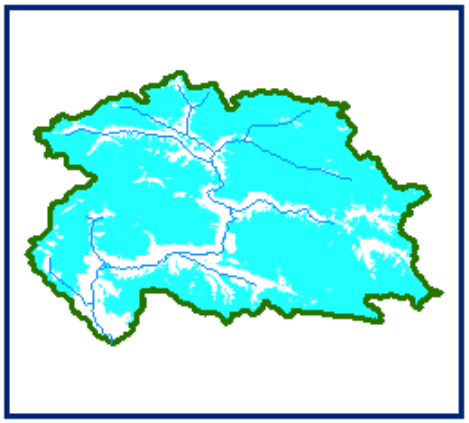
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



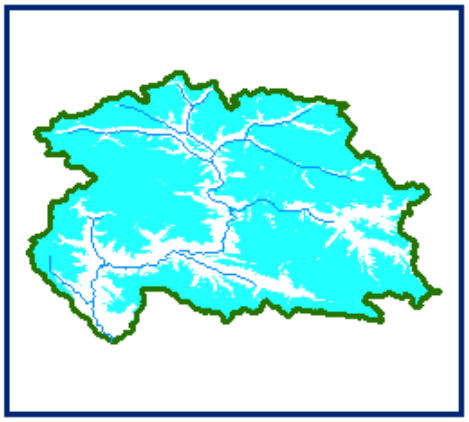
DATA USED

01 OCTOBER 2012
04 OCTOBER 2012
09 OCTOBER 2012



DATA USED

11 OCTOBER 2012
18 OCTOBER 2012



DATA USED

23 OCTOBER 2012
28 OCTOBER 2012
30 OCTOBER 2012

SNOW

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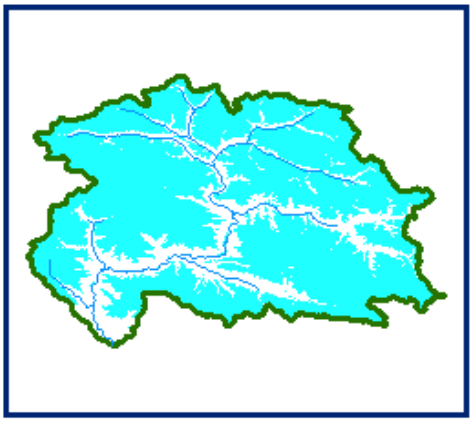
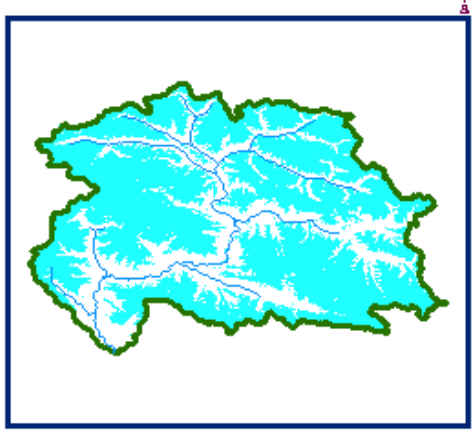
Kilometers

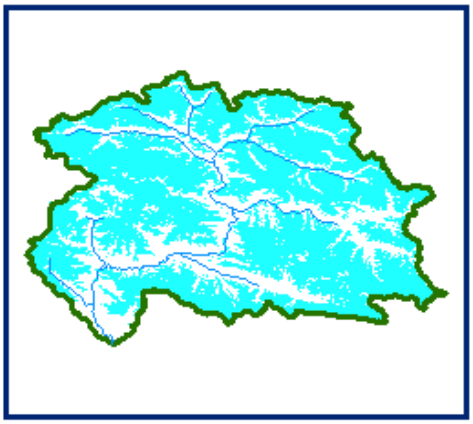
SNOW COVER MAP : HANZA BASIN



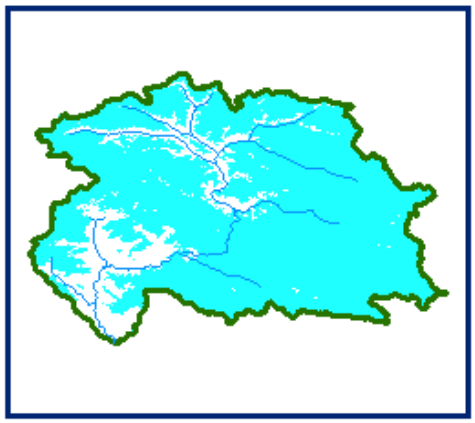
01 NOVEMBER 2012



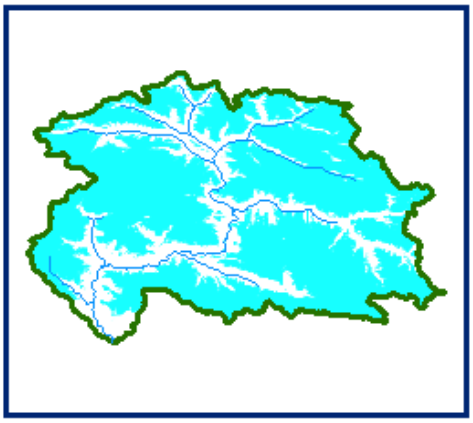
09 NOVEMBER 2012



13 NOVEMBER 2012



16 NOVEMBER 2012



25 NOVEMBER 2012

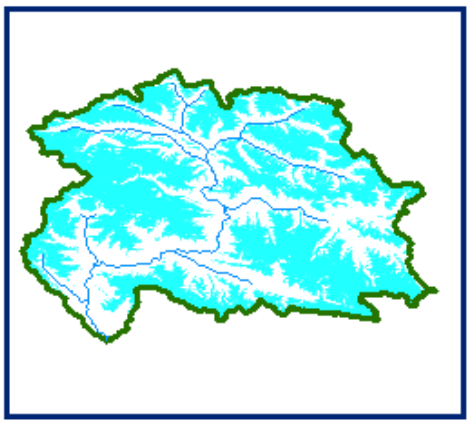
30 NOVEMBER 2012

SNOW

0 20 40 80 120 160

Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



DATA USED

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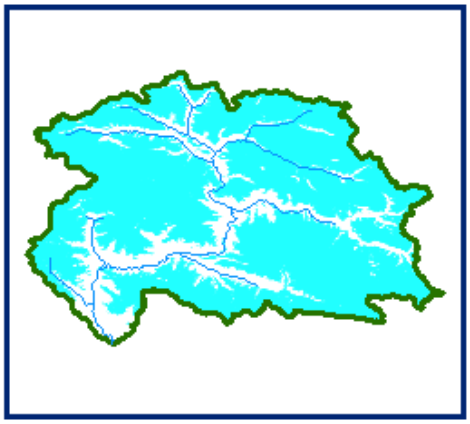
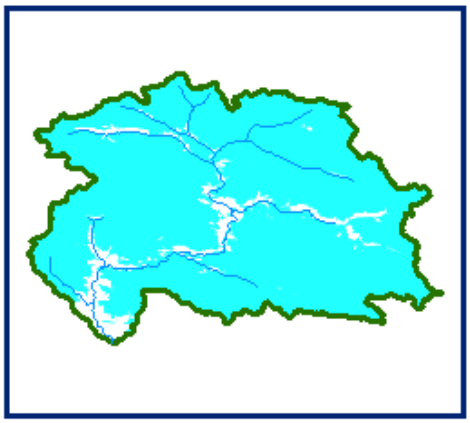
04 NOVEMBER 2012
09 NOVEMBER 2012



DATA USED

11 NOVEMBER 2012
13 NOVEMBER 2012
20 NOVEMBER 2012



DATA USED

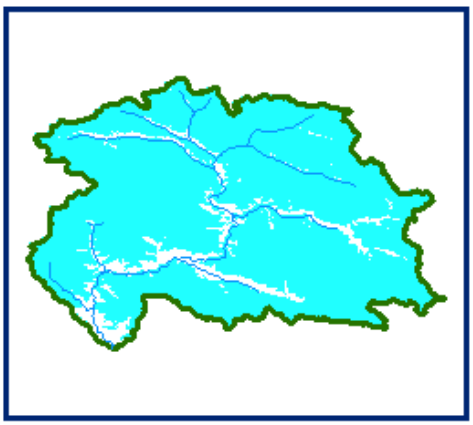
25 NOVEMBER 2012
26 NOVEMBER 2012
30 NOVEMBER 2012

SNOW

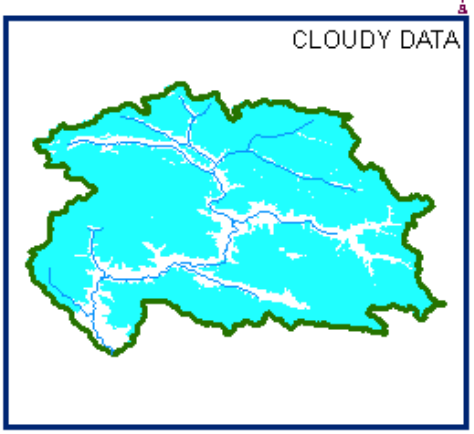
0 20 40 80 120 160

Kilometers

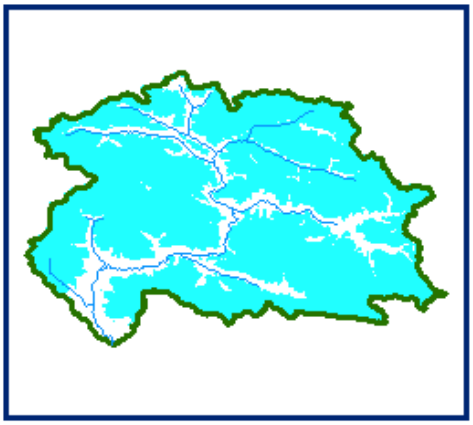
SNOW COVER MAP : HANZA BASIN



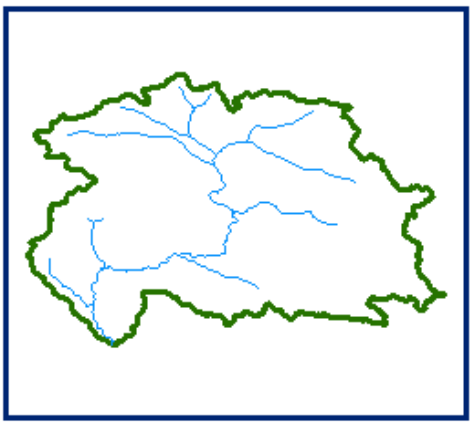
02 DECEMBER 2012



07 DECEMBER 2012



10 DECEMBER 2012



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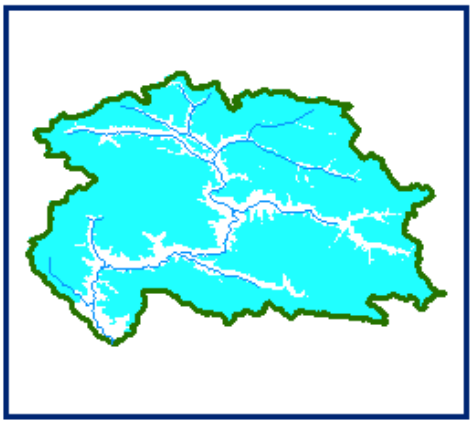
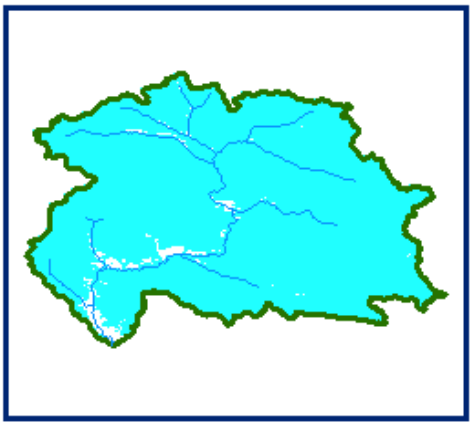


22 DECEMBER 2012



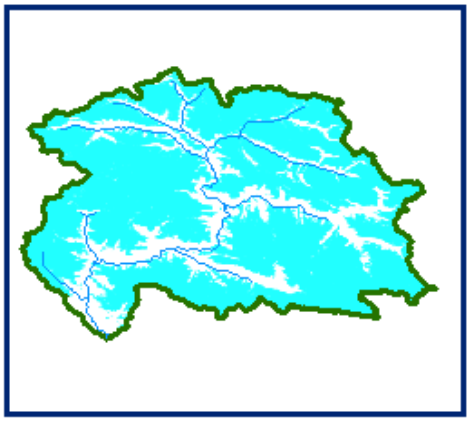
31 DECEMBER 2012

SNOW

0 20 40 80 120 160

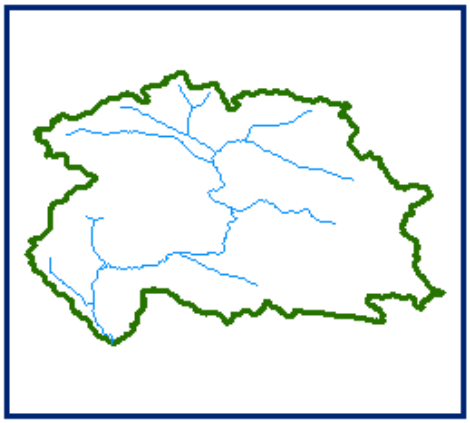
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



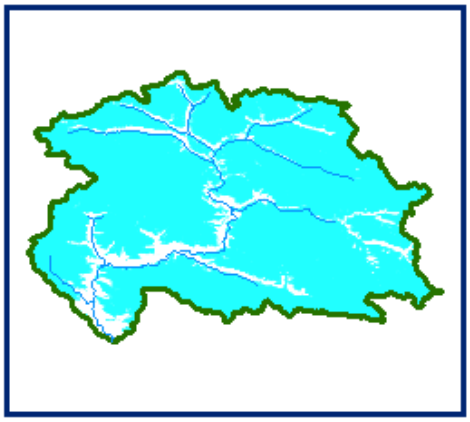
DATA USED

02 DECEMBER 2012
03 DECEMBER 2012
10 DECEMBER 2012



DATA USED

DATA NOT AVAILABLE



DATA USED

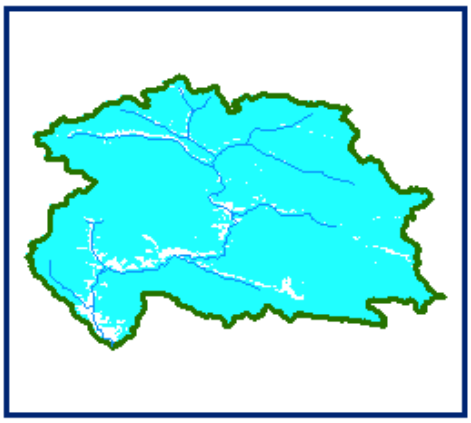
22 DECEMBER 2012
31 DECEMBER 2012

SNOW

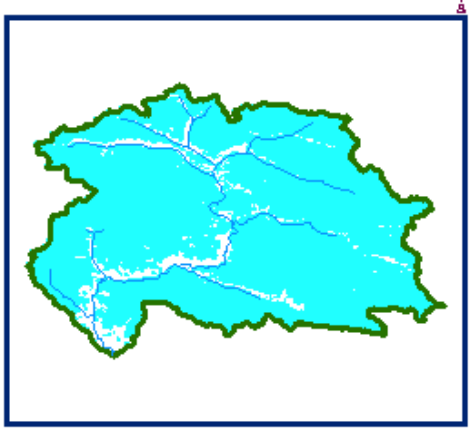
0 20 40 80 120 160

Kilometers

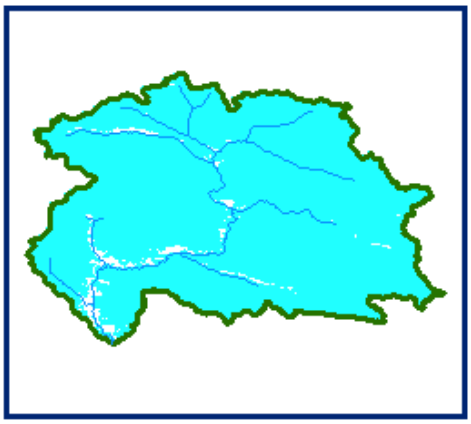
SNOW COVER MAP : HANZA BASIN



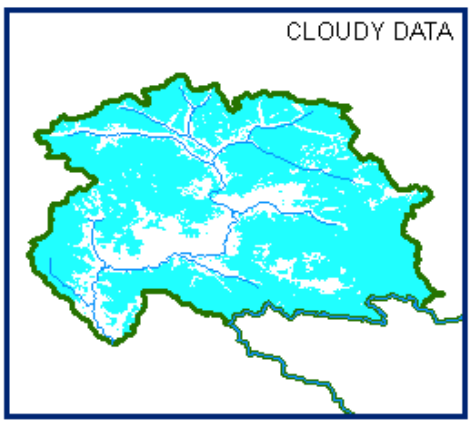
05 JANUARY 2013



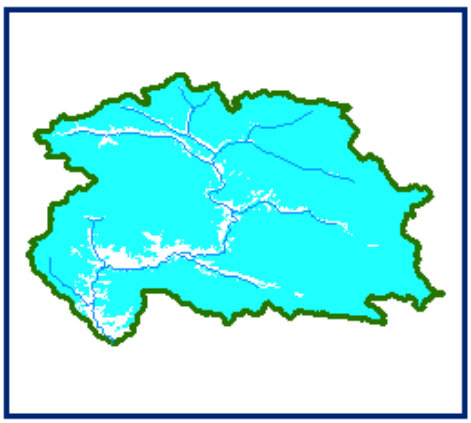
10 JANUARY 2013



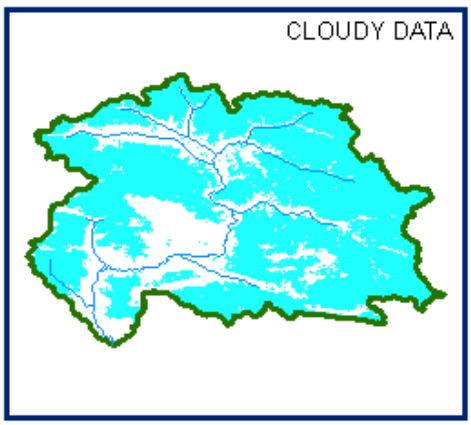
13 JANUARY 2013
08 JANUARY 2013



20 JANUARY 2013



24 JANUARY 2013

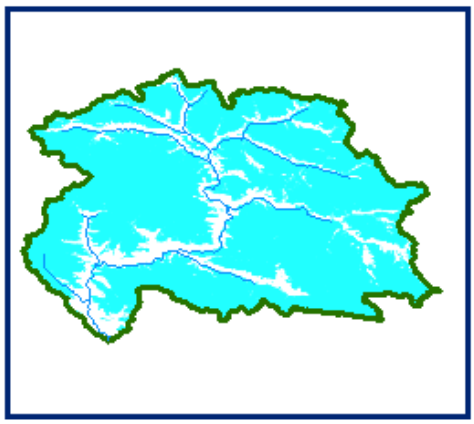


27 JANUARY 2013

SNOW

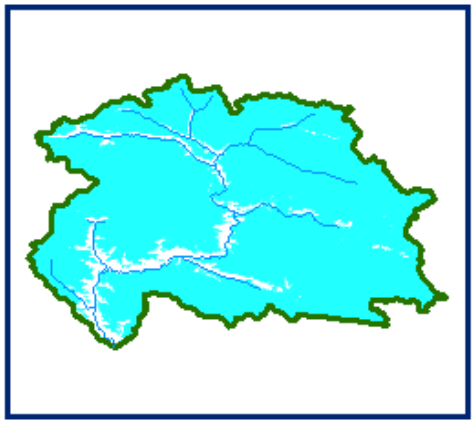
0 20 40 80 120 160
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



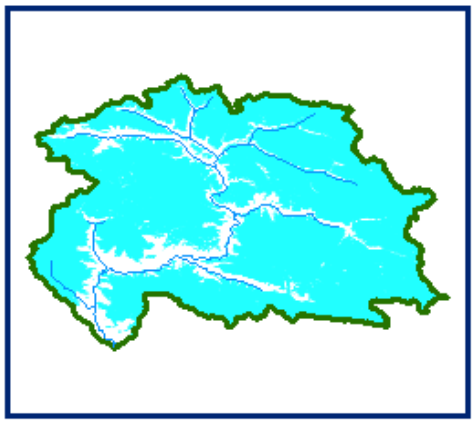
DATA USED

05 JANUARY 2013
08 JANUARY 2013
07 JANUARY 2013



DATA USED

13 JANUARY 2013
19 JANUARY 2013
20 JANUARY 2013



DATA USED

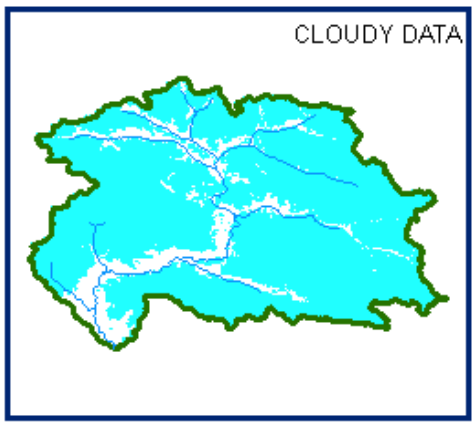
24 JANUARY 2013
22 JANUARY 2013
27 JANUARY 2013

SNOW

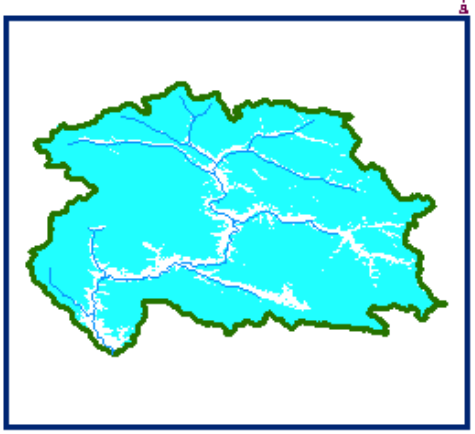
0 20 40 80 120 160

Kilometers

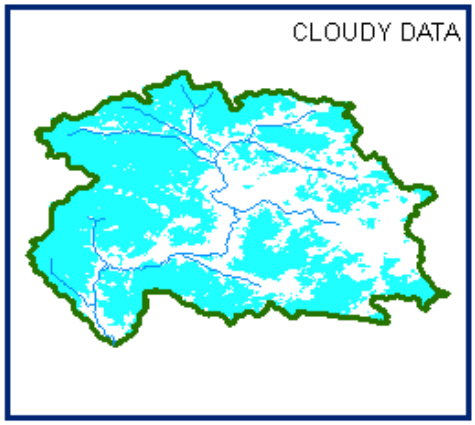
SNOW COVER MAP : HANZA BASIN



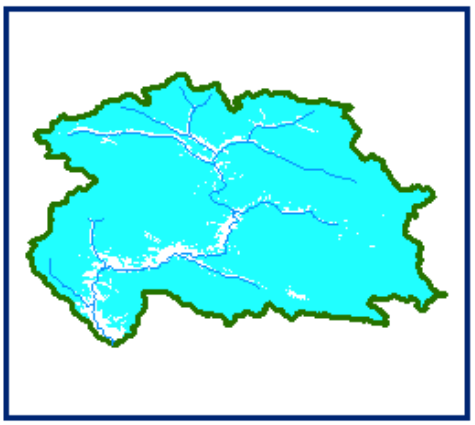
01 FEBRUARY 2013



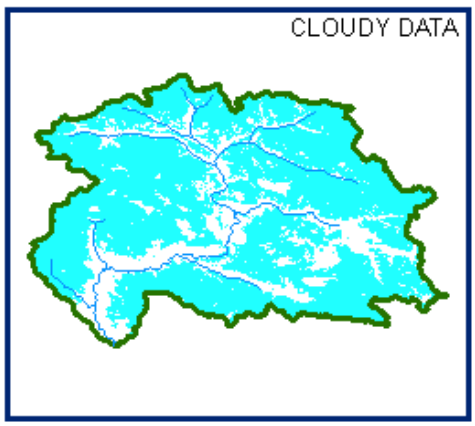
08 FEBRUARY 2013



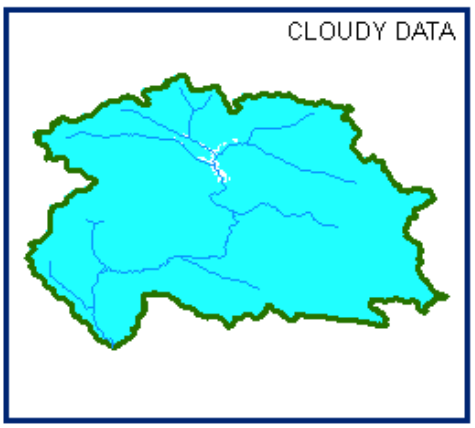
13 FEBRUARY 2013



17 FEBRUARY 2013



20 FEBRUARY 2013



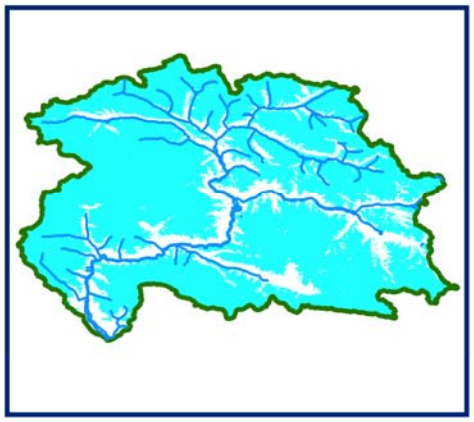
25 FEBRUARY 2013

SNOW

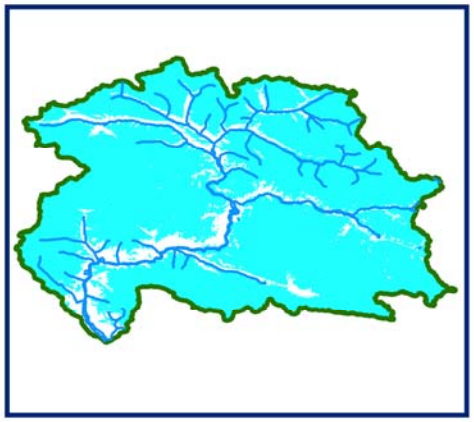
0 20 40 80 120 160

Kilometers

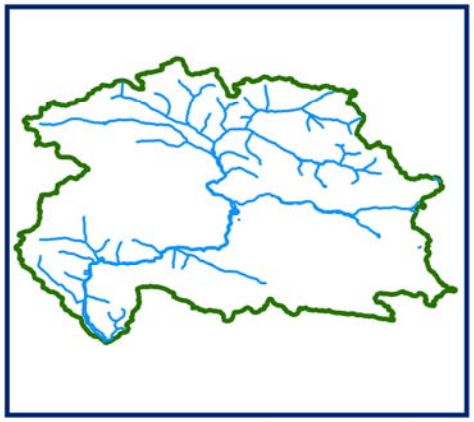
10 DAILY SNOW COVER MAP: HANZA BASIN



DATA USED
08 FEBRUARY 2013
10 FEBRUARY 2013
01 FEBRUARY 2013



DATA USED
17 FEBRUARY 2013
20 FEBRUARY 2013

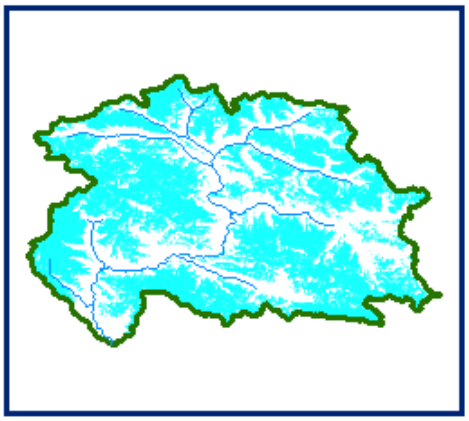


DATA USED
DATA NOT AVAILABLE

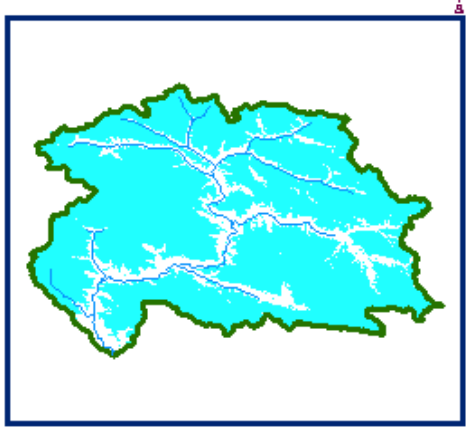
SNOW

0 25 50 100 150 200
Kilometers

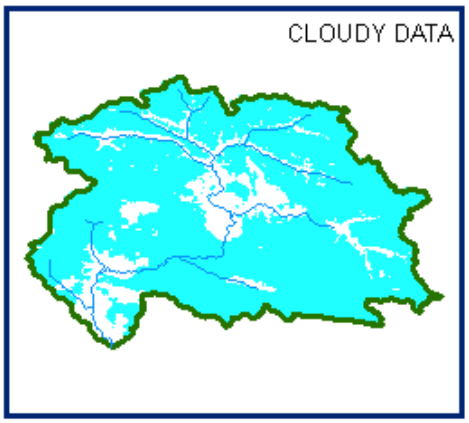
SNOW COVER MAP : HANZA BASIN



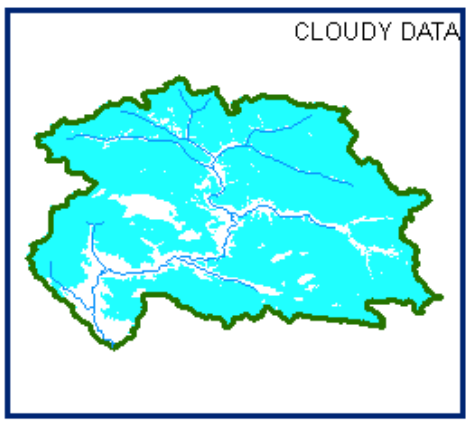
02 MARCH 2013
05 JANUARY 2013



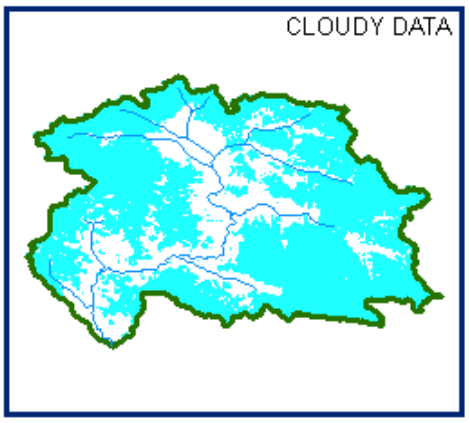
06 MARCH 2013



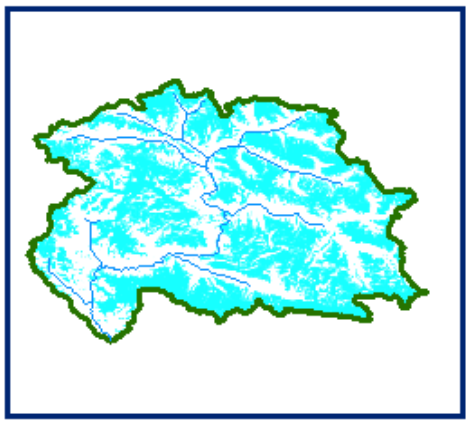
11 MARCH 2013



16 MARCH 2013



21 MARCH 2013

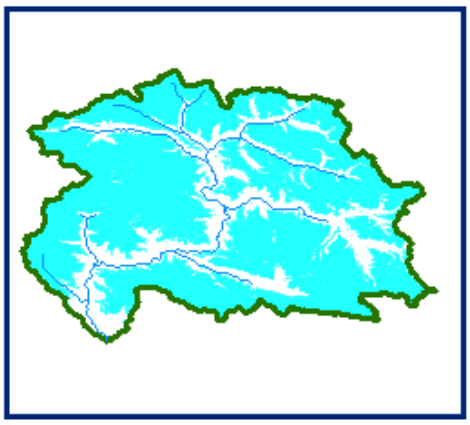


26 MARCH 2013
14 MARCH 2013

SNOW

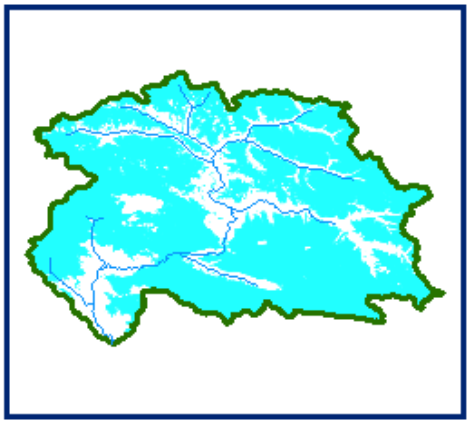
0 20 40 80 120 160
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



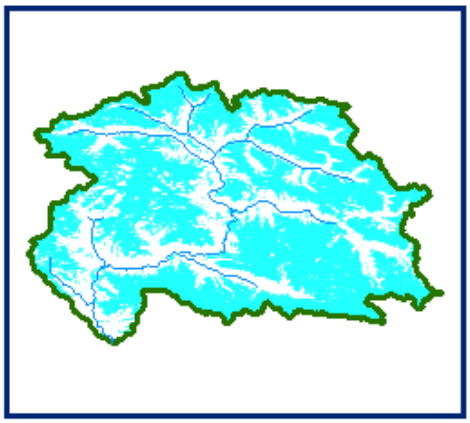
DATA USED

01 MARCH 2013
02 MARCH 2013
06 MARCH 2013



DATA USED

11 MARCH 2013
16 MARCH 2013



DATA USED

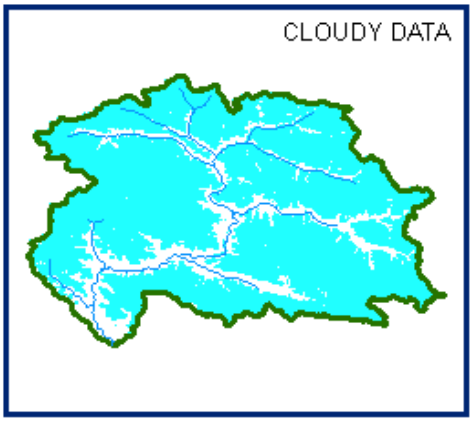
21 MARCH 2013
25 MARCH 2013
26 MARCH 2013

SNOW

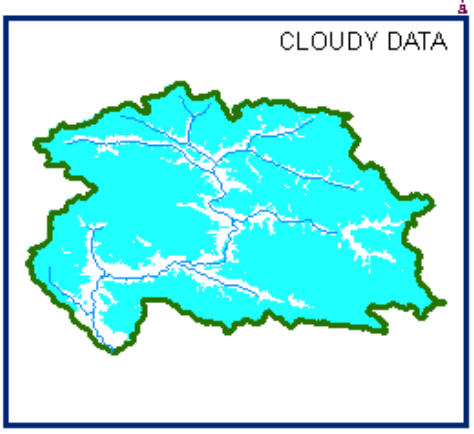
0 20 40 80 120 160

Kilometers

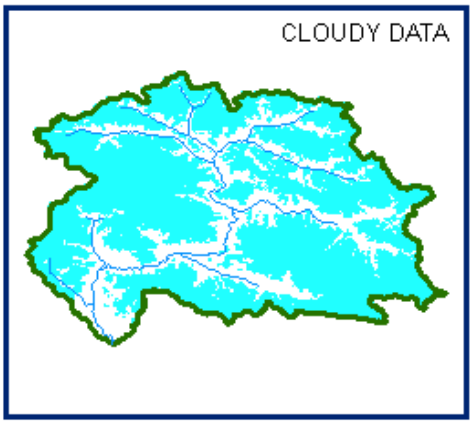
SNOW COVER MAP : HANZA BASIN



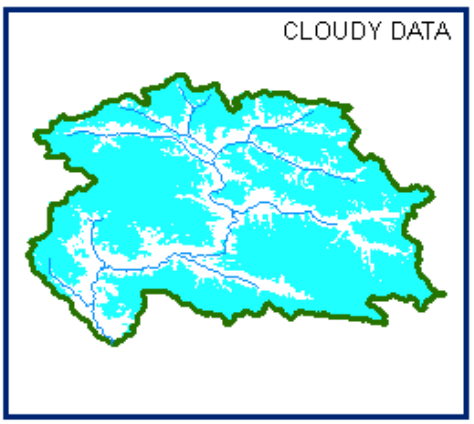
06 APRIL 2013



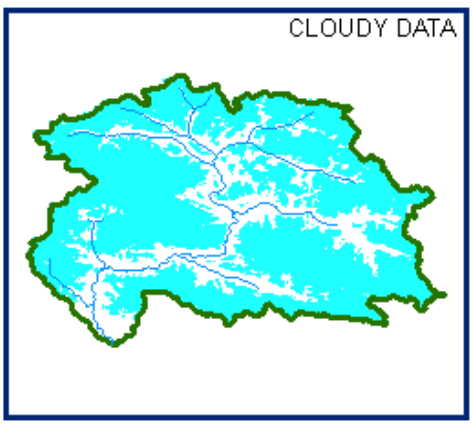
11 APRIL 2013



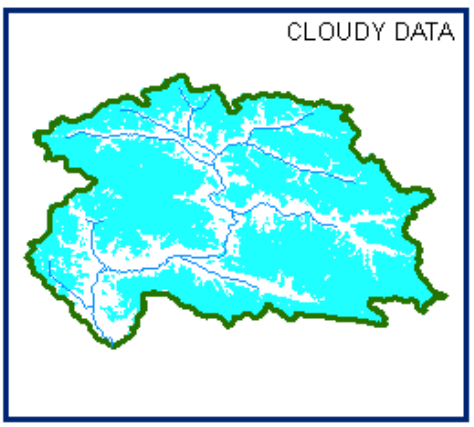
13 APRIL 2013



14 APRIL 2013



18 APRIL 2013



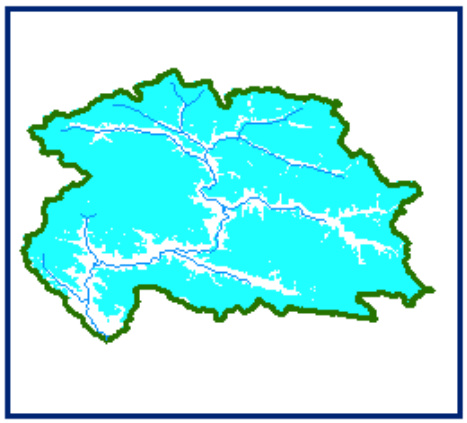
23 APRIL 2013

SNOW

0 20 40 80 120 160

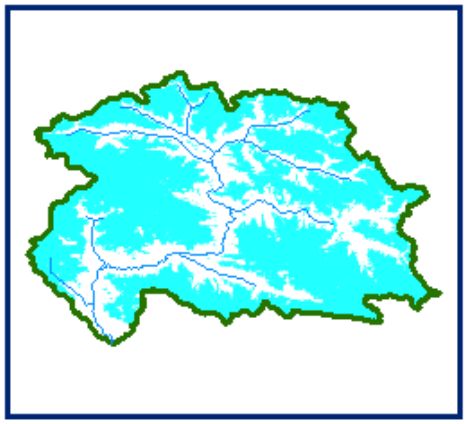
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



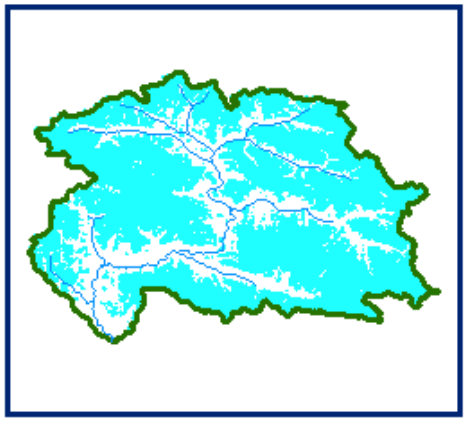
DATA USED

06 APRIL 2013



DATA USED

11 APRIL 2013
18 APRIL 2013
14 APRIL 2013



DATA USED

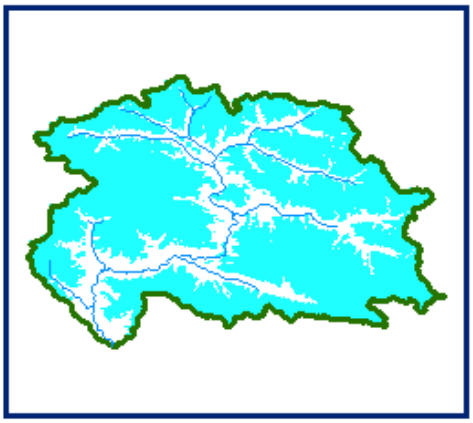
23 APRIL 2013

SNOW

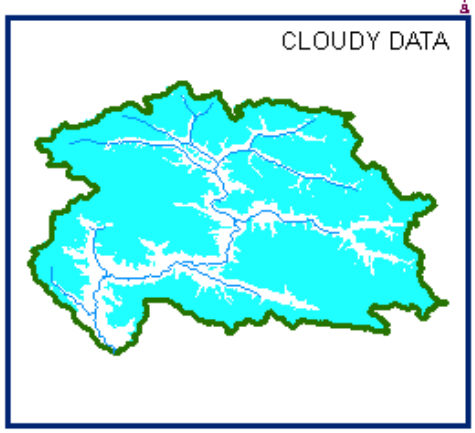
0 20 40 80 120 160

Kilometers

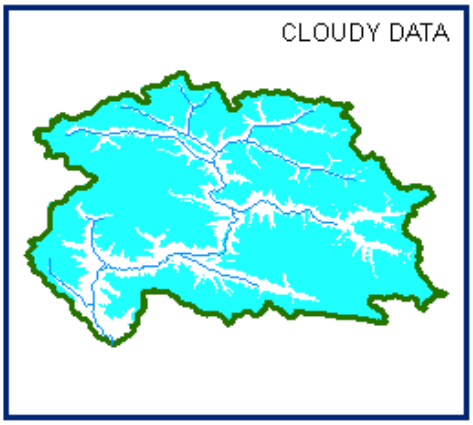
SNOW COVER MAP : HANZA BASIN



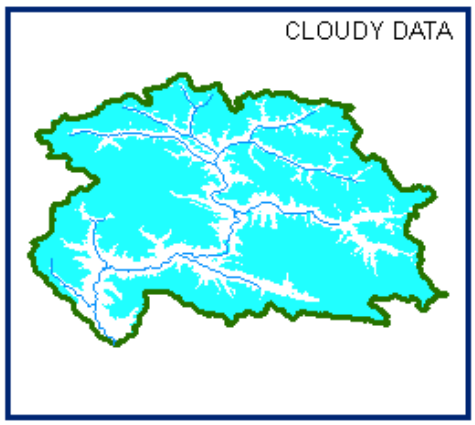
03 MAY 2013



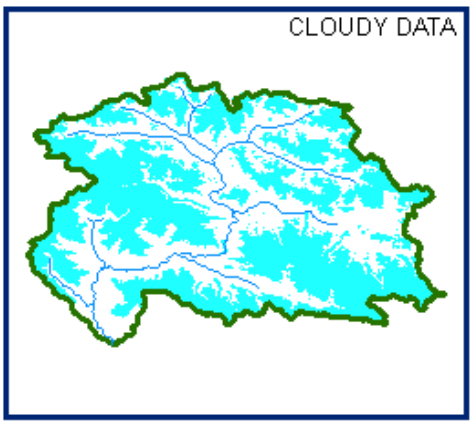
10 MAY 2013



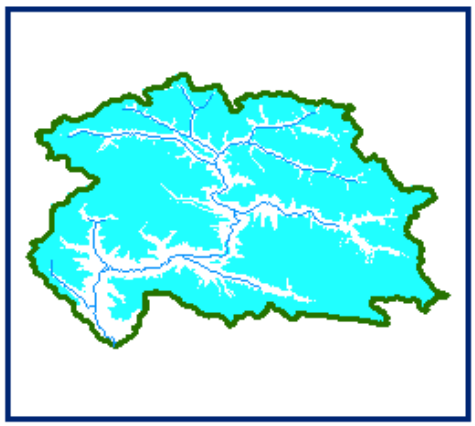
15 MAY 2013



17 MAY 2013



24 MAY 2013



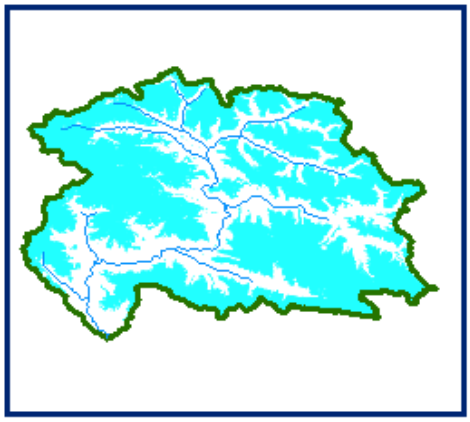
31 MAY 2013

SNOW

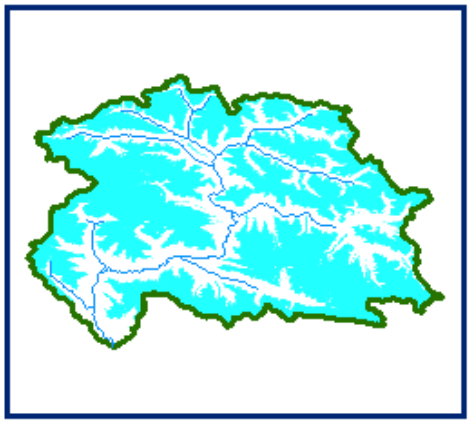
0 20 40 80 120 160

Kilometers

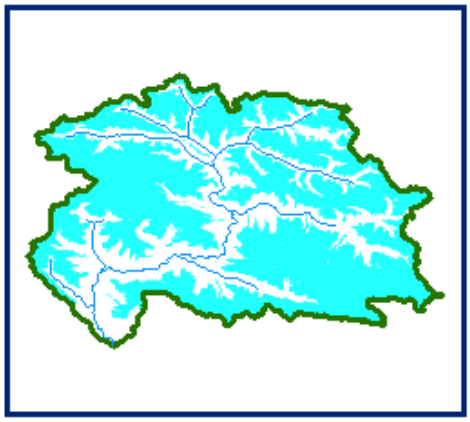
10 DAILY SNOW COVER MAP: HANZA BASIN



DATA USED
10 MAY 2013
03 MAY 2013



DATA USED
15 MAY 2013
17 MAY 2013

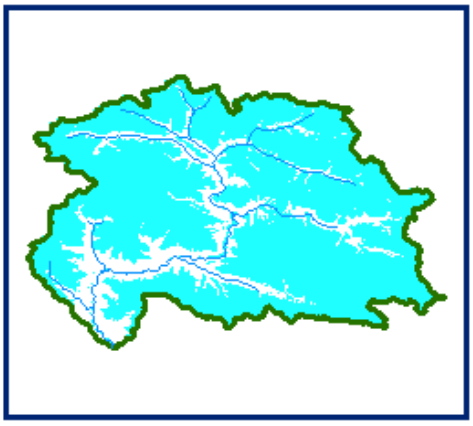


DATA USED
31 MAY 2013
29 MAY 2013
24 MAY 2013

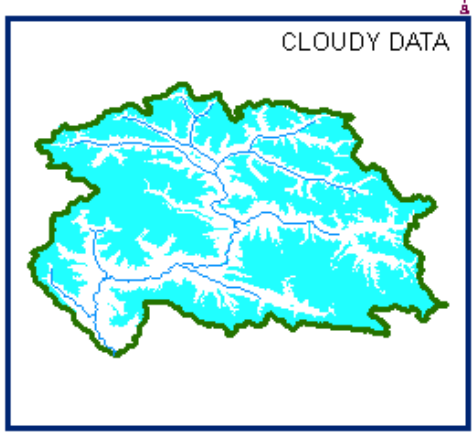
SNOW

0 20 40 80 120 160
Kilometers

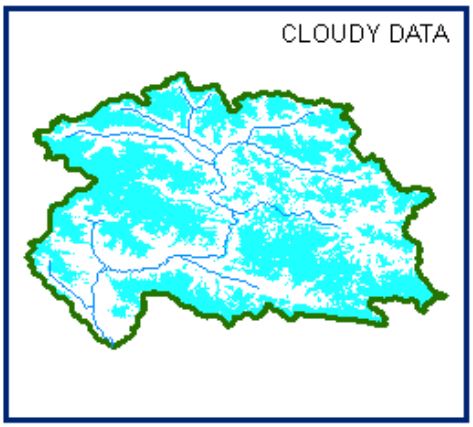
SNOW COVER MAP : HANZA BASIN



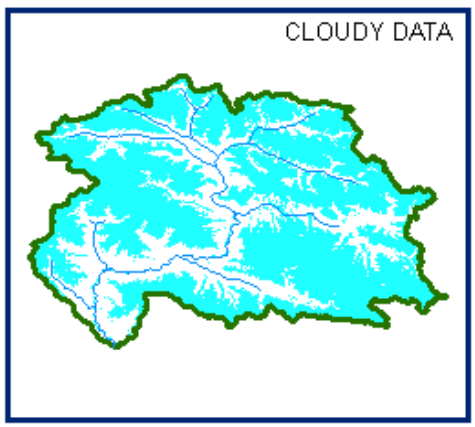
01 JUNE 2013



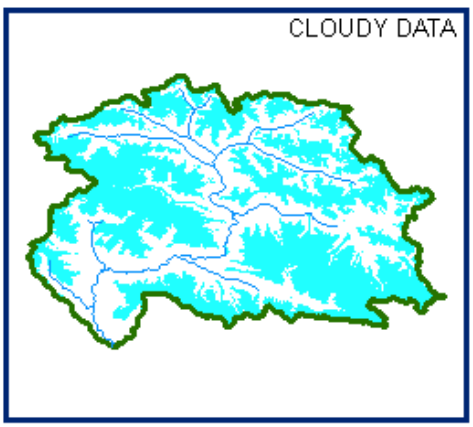
08 JUNE 2013



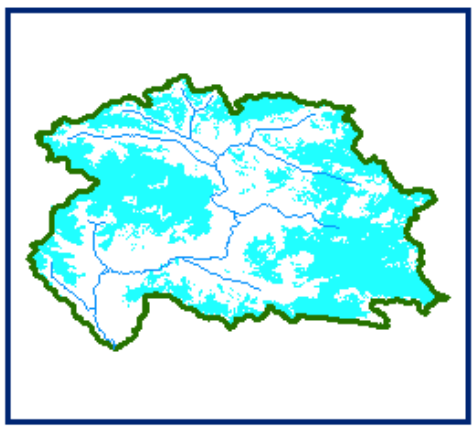
13 JUNE 2013



20 JUNE 2013



22 JUNE 2013



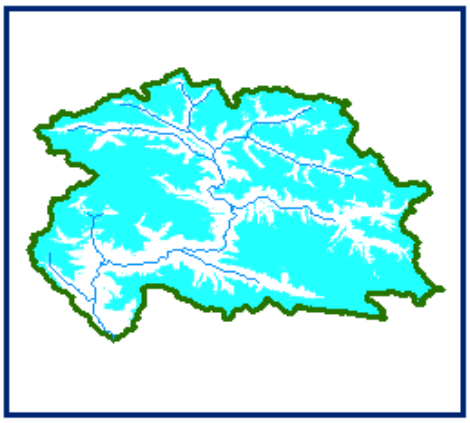
30 JUNE 2013

SNOW

0 20 40 80 120 160

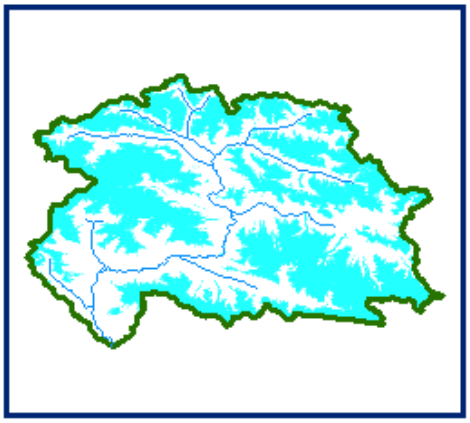
Kilometers

10 DAILY SNOW COVER MAP: HANZA BASIN



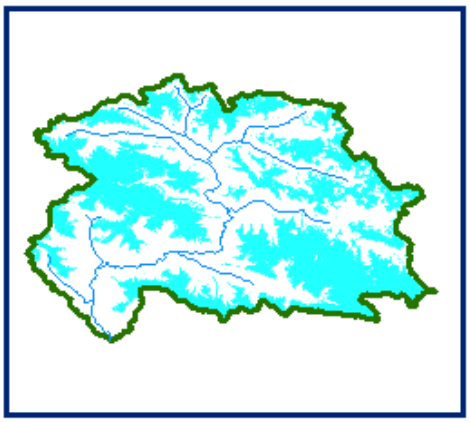
DATA USED

01 JUNE 2013
05 JUNE 2013
08 JUNE 2013



DATA USED

20 JUNE 2013
17 JUNE 2013
13 JUNE 2013



DATA USED

22 JUNE 2013
30 JUNE 2013
25 JUNE 2013

SNOW

0 20 40 80 120 160
Kilometers

GILGIT BASIN

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: GILGIT **BASIN AREA: 13615 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	3884	29	6	18-Oct-12	10204	75
2	4-Oct-12	7286	54	7	23-Oct-12	10945	80
3	6-Oct-12	2932	22	8	27-Oct-12	10114	74
4	8-Oct-12	4089	30	9	28-Oct-12	10141	74
5	11-Oct-12	5761	42	10	30-Oct-12	8757	64
November 2012							
11	1-Nov-12	9272	68	16	16-Nov-12	7755	57
12	4-Nov-12	6804	50	17	20-Nov-12	10281	76
13	6-Nov-12	8713	64	18	25-Nov-12	10705	79
14	11-Nov-12	8289	61	19	30-Nov-12	11955	88
15	13-Nov-12	6768	50				
December 2012							
20	2-Dec-12	10904	80	24	10-Dec-12	10909	80
21	3-Dec-12	12140	89	25	22-Dec-12	10965	81
22	5-Dec-12	12979	95	26	31-Dec-12	12300	90
23	7-Dec-12	11406	84				
January 2013							
27	5-Jan-13	11543	85	32	20-Jan13	11028	81
28	7-Jan-13	11909	87	33	22-Jan-13	10321	76
29	8-Jan-13	12946	95	34	24-Jan-13	11643	86
30	10-Jan-13	11034	81	35	27-Jan-13	10560	78
31	19-Jan-13	12142	89				
February 2013							
36	8-Feb-13	12318	90	39	20-Feb-05	10460	77
37	10-Feb-13	11087	81	40	25-Feb-13	13572	100
38	17-Feb-13	12107	90				
March 2013							
41	1-Mar-13	11466	84	45	16-Mar-13	8777	64
42	4-Mar-13	11563	85	46	21-Mar-13	9689	71
43	6-Mar-13	11134	82	47	25-Mar-13	9628	71
44	11-Mar-13	9269	68				
April 2013							
48	4-Apr-13	11157	82	52	14-Apr-13	9308	68

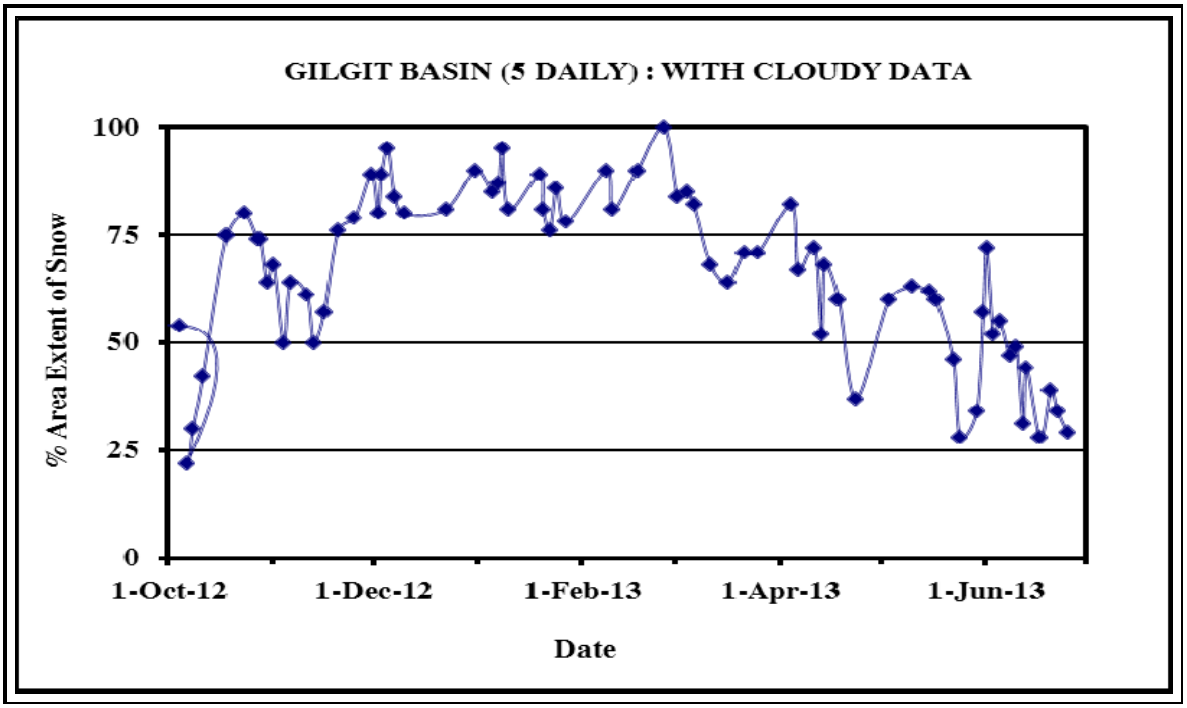
49	6-Apr-13	9166	67	53	18-Apr-13	8153	60
50	11-Apr-13	9865	72	54	23-Apr-13	5051	37
51	13-Apr-13	7081	52				
May 2013							
55	3-May-13	8171	60	59	22-May-13	6217	46
56	10-May-13	8595	63	60	24-May-13	3763	28
57	15-May-13	8495	62	61	29-May-13	4594	34
58	17-May-13	8101	60	62	31-May-13	7728	57
June 2013							
63	1-Jun-13	9844	72	69	13-Jun-13	5943	44
64	3-Jun-13	7130	52	70	17-Jun-13	3794	28
65	5-Jun-13	7524	55	71	20-Jun-13	5319	39
66	8-Jun-13	6431	47	72	22-Jun-13	4627	34
67	10-Jun-13	6652	49	73	25-Jun-13	3925	29
68	12-Jun-13	4249	31				

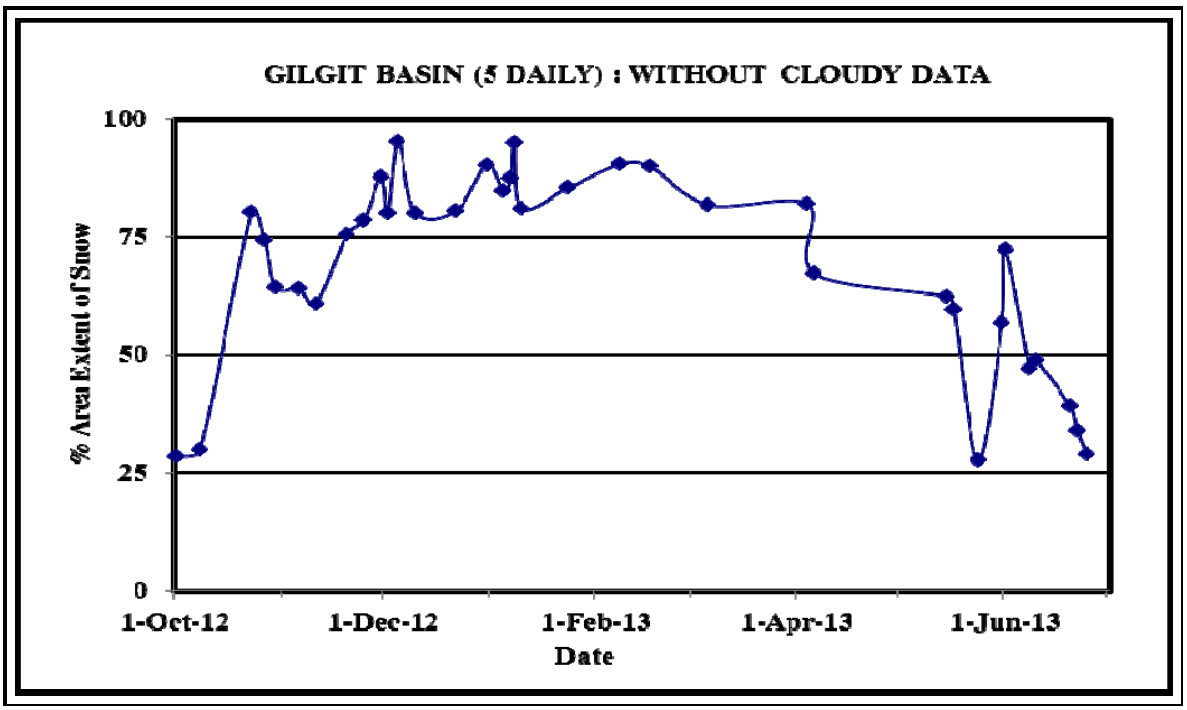
AREAL EXTENT OF SNOW (10 DAILY)

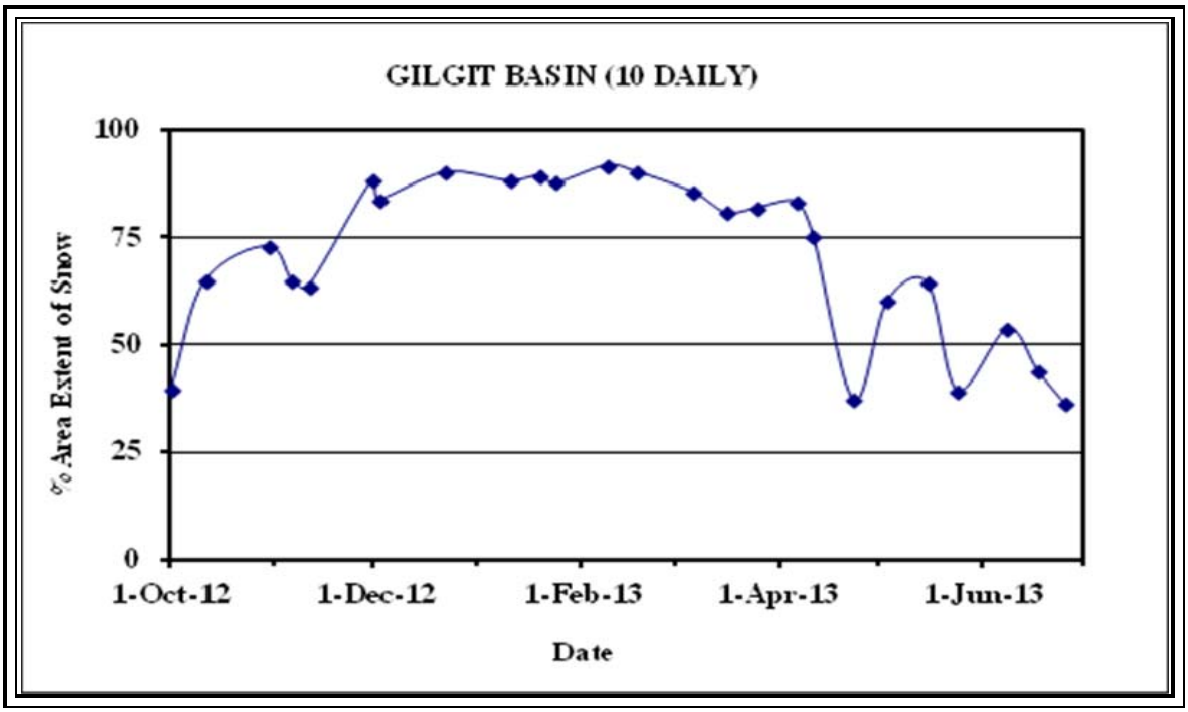
BASIN NAME: GILGIT **BASIN AREA: 13615 sq km**

S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
1	01-Oct-12	4085	30	4	06-Nov-12	8850	65
2	11-Oct-12	8820	65	5	11-Nov-12	10347	76
3	30-Oct-12	10892	80	6	30-Nov-12	11997	88
December 2012				**January 2013**			
7	02-Dec-12	11401	84	9	10-Jan-13	11994	88
8	22-Dec-12	12258	90	10	19-Jan-13	12156	89
				11	24-Jan-13	11920	88
February 2013				**March 2013**			
12	08-Feb-13	12469	92	14	06-Mar-13	11631	85
13	17-Feb-13	12274	90	15	16-Mar-13	10970	81
				16	25-Mar-13	11139	82
April 2013				**May 2013**			
17	06-Apr-13	11318	83	20	03-May-13	8577	63
18	11-Apr-13	10228	75	21	15-May-13	8766	64
				22	24-May-13	7761	57
June 2013							
23	08-Jun-12	6671	49				
24	17-Jun-12	5310	39				
25	25-Jun-12	4629	34				

Snow cover depletion curve

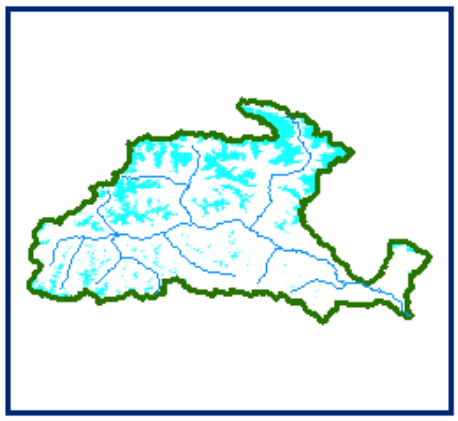




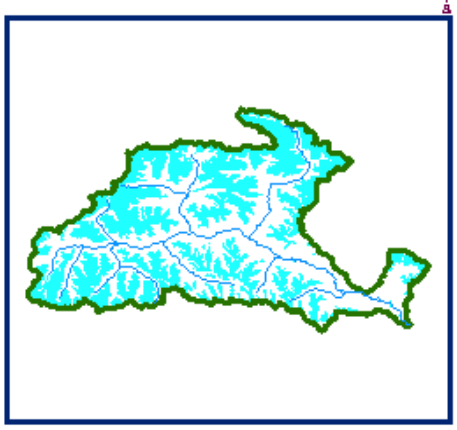

GILGIT BASIN (10 DAILY)
100
75
50
25
0
% Area Extent of Snow
1-Oct-12
1-Dec-12
1-Feb-13
1-Apr-13
1-Jun-13
Date

SNOW COVER MAP

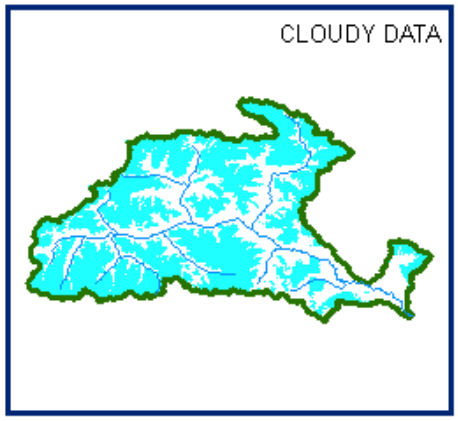
SNOW COVER MAP : GILGIT BASIN



01 OCTOBER 2012

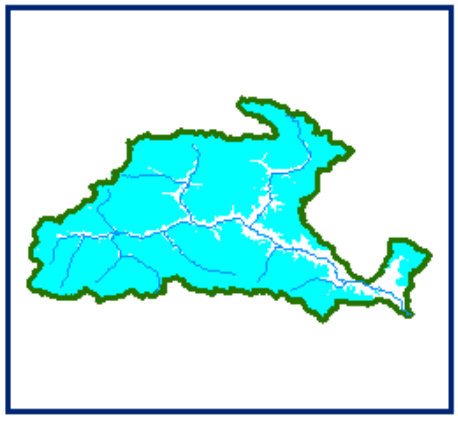


08 OCTOBER 2012

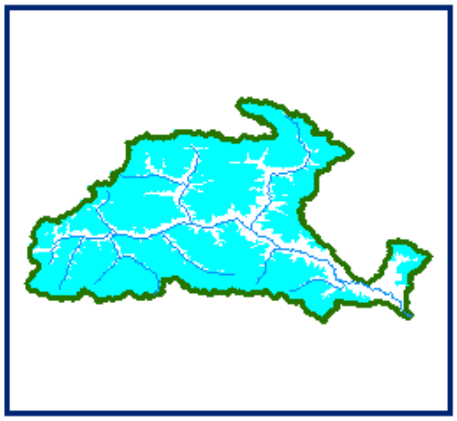


11 OCTOBER 2012

18 OCTOBER 2012



23 OCTOBER 2012



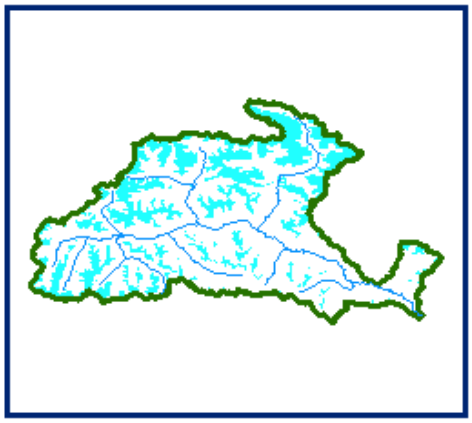
30 OCTOBER 2012

SNOW

0 25 50 100 150 200

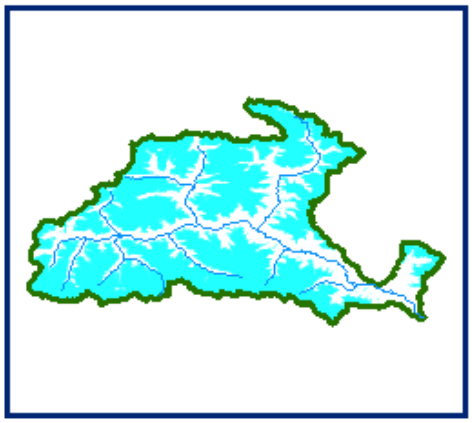
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



DATA USED
01 OCTOBER 2012
04 OCTOBER 2012
08 OCTOBER 2012

DATA USED
11 OCTOBER 2012
18 OCTOBER 2012

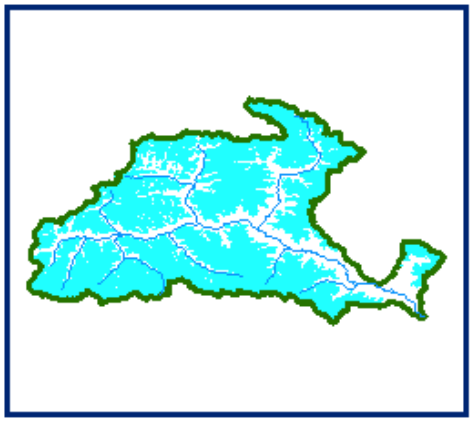


DATA USED
30 OCTOBER 2012
28 OCTOBER 2012
27 OCTOBER 2012

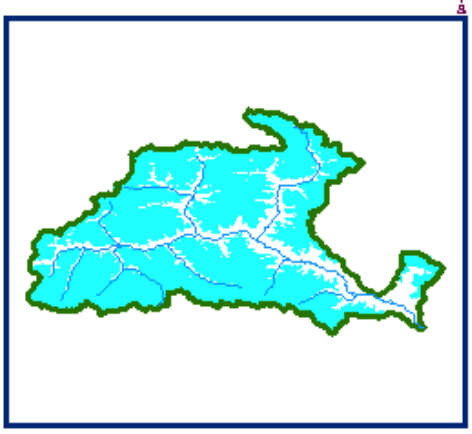
SNOW

0 30 60 120 180 240
Kilometers

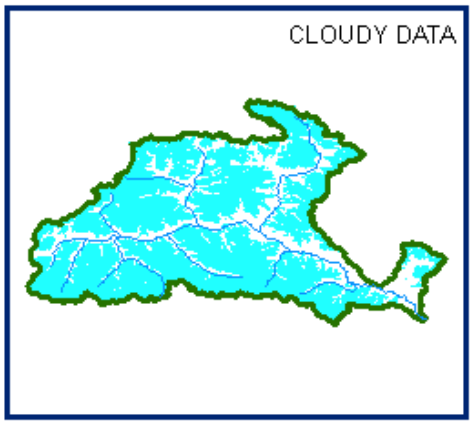
SNOW COVER MAP : GILGIT BASIN



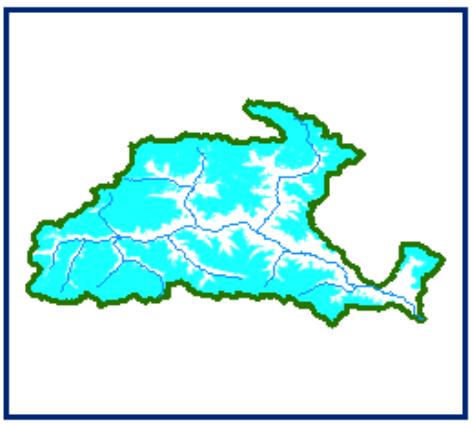
04 NOVEMBER 2012



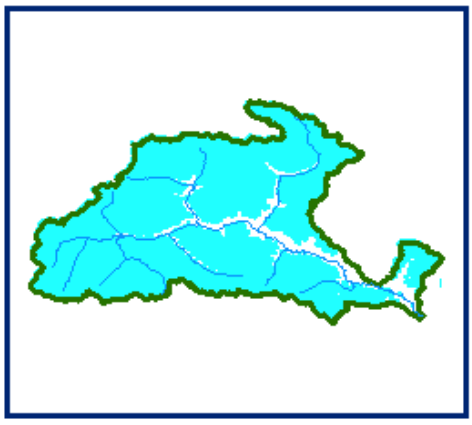
06 NOVEMBER 2012



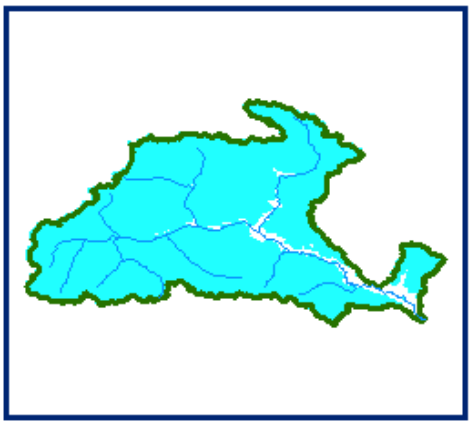
13 NOVEMBER 2012



20 NOVEMBER 2012



25 NOVEMBER 2012



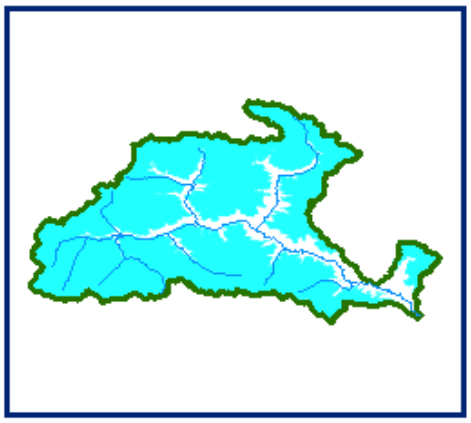
30 NOVEMBER 2012

SNOW

0 25 50 100 150 200

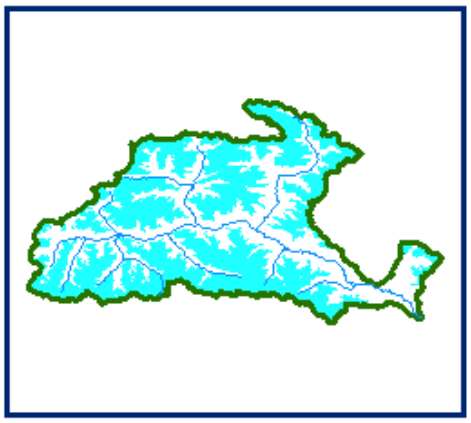
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



DATA USED
06 NOVEMBER 2012
04 NOVEMBER 2012
01 NOVEMBER 2012

DATA USED
11 NOVEMBER 2012
16 NOVEMBER 2012
13 NOVEMBER 2012

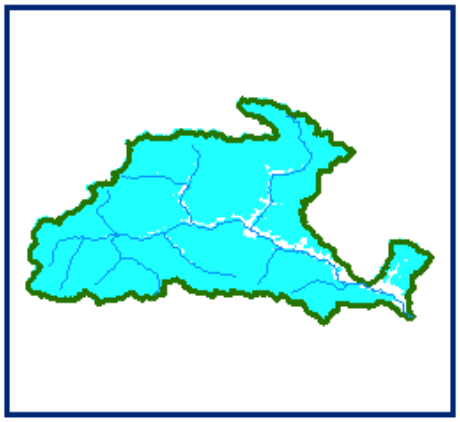


DATA USED
30 NOVEMBER 2012
25 NOVEMBER 2012

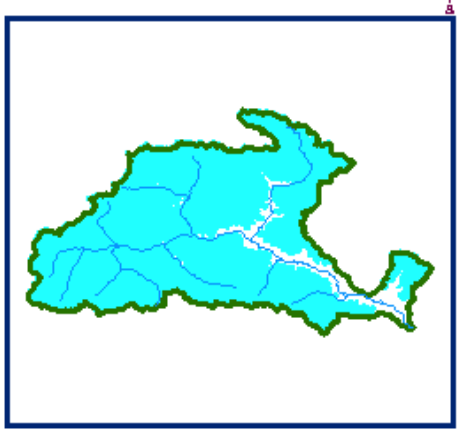
SNOW

0 30 60 120 180 240
Kilometers

SNOW COVER MAP : GILGIT BASIN

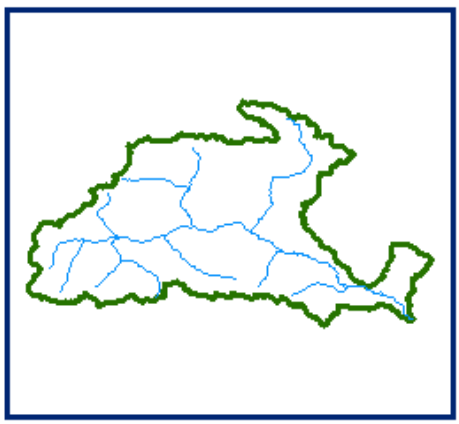


02 DECEMBER 2012

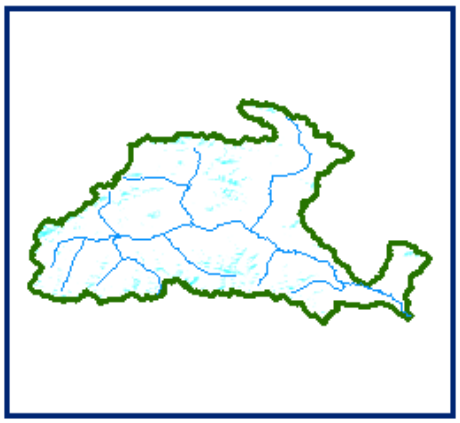


07 DECEMBER 2012

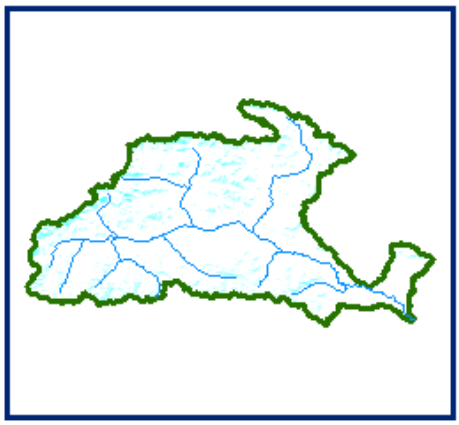
10 DECEMBER 2012



DATA NOT AVAILABLE



22 DECEMBER 2012



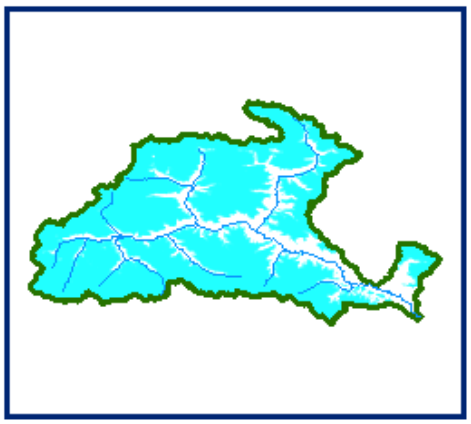
31 DECEMBER 2012

SNOW

0 25 50 100 150 200

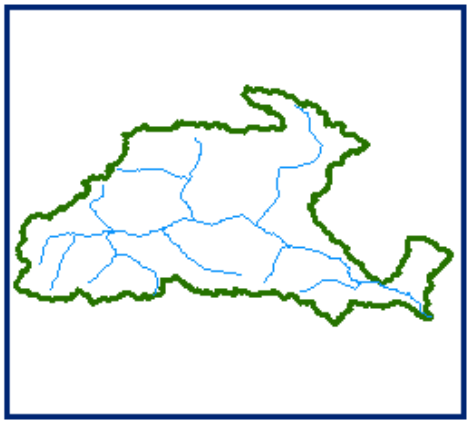
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



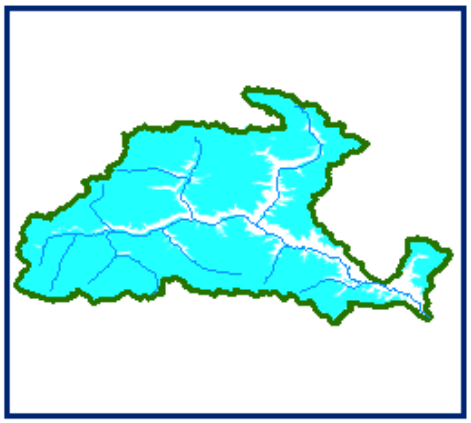
DATA USED

02 DECEMBER 2012
10 DECEMBER 2012
03 DECEMBER 2012



DATA USED

DATA NOT AVAILABLE



DATA USED

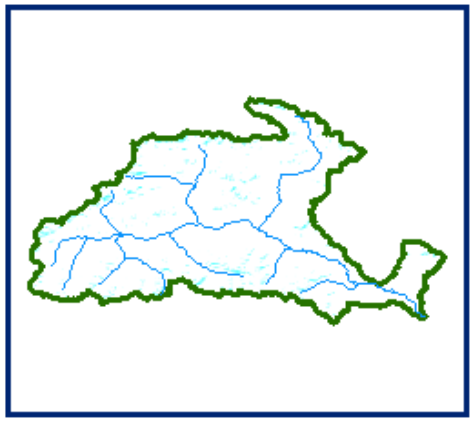
22 DECEMBER 2012
31 DECEMBER 2012

SNOW

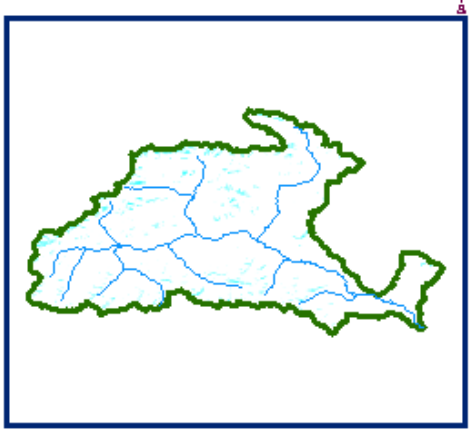
0 30 60 120 180 240

Kilometers

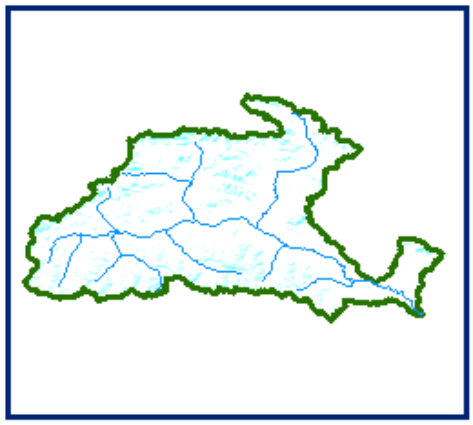
SNOW COVER MAP : GILGIT BASIN



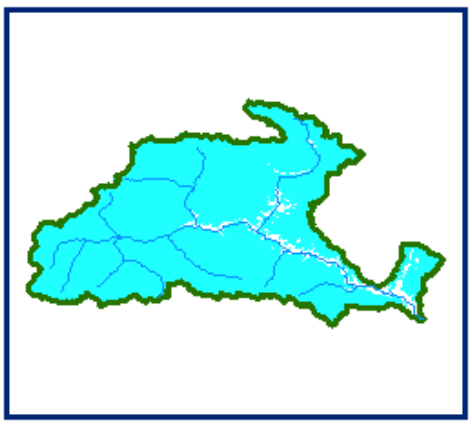
05 JANUARY 2013



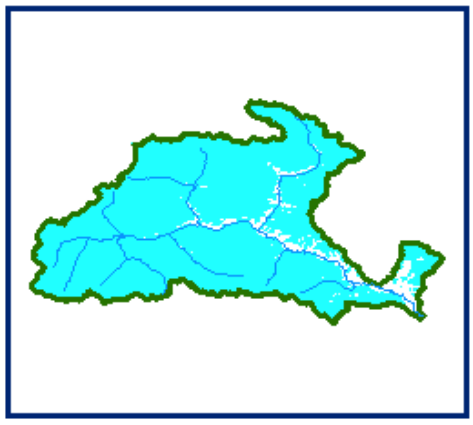
07 JANUARY 2013



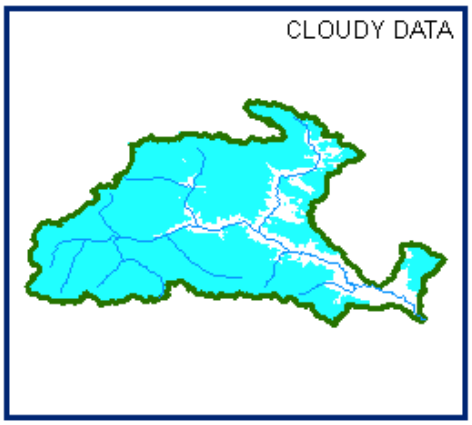
10 JANUARY 2013



19 JANUARY 2013



24 JANUARY 2013



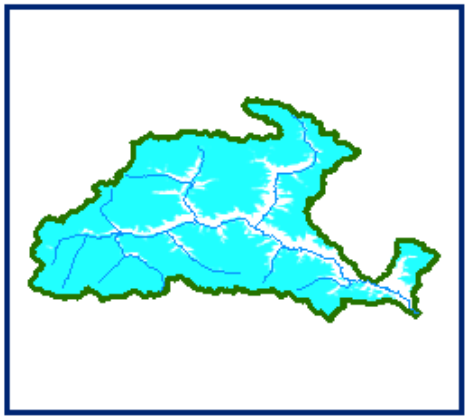
27 JANUARY 2013

SNOW

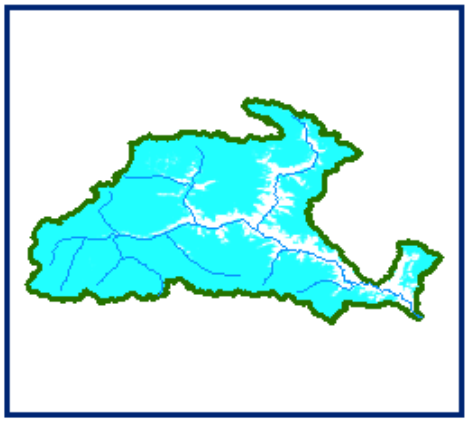
0 25 50 100 150 200

Kilometers

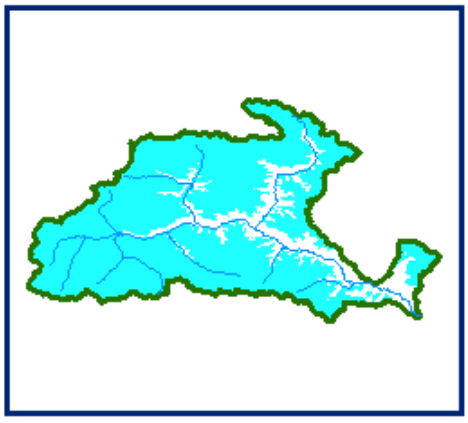
10 DAILY SNOW COVER MAP: GILGIT BASIN



DATA USED
10 JANUARY 2013
07 JANUARY 2013
05 JANUARY 2013



DATA USED
19 JANUARY 2013
20 JANUARY 2013

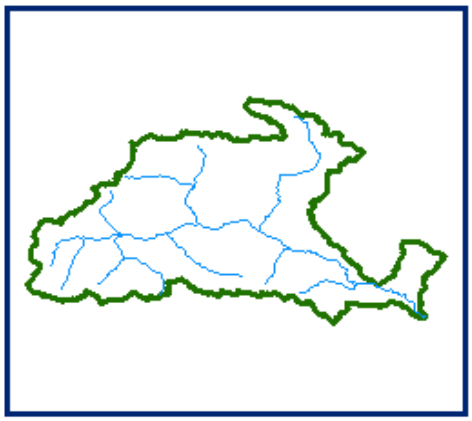


DATA USED
24 JANUARY 2013
27 JANUARY 2013
22 JANUARY 2013

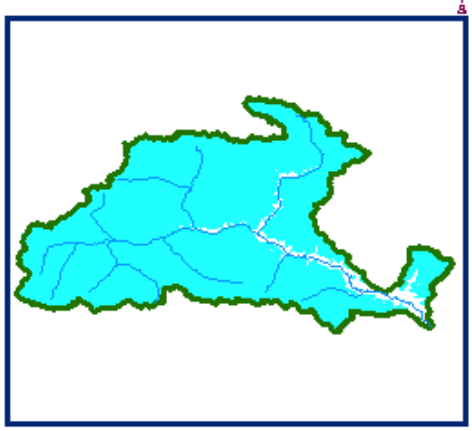
SNOW

0 30 60 120 180 240
Kilometers

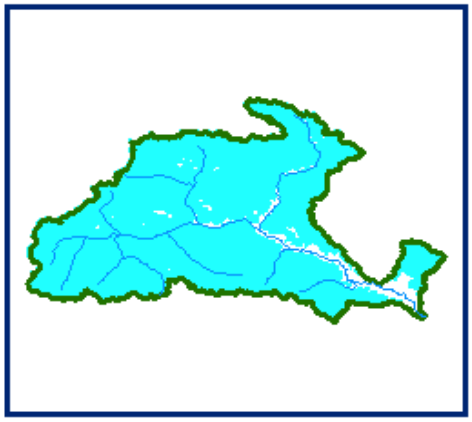
SNOW COVER MAP : GILGIT BASIN



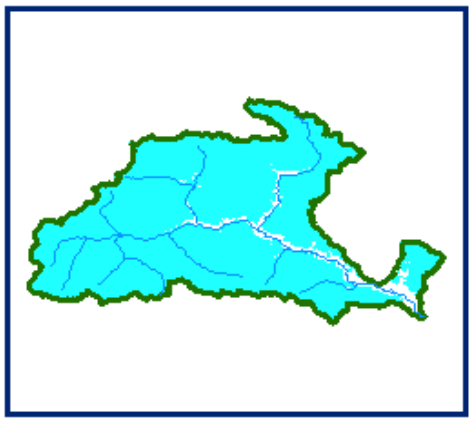
DATA NOT AVAILABLE



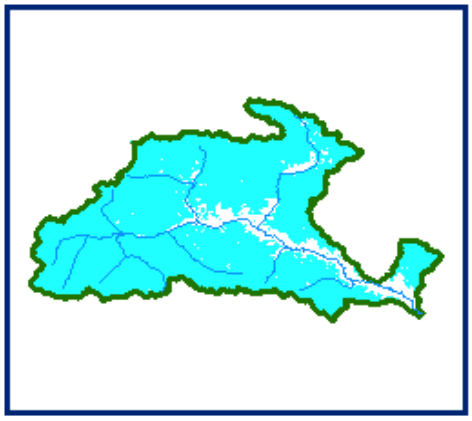
08 FEBRUARY 2013



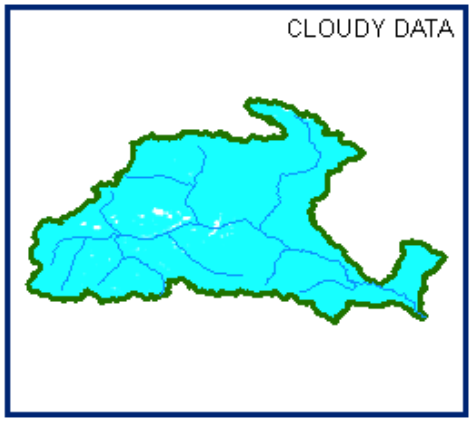
10 FEBRUARY 2013



17 FEBRUARY 2013



20 FEBRUARY 2013



25 FEBRUARY 2013
10 FEBRUARY 2013

SNOW

0 25 50 100 150 200
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN

DATA USED
08 FEBRUARY 2013
10 FEBRUARY 2013

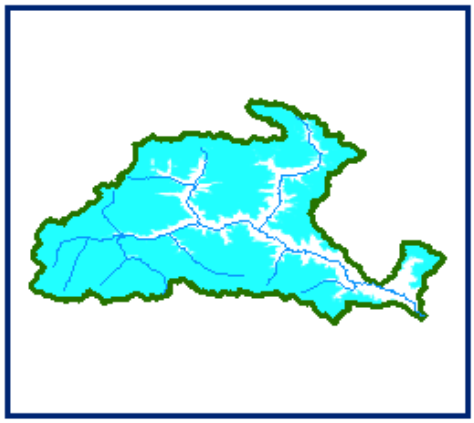
DATA USED
17 FEBRUARY 2013
20 FEBRUARY 2013

DATA USED
DATA NOT AVAILABLE

SNOW

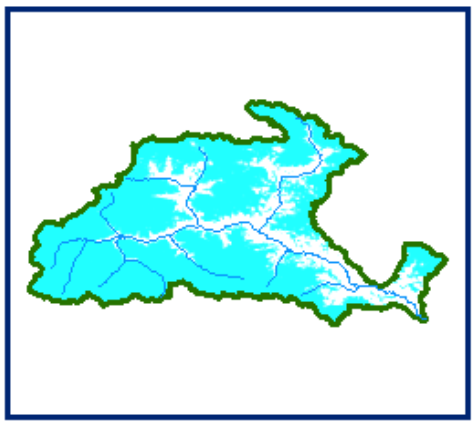
0 25 50 100 150 200
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



DATA USED
06 MARCH 2013
01 MARCH 2013
04 MARCH 2013

DATA USED
16 MARCH 2013
11 MARCH 2013

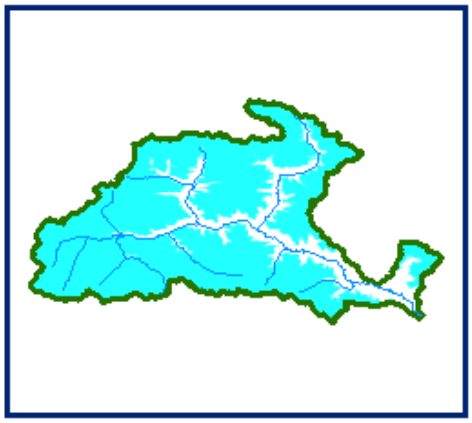


DATA USED
25 MARCH 2013
21 MARCH 2013

SNOW

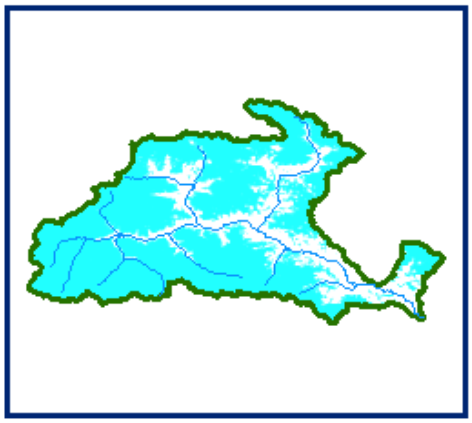
0 30 60 120 180 240
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



DATA USED
06 MARCH 2013
01 MARCH 2013
04 MARCH 2013

DATA USED
16 MARCH 2013
11 MARCH 2013

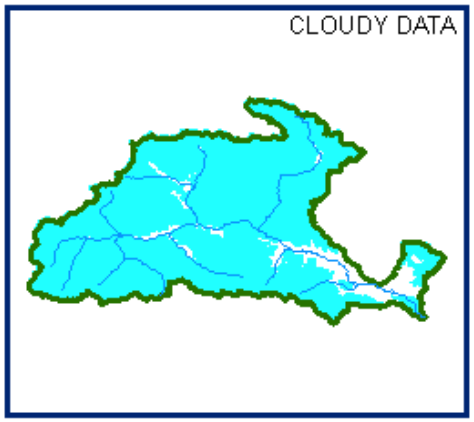


DATA USED
25 MARCH 2013
21 MARCH 2013

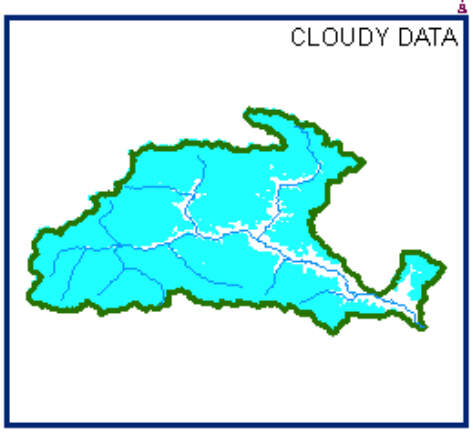
SNOW

0 30 60 120 180 240
Kilometers

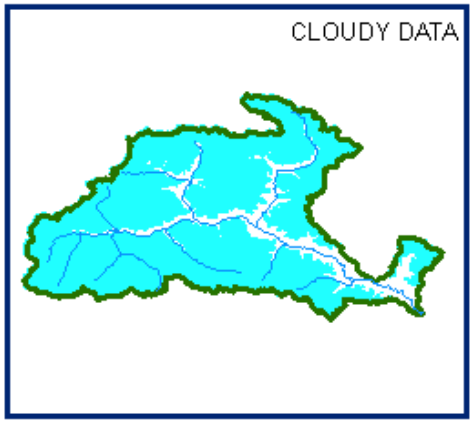
SNOW COVER MAP : GILGIT BASIN



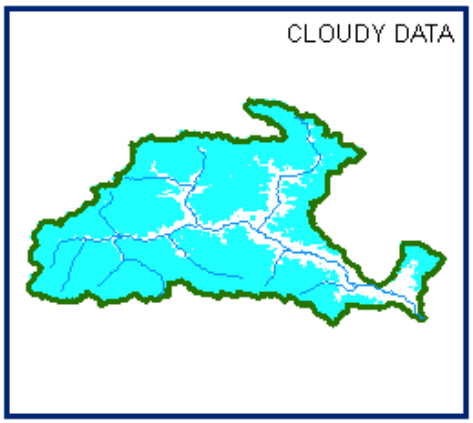
04 APRIL 2013



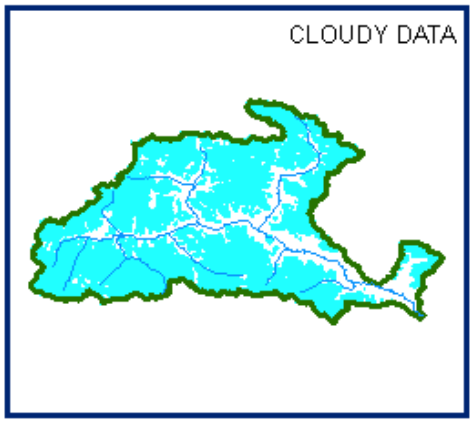
06 APRIL 2013



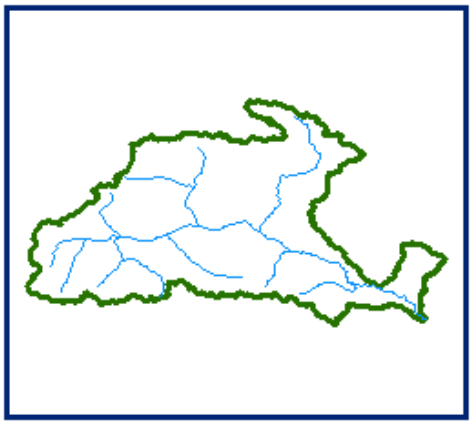
11 APRIL 2013



18 APRIL 2013



23 APRIL 2013



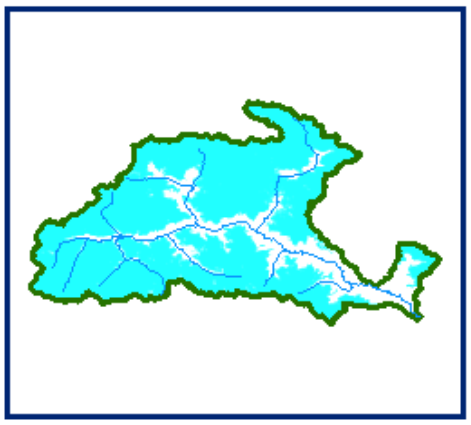
DATA NOT AVAILABLE

SNOW

0 25 50 100 150 200

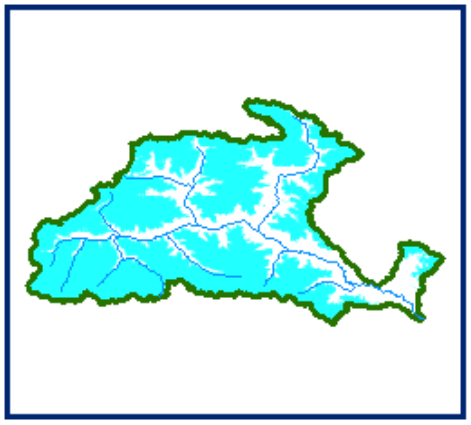
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



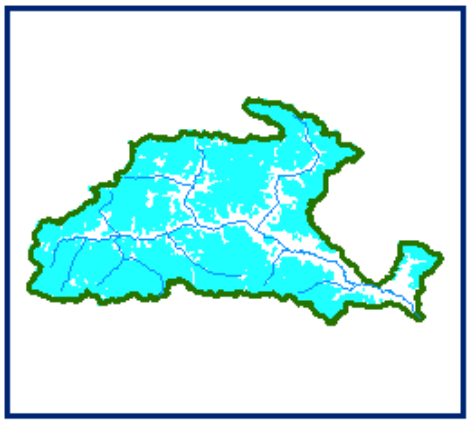
DATA USED

04 APRIL 2013
06 APRIL 2013



DATA USED

11 APRIL 2013
18 APRIL 2013
14 APRIL 2013



DATA USED

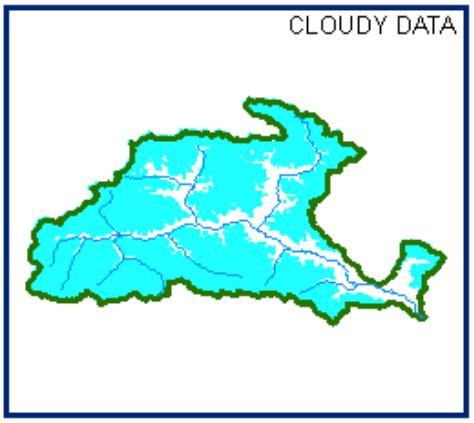
23 APRIL 2013

SNOW

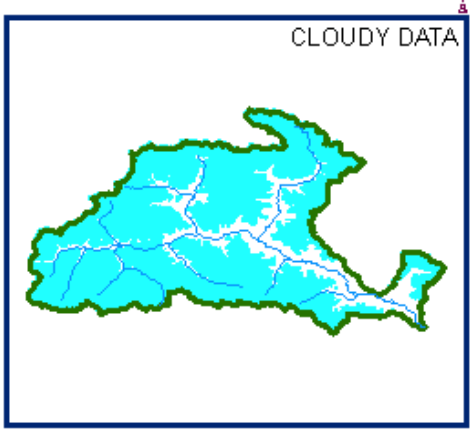
0 30 60 120 180 240

Kilometers

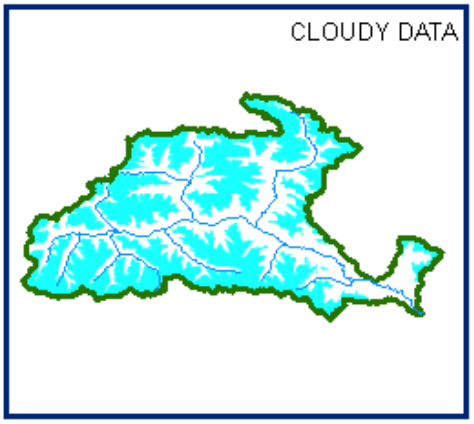
SNOW COVER MAP : GILGIT BASIN



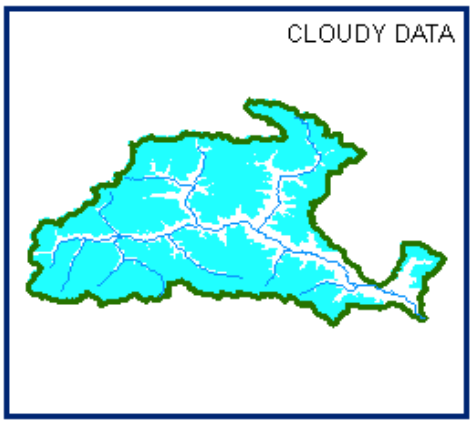
03 MAY 2013



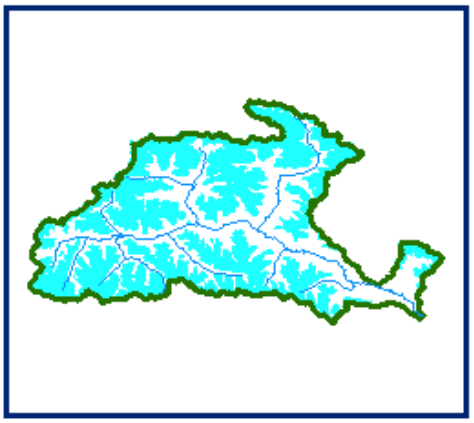
10 MAY 2013



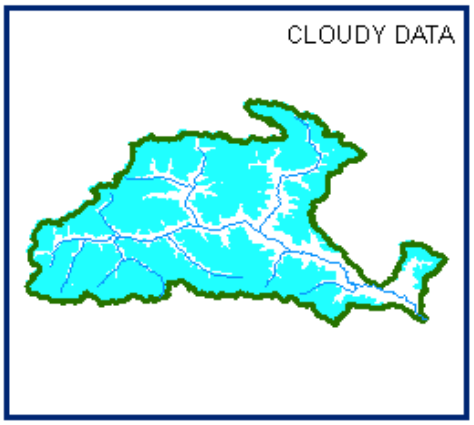
15 MAY 2013



17 MAY 2013



24 MAY 2013



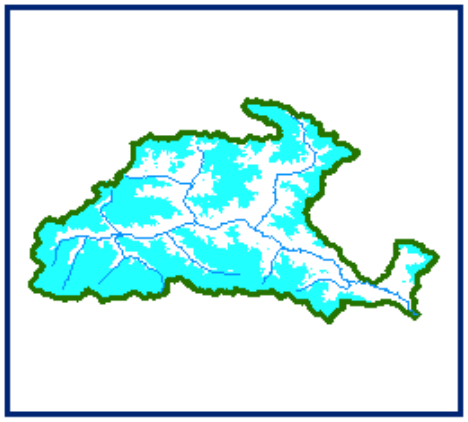
31 MAY 2013

SNOW

0 25 50 100 150 200

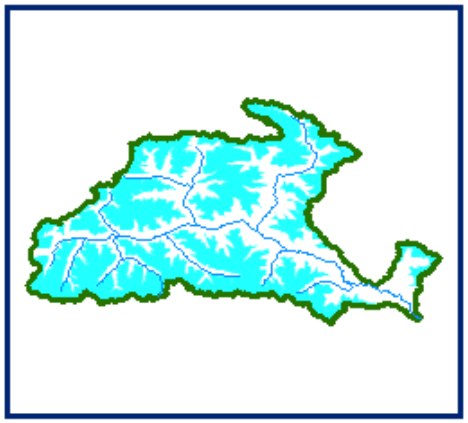
Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN



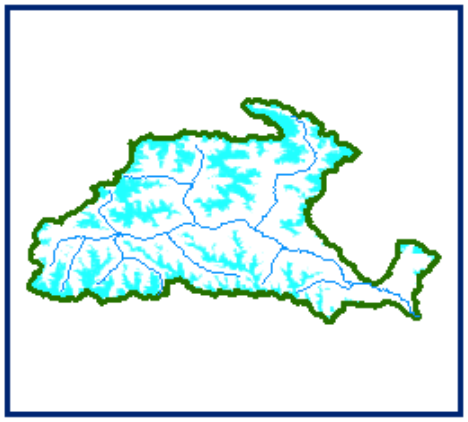
DATA USED

03 MAY 2013
10 MAY 2013



DATA USED

15 MAY 2013
17 MAY 2013



DATA USED

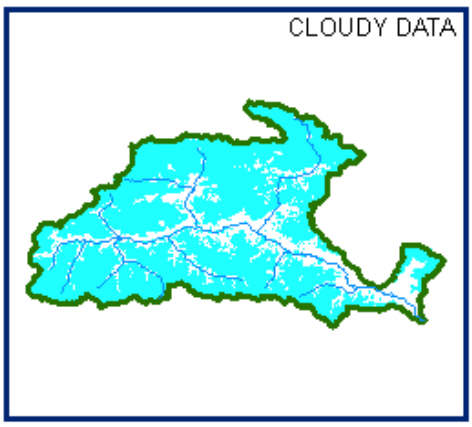
24 MAY 2013
22 MAY 2013
31 MAY 2013

SNOW

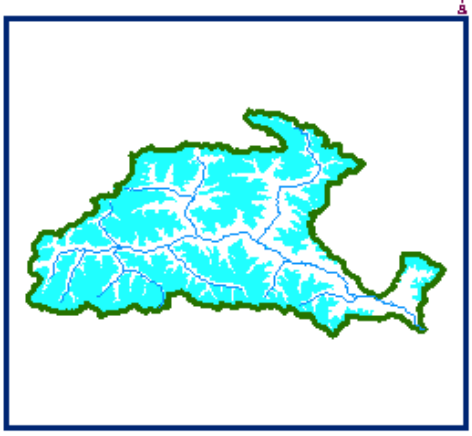
0 30 60 120 180 240

Kilometers

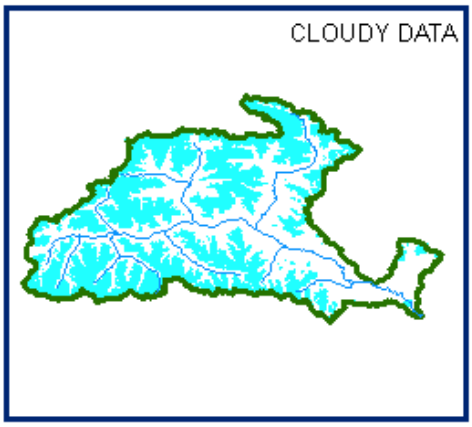
SNOW COVER MAP : GILGIT BASIN



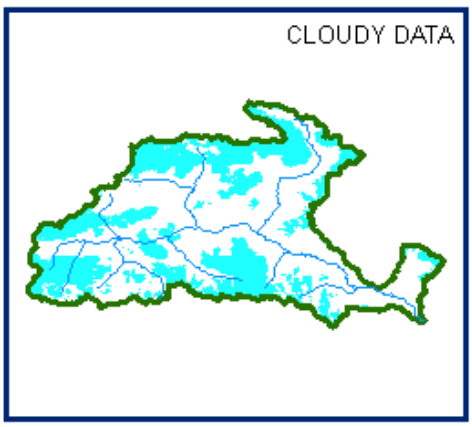
05 JUNE 2013



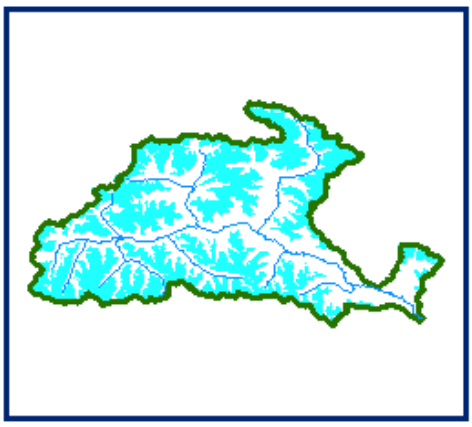
08 JUNE 2013



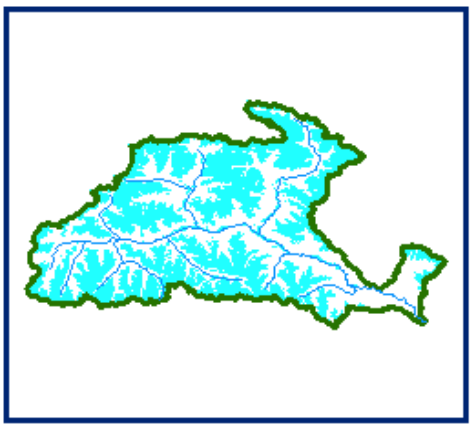
12 JUNE 2013



17 JUNE 2013



22 JUNE 2013



25 JUNE 2013

SNOW

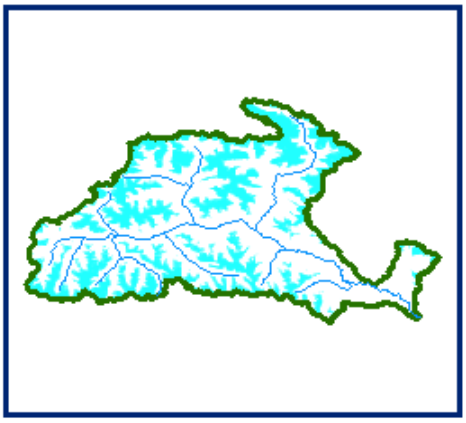
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: GILGIT BASIN

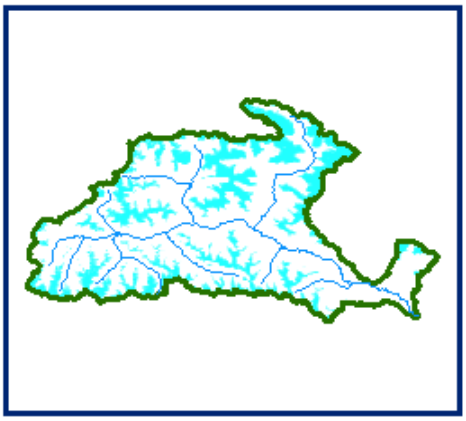
DATA USED

01 JUNE 2013
03 JUNE 2013
08 JUNE 2013



DATA USED

12 JUNE 2013
13 JUNE 2013
20 JUNE 2013



DATA USED

22 JUNE 2013
25 JUNE 2013

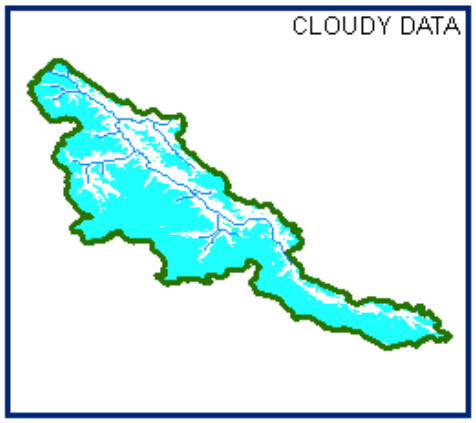
SNOW

0 30 60 120 180 240

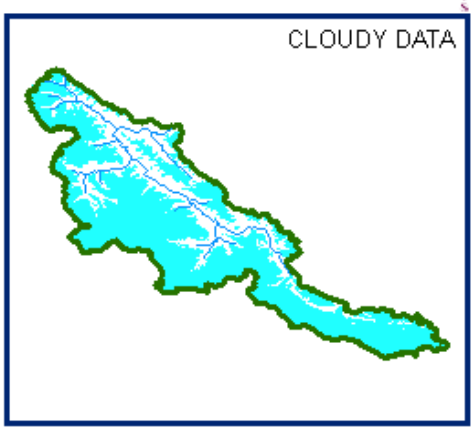
Kilometers

SNOW COVER MAP

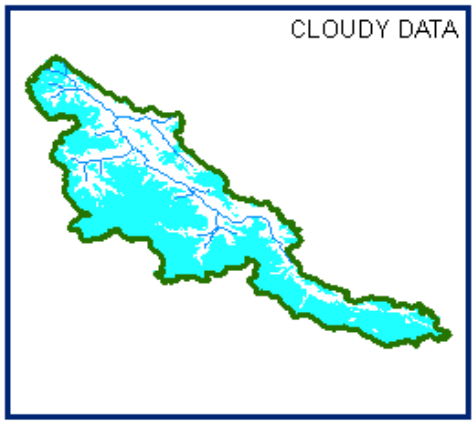
SNOW COVER MAP : SHASGAN BASIN



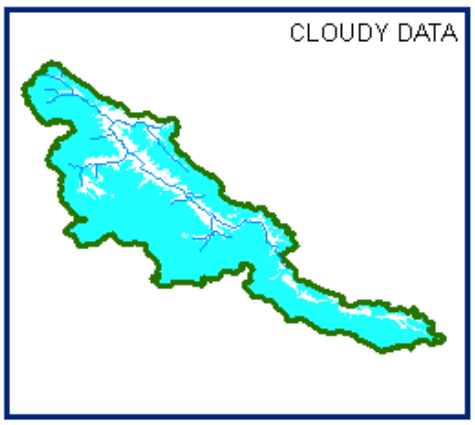
01 OCTOBER 2012



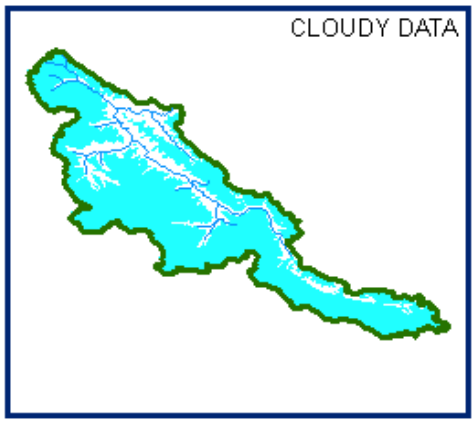
09 OCTOBER 2012



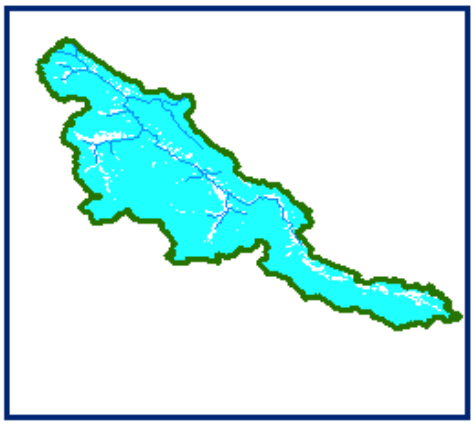
11 OCTOBER 2012



18 OCTOBER 2012



23 OCTOBER 2012



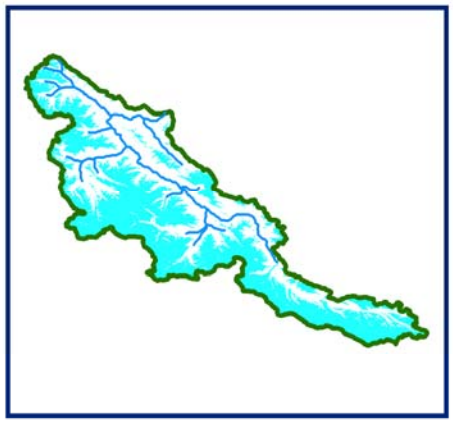
26 OCTOBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN



DATA USED

09 OCTOBER 2012
02 OCTOBER 2012
01 OCTOBER 2012

DATA USED

11 OCTOBER 2012
14 OCTOBER 2012
18 OCTOBER 2012

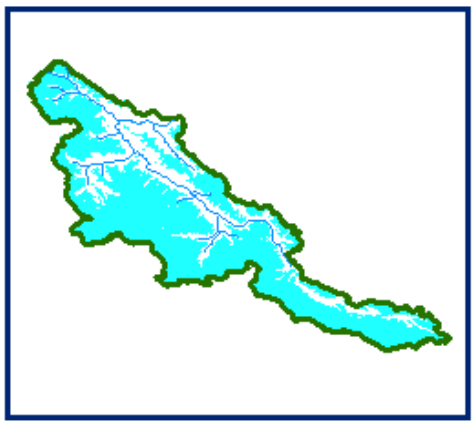
DATA USED

23 OCTOBER 2012
28 OCTOBER 2012
26 OCTOBER 2012

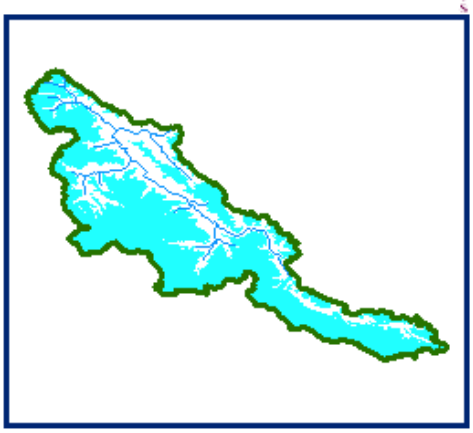
SNOW

0 25 50 100 150 200
Kilometers

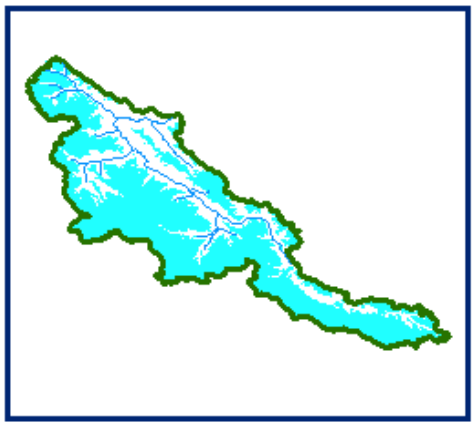
SNOW COVER MAP : SHASGAN BASIN



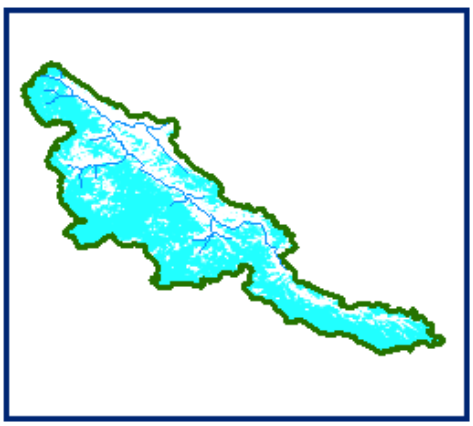
01 NOVEMBER 2012



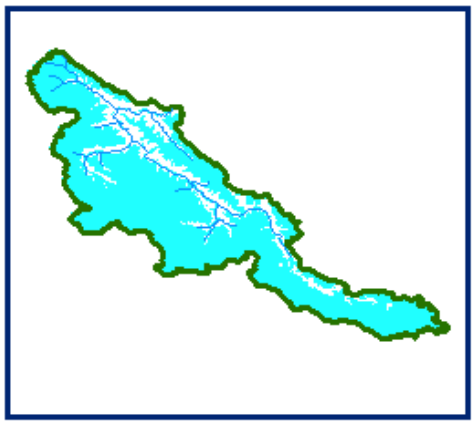
06 NOVEMBER 2012



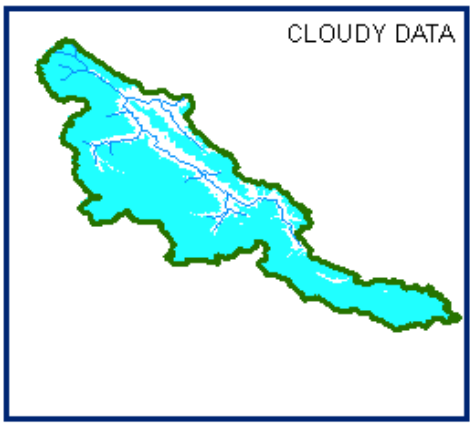
11 NOVEMBER 2012



19 NOVEMBER 2012



25 NOVEMBER 2012



30 NOVEMBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

06 NOVEMBER 2012
09 NOVEMBER 2012
01 NOVEMBER 2012

DATA USED

11 NOVEMBER 2012
20 NOVEMBER 2012
14 NOVEMBER 2012

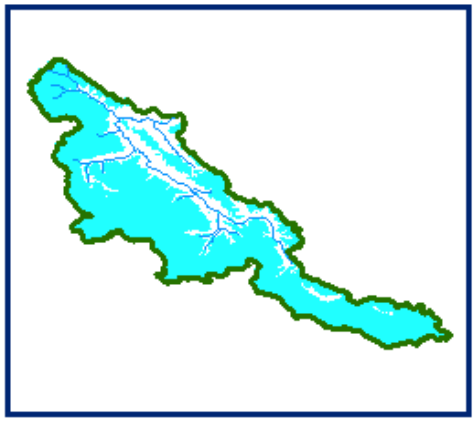
DATA USED

25 NOVEMBER 2012
26 NOVEMBER 2012
30 NOVEMBER 2012

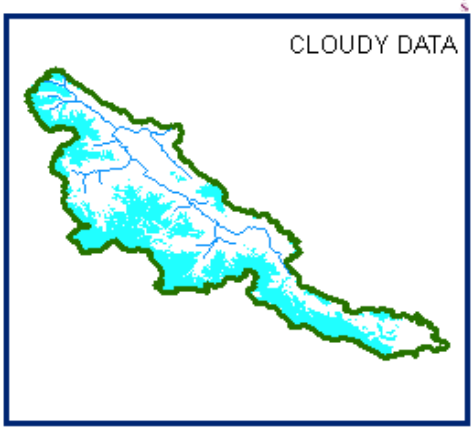
SNOW

0 25 50 100 150 200
Kilometers

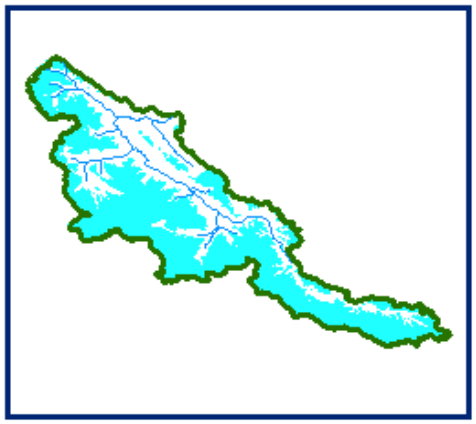
SNOW COVER MAP : SHASGAN BASIN



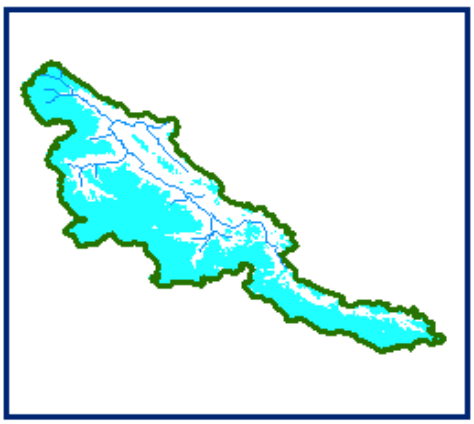
01 DECEMBER 2012



07 DECEMBER 2012



10 DECEMBER 2012



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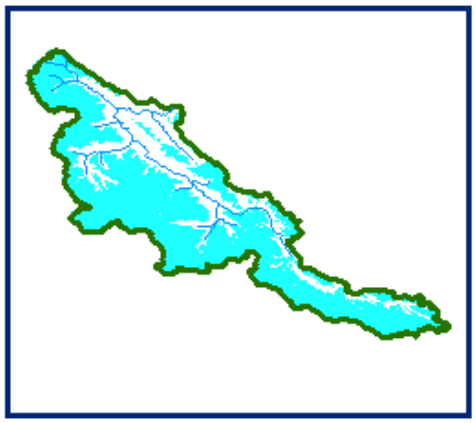
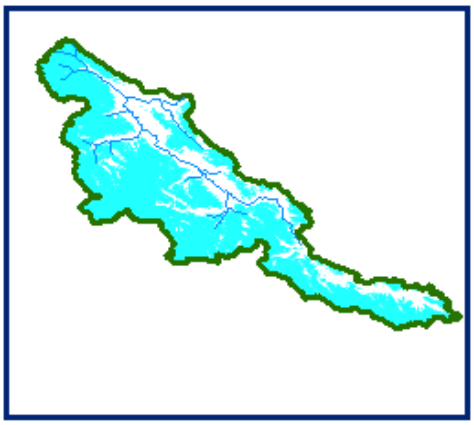


22 DECEMBER 2012



31 DECEMBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

01 DECEMBER 2012
10 DECEMBER 2012
02 DECEMBER 2012

DATA USED

20 DECEMBER 2012

DATA USED

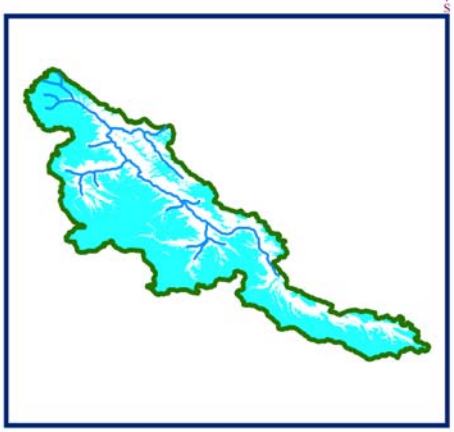
22 DECEMBER 2012
25 DECEMBER 2012
31 DECEMBER 2012

SNOW

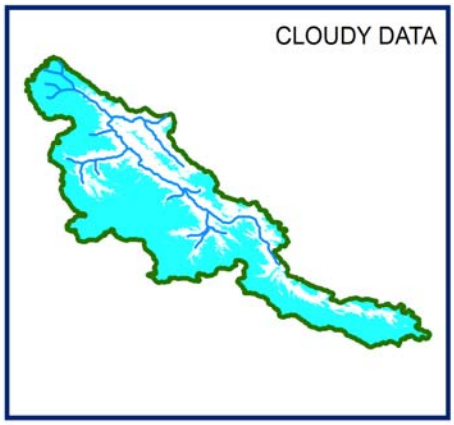
0 25 50 100 150 200
Kilometers

SNOW COVER MAP : SHASGAN BASIN

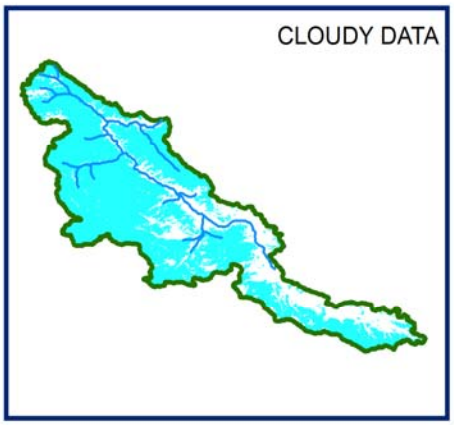
05 JANUARY 2013



08 JANUARY 2013

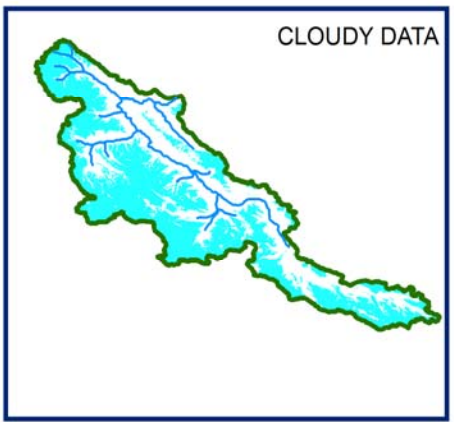


13 JANUARY 2013



20 JANUARY 2013

24 JANUARY 2013



30 JANUARY 2013

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED
08 JANUARY 2013
05 JANUARY 2013
10 JANUARY 2013

DATA USED
13 JANUARY 2013
20 JANUARY 2013

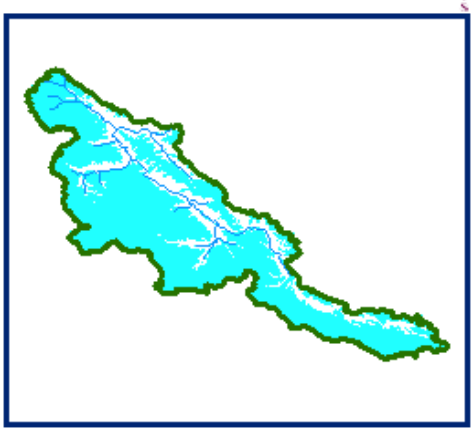
DATA USED
24 JANUARY 2013
22 JANUARY 2013
27 JANUARY 2013

SNOW

0 25 50 100 150 200
Kilometers

SNOW COVER MAP : SHASGAN BASIN

01 FEBRUARY 2013



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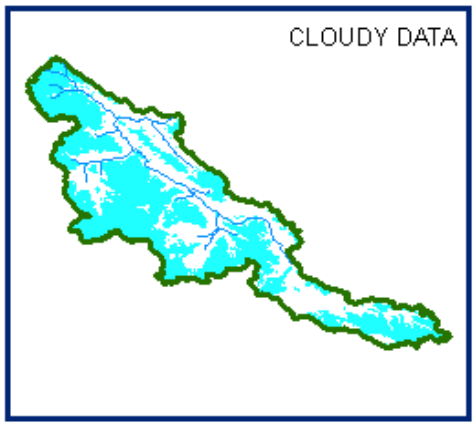

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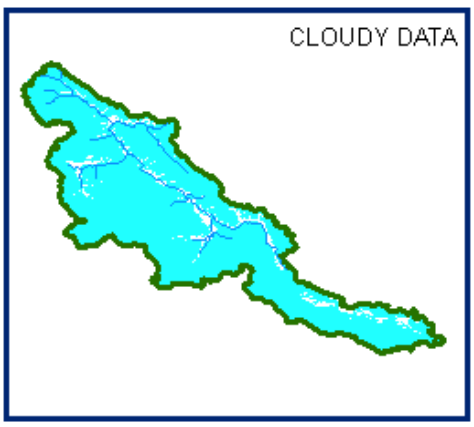
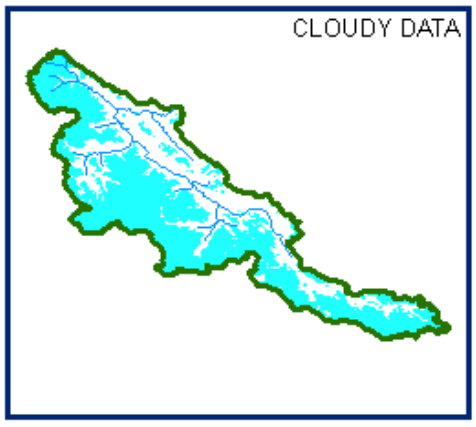


17 FEBRUARY 2013



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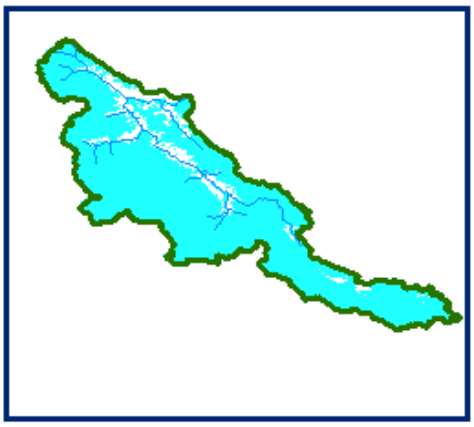


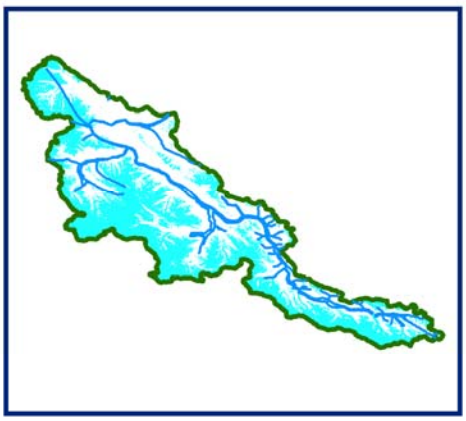
25 FEBRUARY 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN



DATA USED
01 FEBRUARY 2013
10 FEBRUARY 2013
08 FEBRUARY 2013

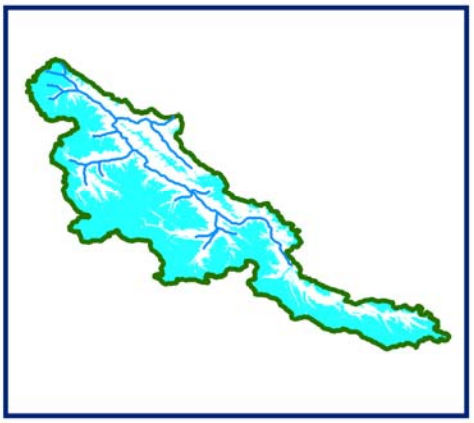
DATA USED
17 FEBRUARY 2013
11 FEBRUARY 2013
20 FEBRUARY 2013

DATA USED
DATA NOT AVAILABLE

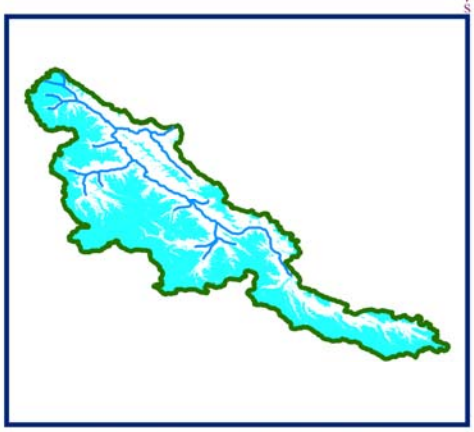
SNOW

0 25 50 100 150 200
Kilometers

SNOW COVER MAP : SHASGAN BASIN



02 MARCH 2013



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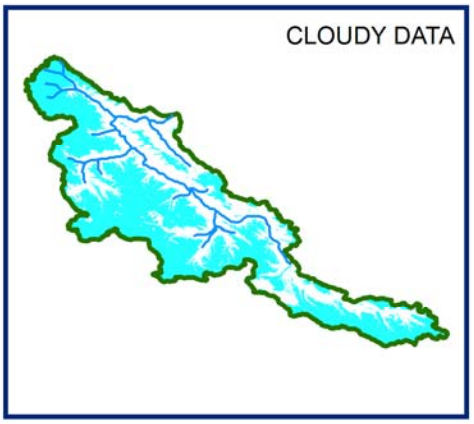

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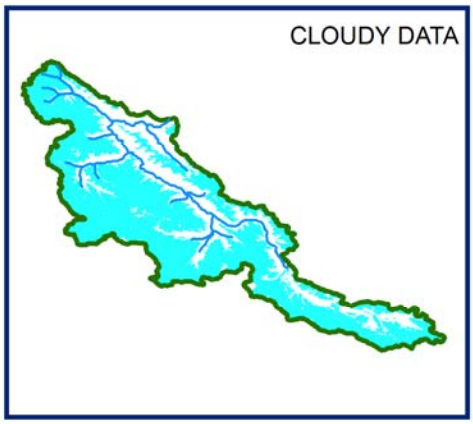

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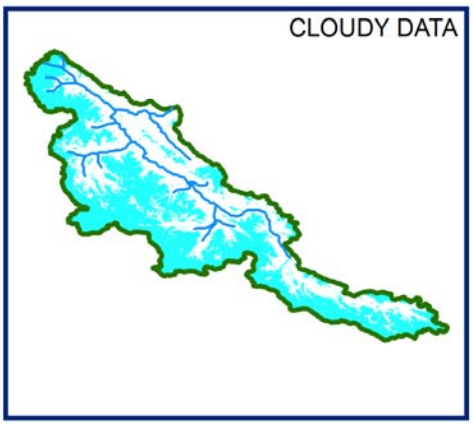
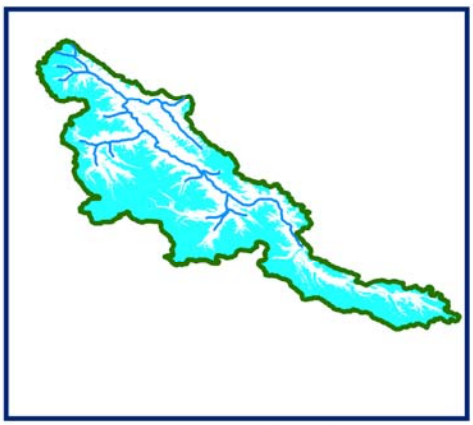


21 MARCH 2013



26 MARCH 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

06 MARCH 2013
01 MARCH 2013
02 MARCH 2013

DATA USED

11 MARCH 2013
16 MARCH 2013

DATA USED

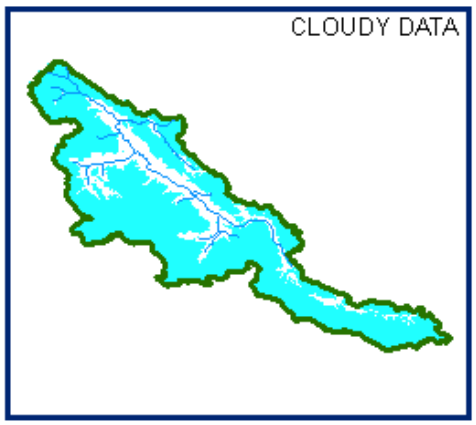
26 MARCH 2013
31 MARCH 2013
25 MARCH 2013

SNOW

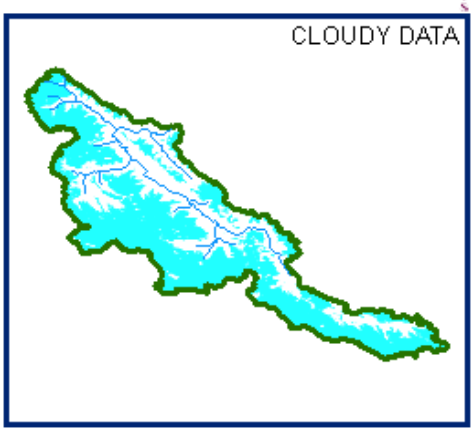
0 25 50 100 150 200

Kilometers

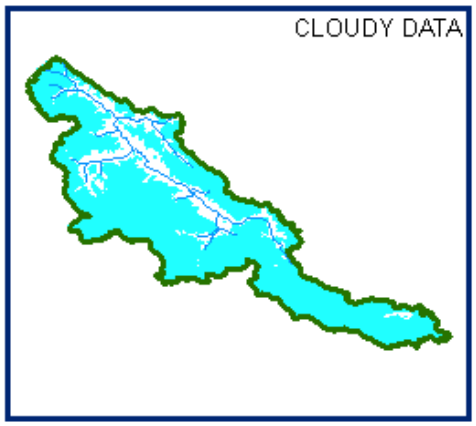
SNOW COVER MAP : SHASGAN BASIN



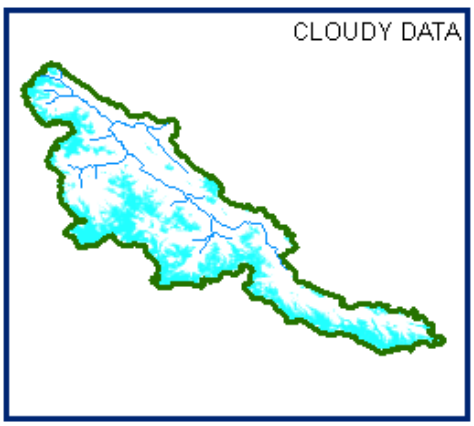
04 APRIL 2013



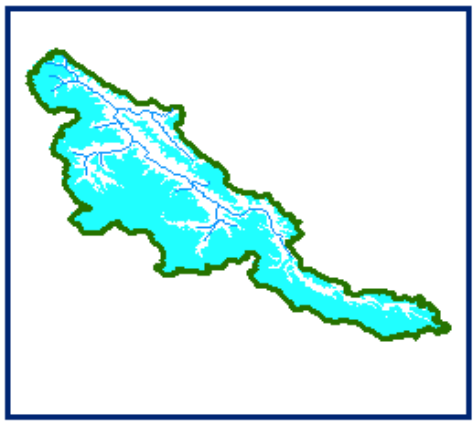
06 APRIL 2013



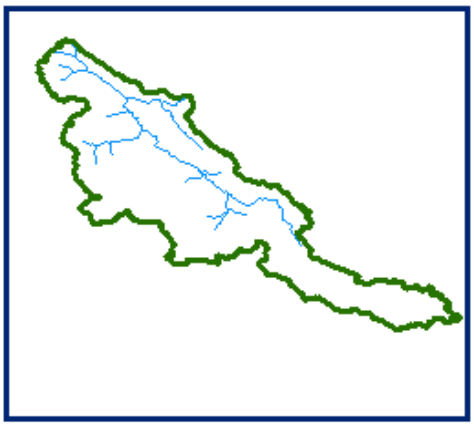
11 APRIL 2013



18 APRIL 2013



23 APRIL 2013



DATA NOT AVAILABLE

SNOW

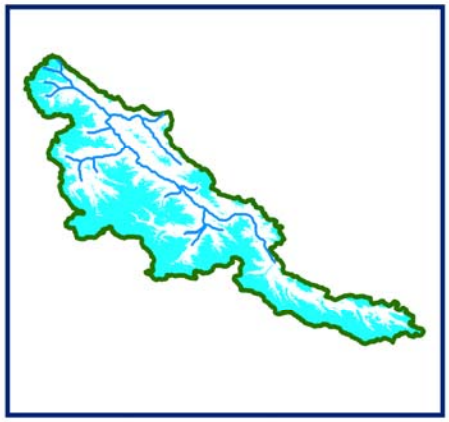
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

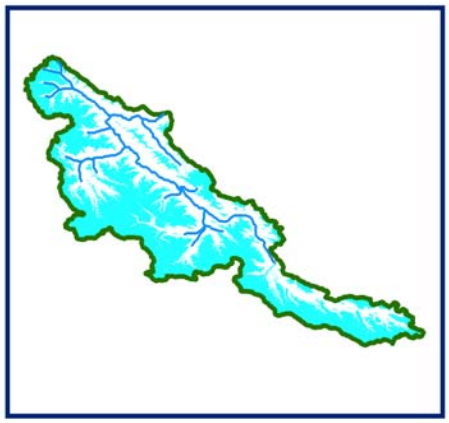
DATA USED

06 APRIL 2013
04 APRIL 2013



DATA USED

14 APRIL 2013
18 APRIL 2013
13 APRIL 2013



DATA USED

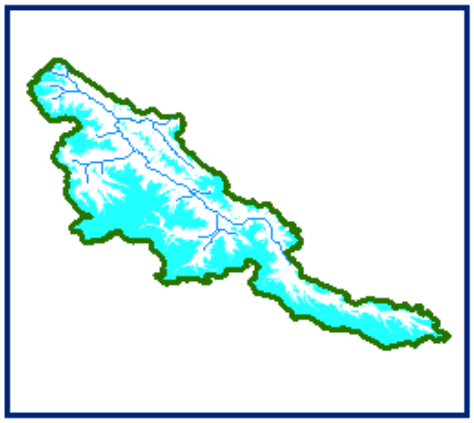
23 APRIL 2013

SNOW

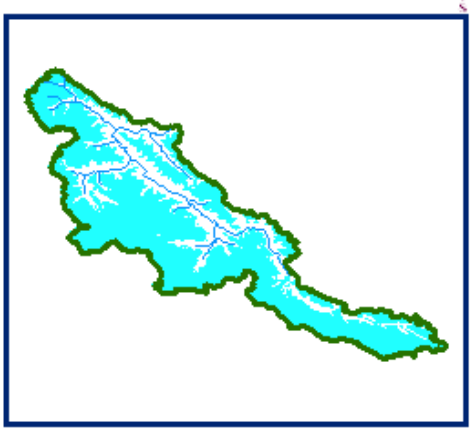
0 25 50 100 150 200

Kilometers

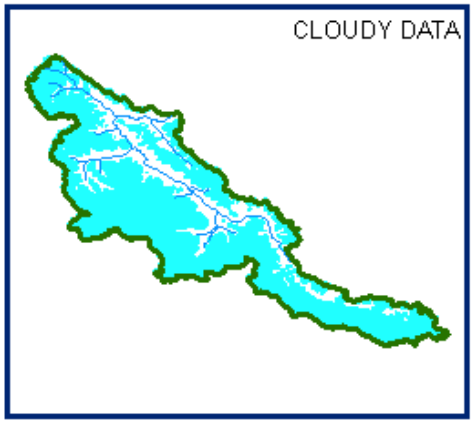
SNOW COVER MAP : SHASGAN BASIN



03 MAY 2013



10 MAY 2013



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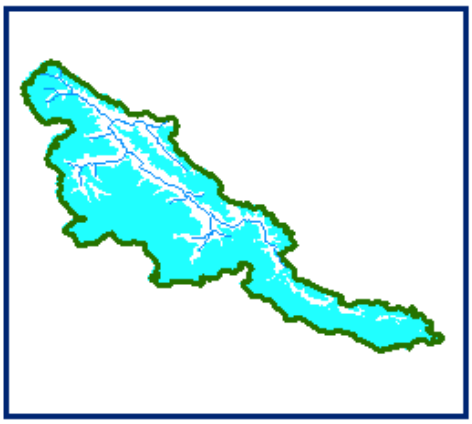
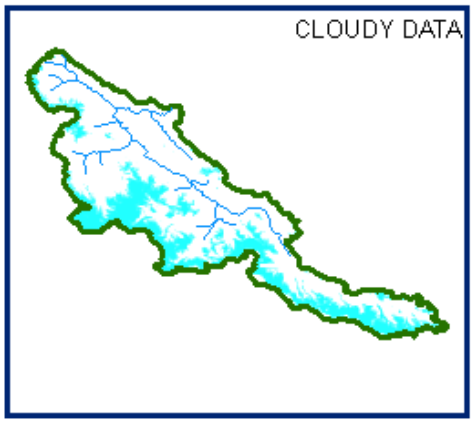


18 MAY 2013



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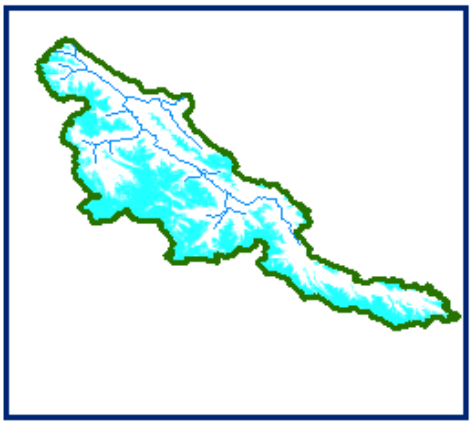


31 MAY 2013

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

10 MAY 2013
03 MAY 2013

DATA USED

18 MAY 2013
17 MAY 2013
15 MAY 2013

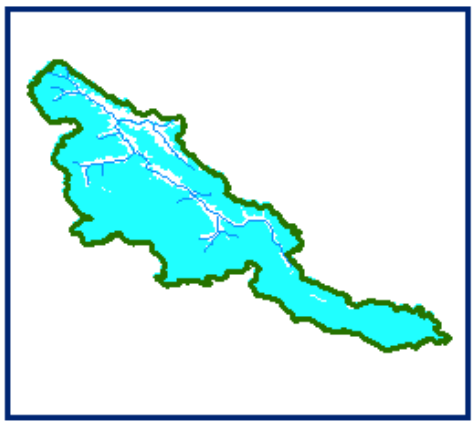
DATA USED

31 MAY 2013
24 MAY 2013
22 MAY 2013

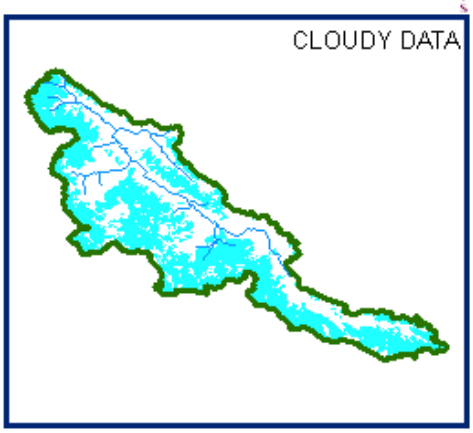
SNOW

0 25 50 100 150 200
Kilometers

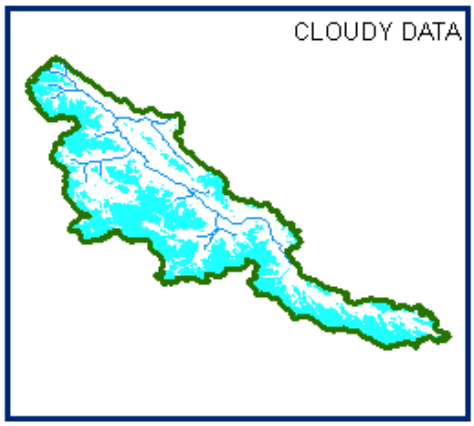
SNOW COVER MAP : SHASGAN BASIN



01 JUNE 2013

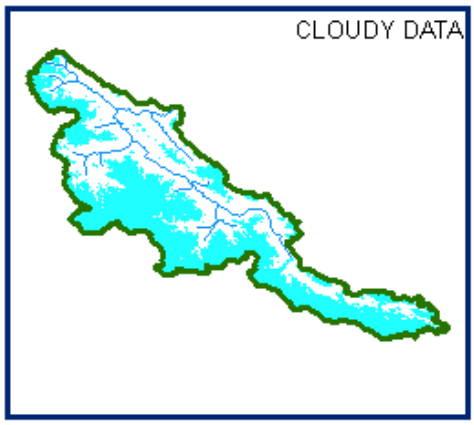


06 JUNE 2013

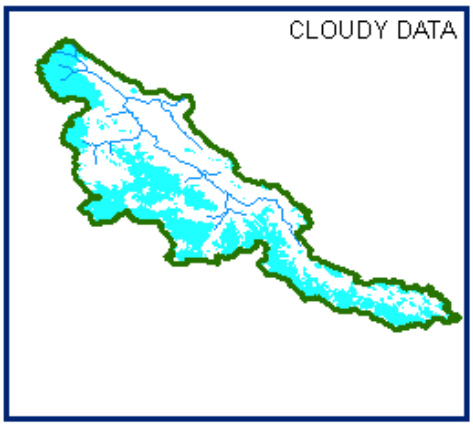


12 JUNE 2013

20 JUNE 2013



25 JUNE 2013



30 JUNE 2013

SNOW

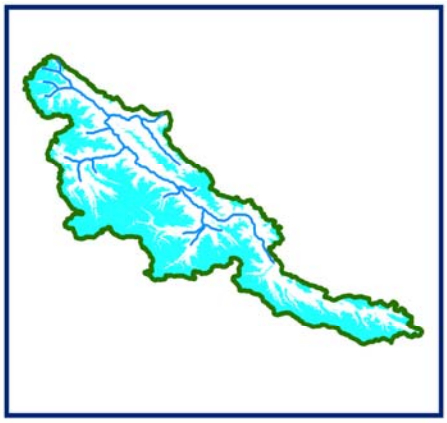
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

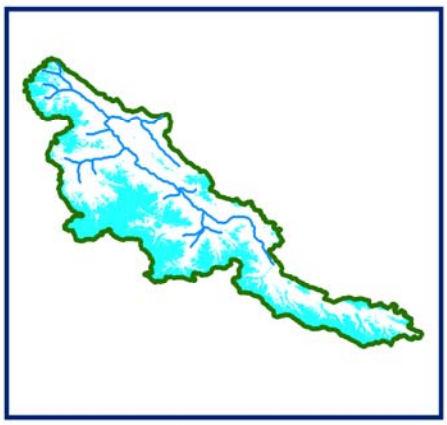
DATA USED

01 JUNE 2013
08 JUNE 2013
10 JUNE 2013



DATA USED

20 JUNE 2013
12 JUNE 2013
11 JUNE 2013



DATA USED

25 JUNE 2013
30 JUNE 2013
22 JUNE 2013

SNOW

0 25 50 100 150 200

Kilometers

AREAL EXTENT OF SNOW (5 DAILY)

BASIN NAME: SHASGAN **BASIN AREA: 7613 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	3766	49	8	14-Oct-12	5843	77
2	2-Oct-12	3364	44	9	18-Oct-12	5299	70
3	4-Oct-12	5182	68	10	23-Oct-12	4974	65
4	6-Oct-12	3038	40	11	26-Oct-12	5248	69
5	8-Oct-12	4768	63	12	28-Oct-12	4536	60
6	9-Oct-12	4153	55	13	30-Oct-12	3924	52
7	11-Oct-12	3468	46				
November 2012							
14	1-Nov-12	4288	56	22	14-Nov-12	3966	52
15	2-Nov-12	4226	56	23	16-Nov-12	6050	79
16	4-Nov-12	3711	49	24	19-Nov-12	5823	76
17	6-Nov-12	4033	53	25	20-Nov-12	6283	83
18	7-Nov-12	3980	52	26	25-Nov-12	5233	69
19	9-Nov-12	3549	47	27	26-Nov-12	4696	62
20	11-Nov-12	3892	51	28	30-Nov-12	5562	73
21	13-Nov-12	4429	58				
December 2012							
29	1-Dec-12	5138	67	34	10-Dec-12	3735	49
30	2-Dec-12	5858	77	35	20-Dec-12	3735	49
31	3-Dec-12	4195	55	36	22-Dec-12	4178	55
32	5-Dec-12	5254	69	37	25-Dec-12	4336	57
33	7-Dec-12	4998	66	38	31-Dec-12	5219	69
January 2013							
39	5-Jan-13	4208	55	44	22-Jan-13	6364	84
40	8-Jan-13	4770	63	45	24-Jan-13	5624	74
41	10-Jan-13	4088	54	46	27-Jan-13	3824	50
42	13-Jan-13	4953	65	47	30-Jan-13	3792	50
43	20-Jan13	4963	65				
February 2013							
48	1-Feb-13	3789	50	52	17-Feb-13	5763	76
49	8-Feb-13	4638	61	53	20-Feb-05	3262	43
50	10-Feb-13	1163	15	54	25-Feb-13	6131	81
51	11-Feb-13	2714	36				

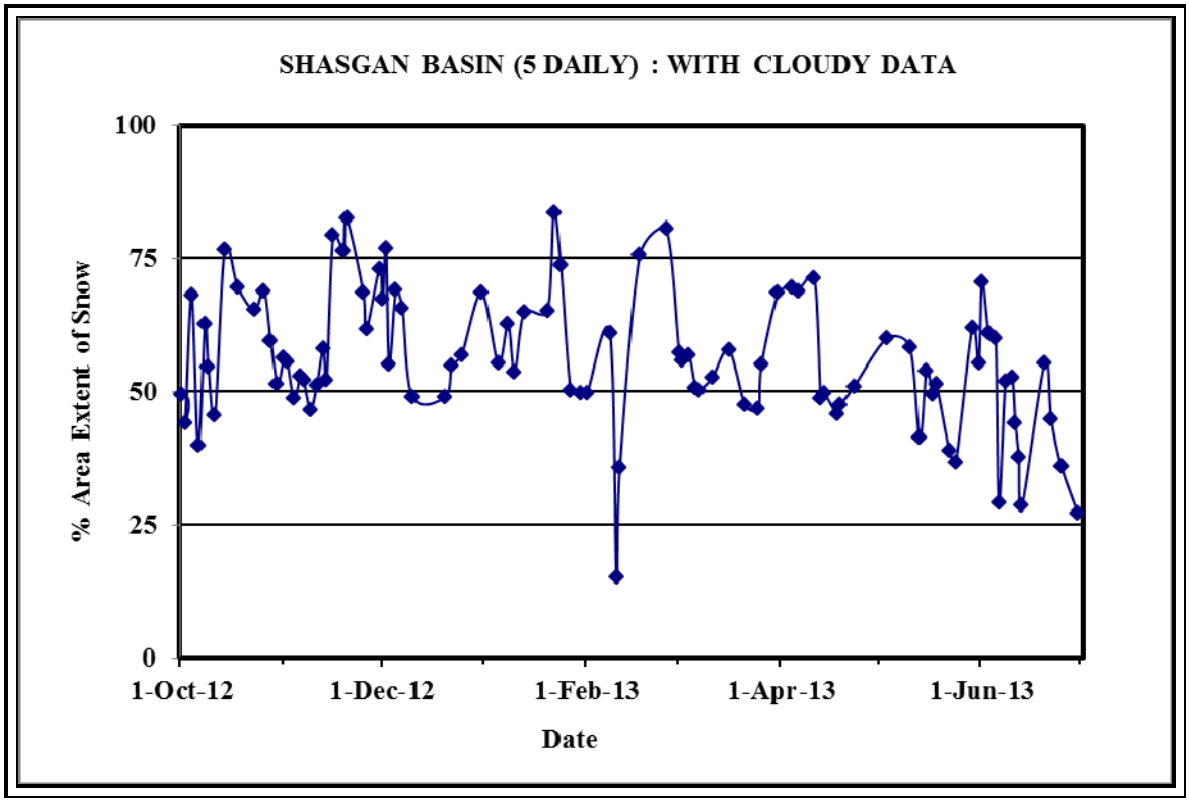
March 2013							
55	1-Mar-13	4369	57	61	16-Mar-13	4576	58
56	2-Mar-13	4258	56	62	21-Mar-13	3613	47
57	4-Mar-13	4330	57	63	25-Mar-13	3560	47
58	6-Mar-13	3853	51	64	26-Mar-13	4191	55
59	7-Mar-13	3828	50	65	31-Mar-13	5219	69
60	11-Mar-13	4013	53				
April 2013							
66	4-Apr-13	5289	69	70	14-Apr-13	3788	50
67	6-Apr-13	5248	69	71	18-Apr-13	3482	46
68	11-Apr-13	5432	71	72	19-Apr-13	3617	48
69	13-Apr-13	3712	49	73	23-Apr-13	3880	51
May 2013							
74	3-May-13	4567	60	79	18-May-13	3920	51
75	10-May-13	4444	58	80	22-May-13	2960	39
76	13-May-13	3145	41	81	24-May-13	2798	37
77	15-May-13	4102	54	82	29-May-13	4711	62
78	17-May-13	3765	49	83	31-May-13	4220	55
June 2013							
84	1-Jun-13	5376	71	91	12-Jun-13	2876	38
85	3-Jun-13	4626	61	92	13-Jun-13	2177	29
86	5-Jun-13	4574	60	93	17-Jun-13	3928	52
87	6-Jun-13	2218	29	94	20-Jun-13	4216	55
88	8-Jun-13	3946	52	95	22-Jun-13	3412	45
89	10-Jun-13	4006	53	96	25-Jun-13	2732	36
90	11-Jun-13	3357	44	97	30-Jun-13	2062	27

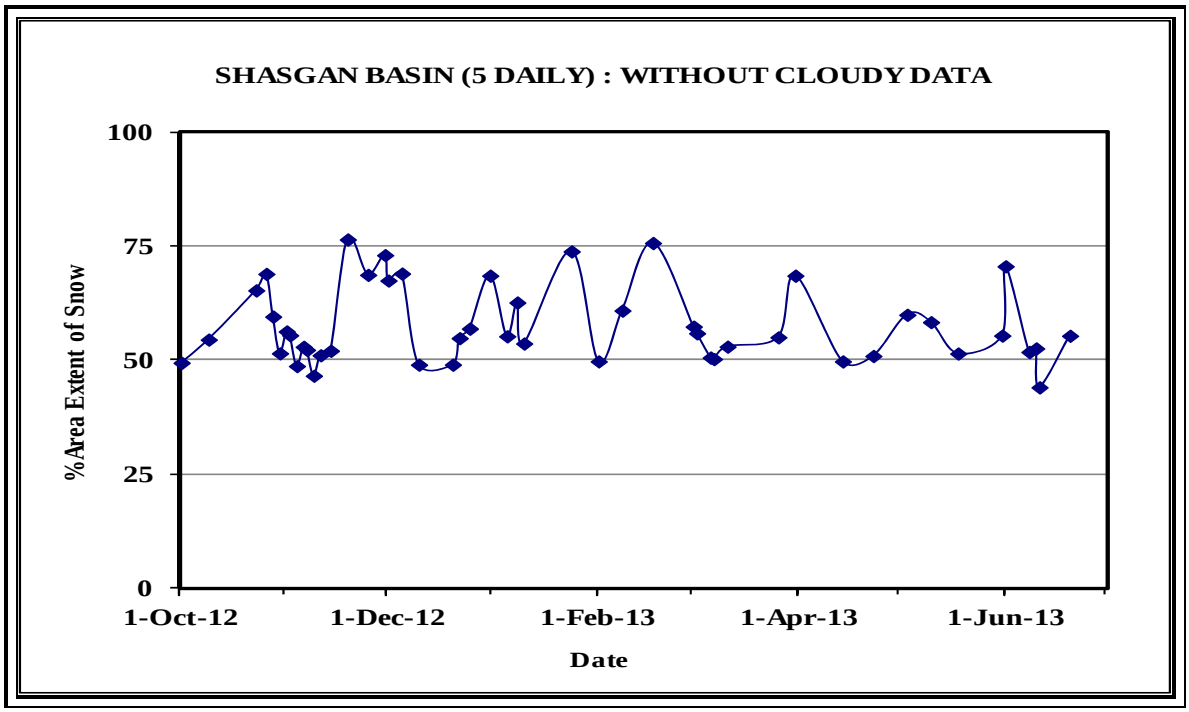
AREAL EXTENT OF SNOW (10 DAILY)

BASIN NAME: SHASGAN **BASIN AREA: 7613 sq km**

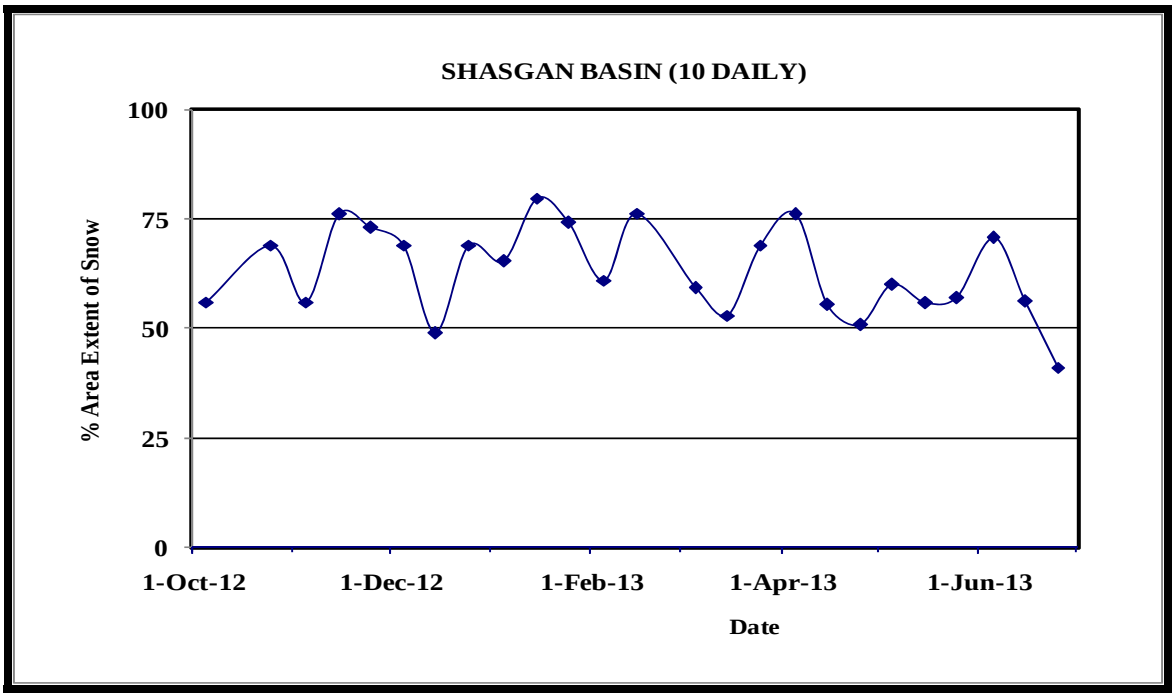
S No	Date	Snow cover (sq km)	Snow cover (%)	S No	Date	Snow cover (sq km)	Snow cover (%)
October 2012				**November 2012**			
1	9-Oct-12	4267	56	4	06-Nov-12	4263	56
				5	11-Nov-12	5786	76
3	23-Oct-12	5253	69	6	25-Nov-12	5557	73
December 2012				**January 2013**			
7	1-Dec-12	5253	69	10	08-Jan-13	4981	63
8	20-Dec-12	3735	49	11	13-Jan-13	6077	80
9	22-Dec-12	5253	69	12	24-Jan-13	5648	74
February 2013				**March 2013**			
13	01-Feb-13	4644	61	15	06-Mar-13	4508	57
14	17-Feb-13	5808	76	16	11-Mar-13	4035	53
				17	26-Mar-13	5253	69
April 2013				**May 2013**			
18	06-Apr-13	5800	76	21	10-May-13	4568	60
19	14-Apr-13	4219	50	22	18-May-13	4260	51
20	23-Apr-13	3880	51	23	31-May-13	4345	55
June 2013							
24	01-Jun-2013	5383	71				
25	20-Jun-2013	4286	56				
26	25-Jun-2013	3126	41				

Snow cover depletion curve



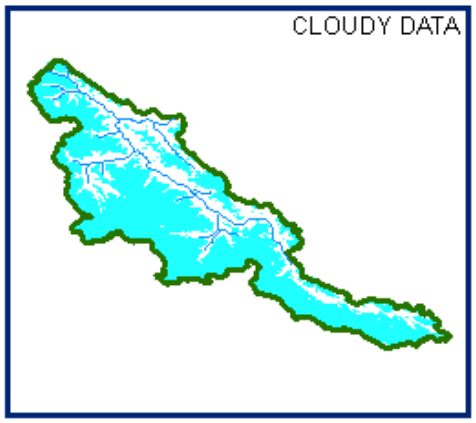


Snow cover depletion curve

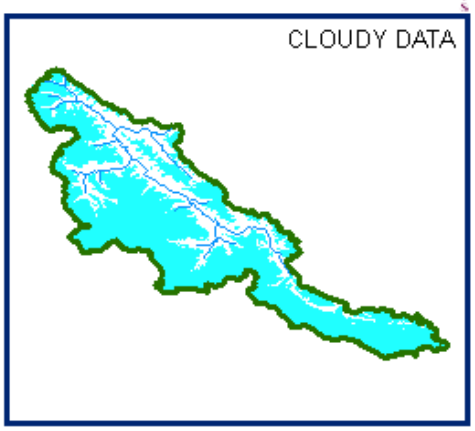


SNOW COVER MAP

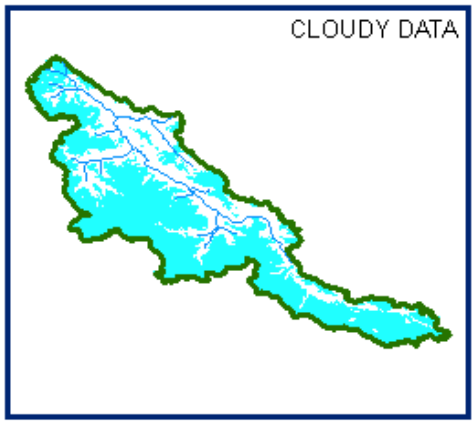
SNOW COVER MAP : SHASGAN BASIN



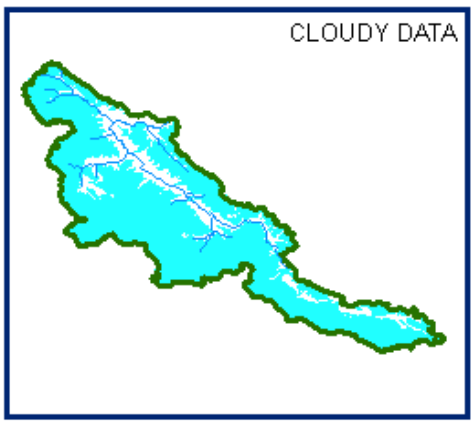
01 OCTOBER 2012



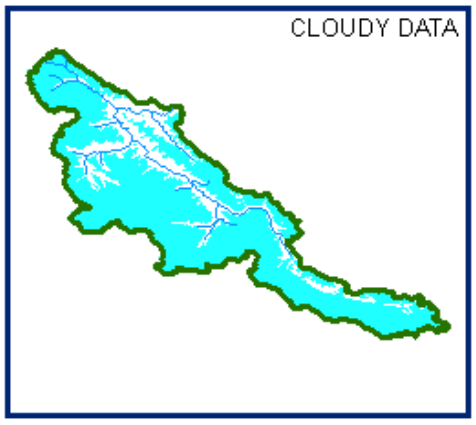
09 OCTOBER 2012



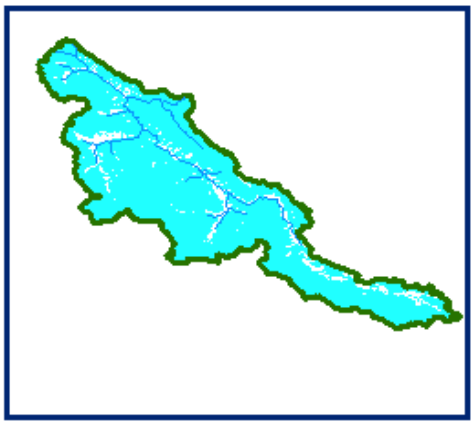
11 OCTOBER 2012



18 OCTOBER 2012



23 OCTOBER 2012



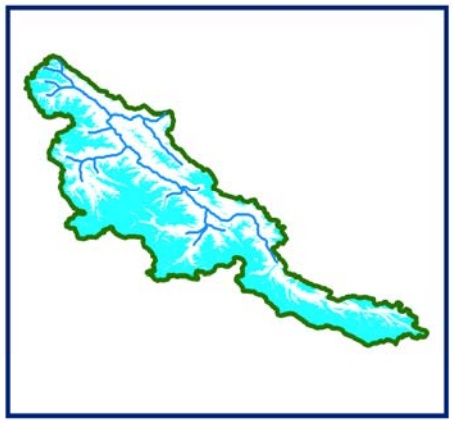
26 OCTOBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN



DATA USED

09 OCTOBER 2012
02 OCTOBER 2012
01 OCTOBER 2012

DATA USED

11 OCTOBER 2012
14 OCTOBER 2012
18 OCTOBER 2012

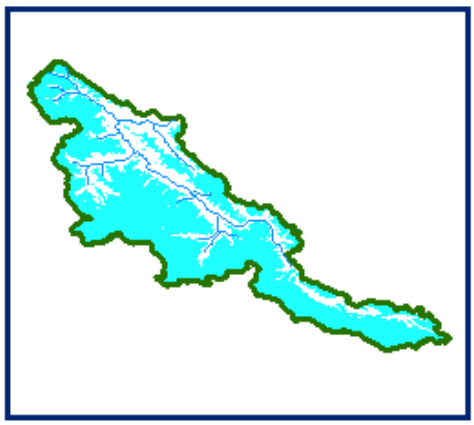
DATA USED

23 OCTOBER 2012
28 OCTOBER 2012
26 OCTOBER 2012

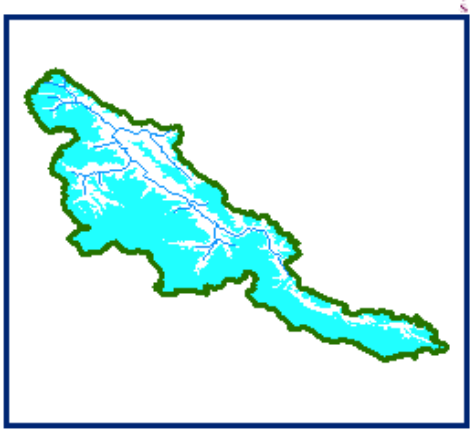
SNOW

0 25 50 100 150 200
Kilometers

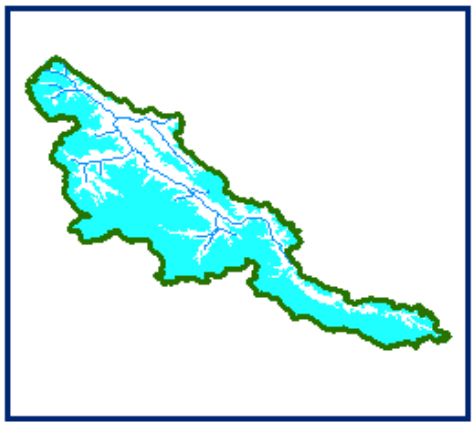
SNOW COVER MAP : SHASGAN BASIN



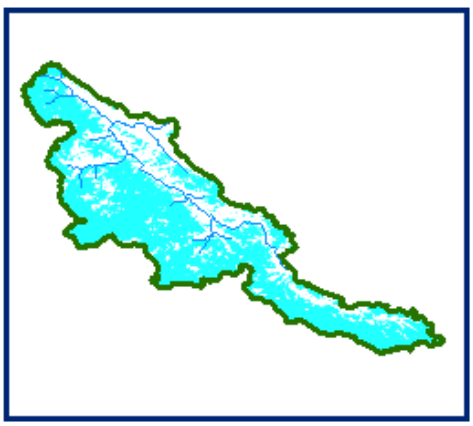
01 NOVEMBER 2012



06 NOVEMBER 2012



11 NOVEMBER 2012



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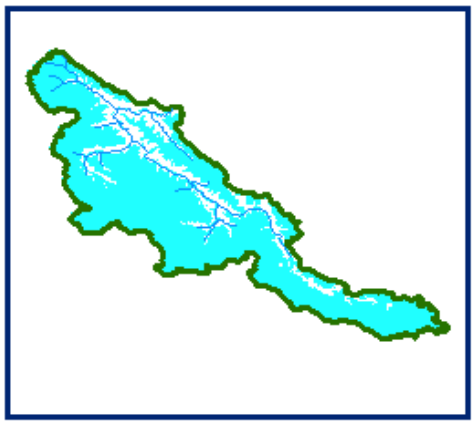
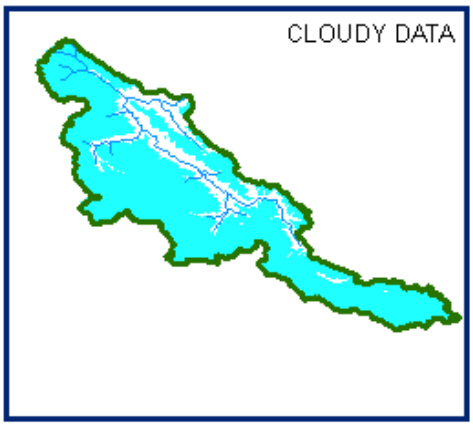


25 NOVEMBER 2012



30 NOVEMBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

06 NOVEMBER 2012
09 NOVEMBER 2012
01 NOVEMBER 2012

DATA USED

11 NOVEMBER 2012
20 NOVEMBER 2012
14 NOVEMBER 2012

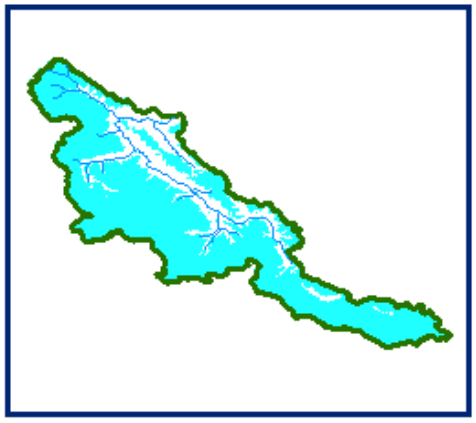
DATA USED

25 NOVEMBER 2012
26 NOVEMBER 2012
30 NOVEMBER 2012

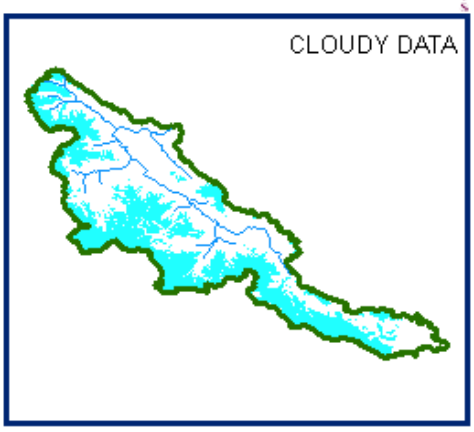
SNOW

0 25 50 100 150 200
Kilometers

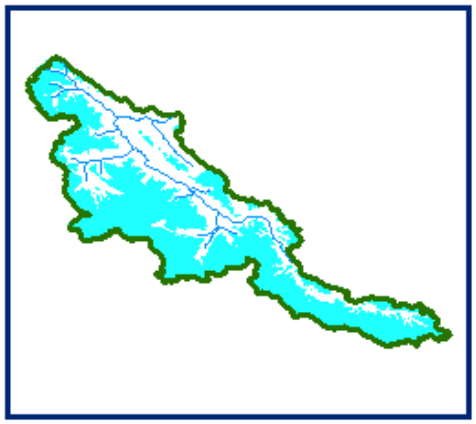
SNOW COVER MAP : SHASGAN BASIN



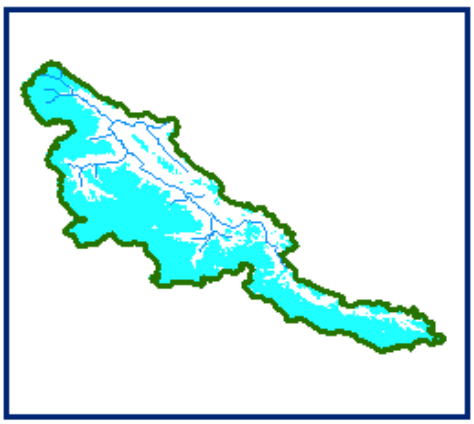
01 DECEMBER 2012



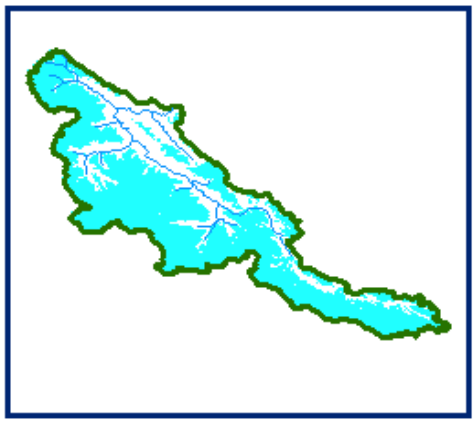
07 DECEMBER 2012



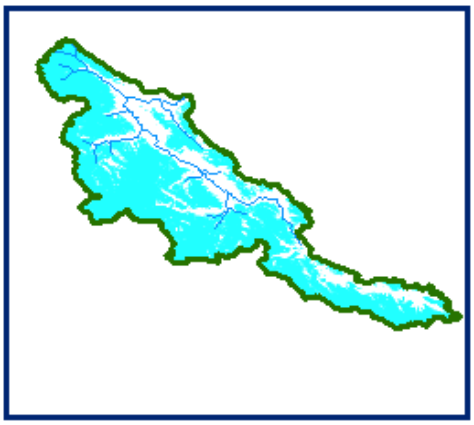
10 DECEMBER 2012



20 DECEMBER 2012



22 DECEMBER 2012



31 DECEMBER 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

01 DECEMBER 2012
10 DECEMBER 2012
02 DECEMBER 2012

DATA USED

20 DECEMBER 2012

DATA USED

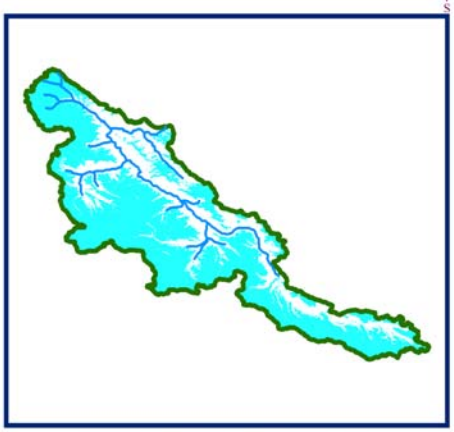
22 DECEMBER 2012
25 DECEMBER 2012
31 DECEMBER 2012

SNOW

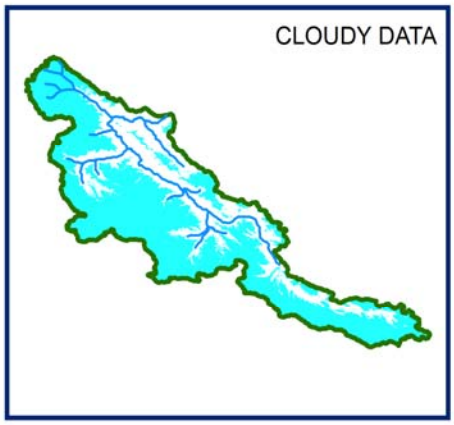
0 25 50 100 150 200
Kilometers

SNOW COVER MAP : SHASGAN BASIN

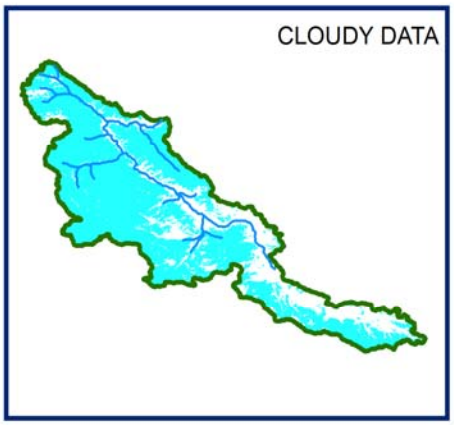
05 JANUARY 2013



08 JANUARY 2013

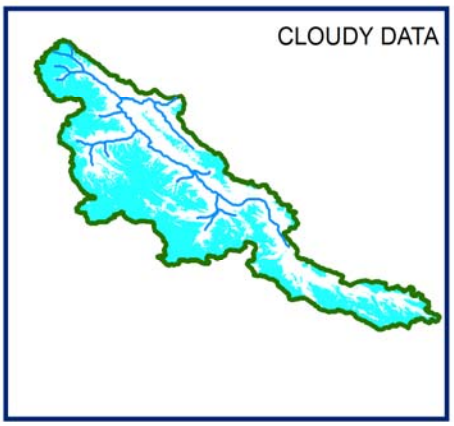


13 JANUARY 2013



20 JANUARY 2013

24 JANUARY 2013



30 JANUARY 2013

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED
08 JANUARY 2013
05 JANUARY 2013
10 JANUARY 2013

DATA USED
13 JANUARY 2013
20 JANUARY 2013

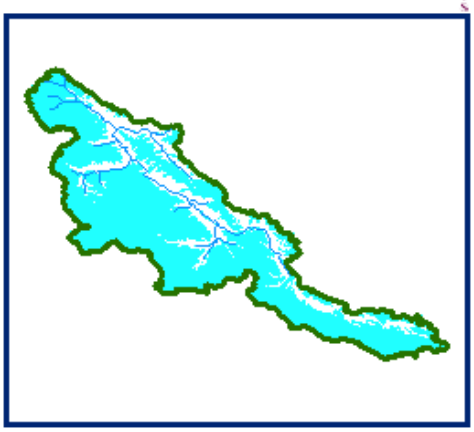
DATA USED
24 JANUARY 2013
22 JANUARY 2013
27 JANUARY 2013

SNOW

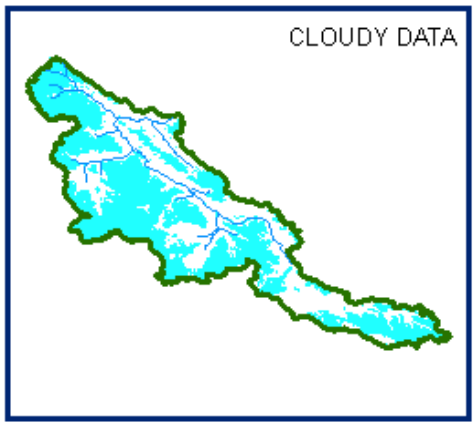
0 25 50 100 150 200
Kilometers

SNOW COVER MAP : SHASGAN BASIN

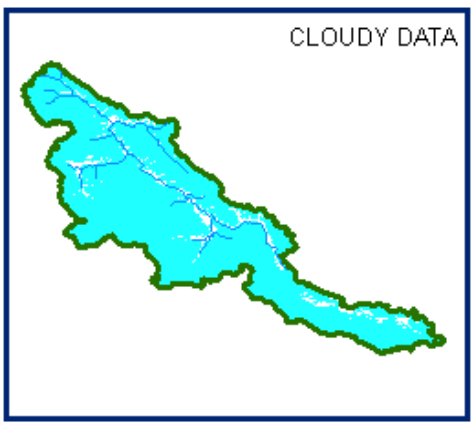
01 FEBRUARY 2013



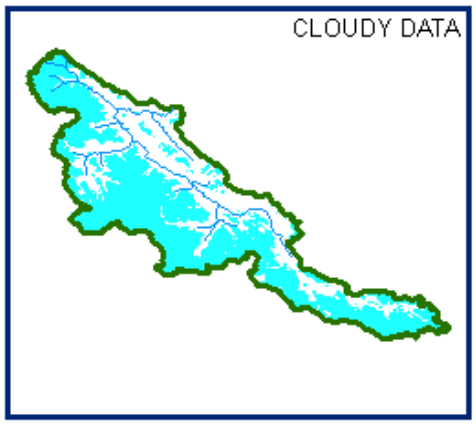
08 FEBRUARY 2013



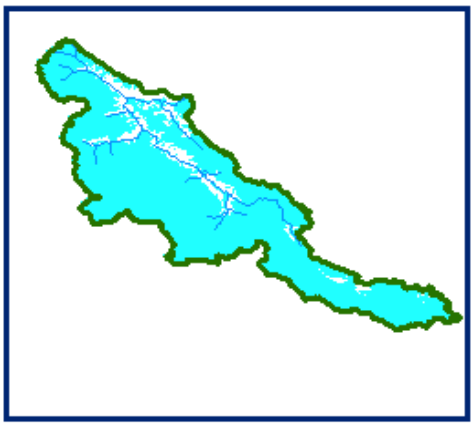
11 FEBRUARY 2013



17 FEBRUARY 2013



20 FEBRUARY 2013



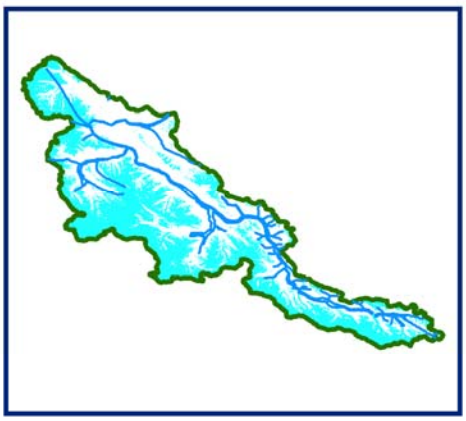
25 FEBRUARY 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN



DATA USED
01 FEBRUARY 2013
10 FEBRUARY 2013
08 FEBRUARY 2013

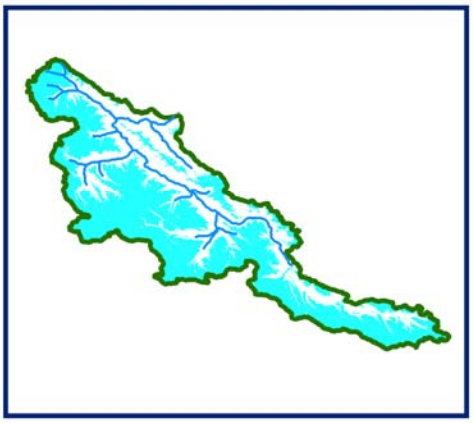
DATA USED
17 FEBRUARY 2013
11 FEBRUARY 2013
20 FEBRUARY 2013

DATA USED
DATA NOT AVAILABLE

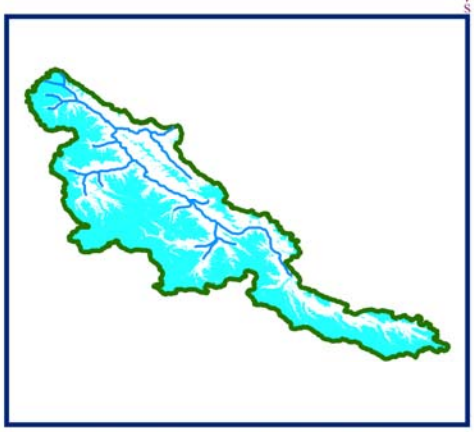
SNOW

0 25 50 100 150 200
Kilometers

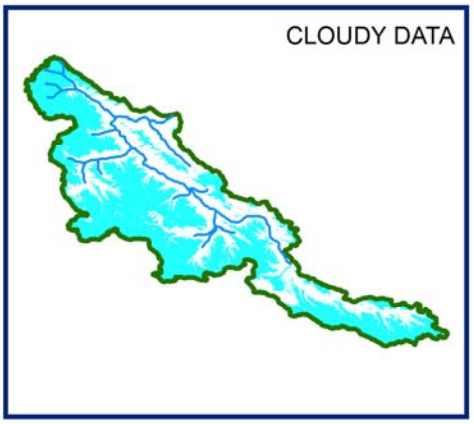
SNOW COVER MAP : SHASGAN BASIN



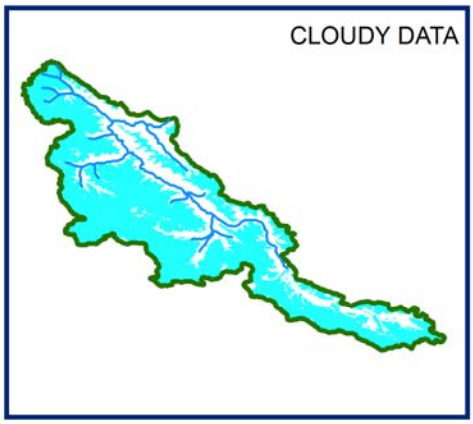
02 MARCH 2013



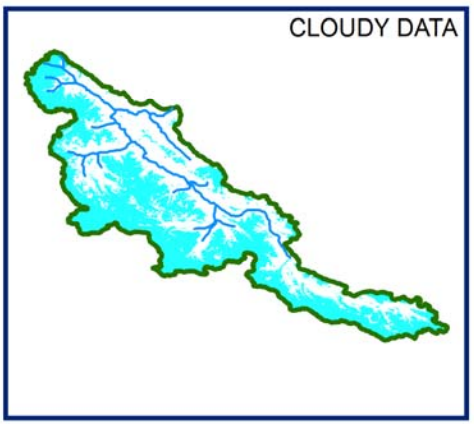
06 MARCH 2013



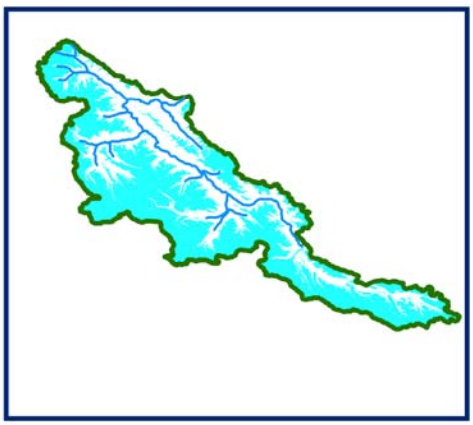
11 MARCH 2013



16 MARCH 2013



21 MARCH 2013



26 MARCH 2012

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

06 MARCH 2013
01 MARCH 2013
02 MARCH 2013

DATA USED

11 MARCH 2013
16 MARCH 2013

DATA USED

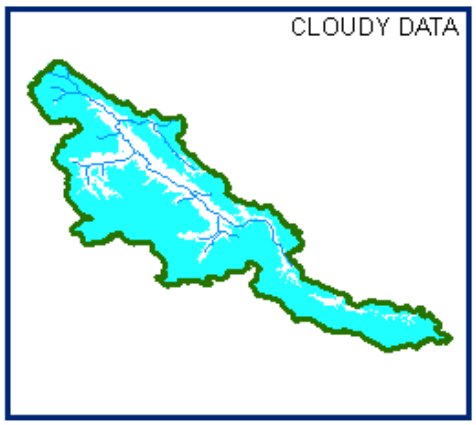
26 MARCH 2013
31 MARCH 2013
25 MARCH 2013

SNOW

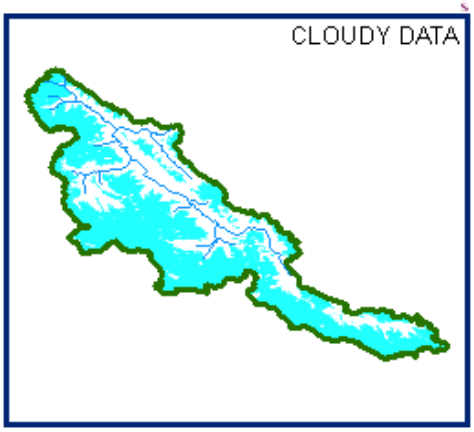
0 25 50 100 150 200

Kilometers

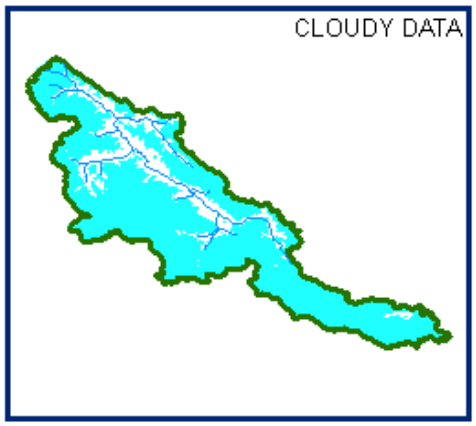
SNOW COVER MAP : SHASGAN BASIN



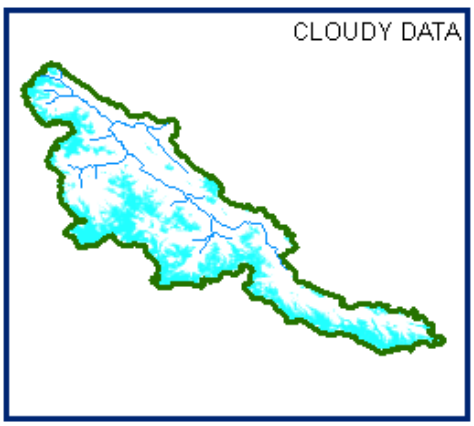
04 APRIL 2013



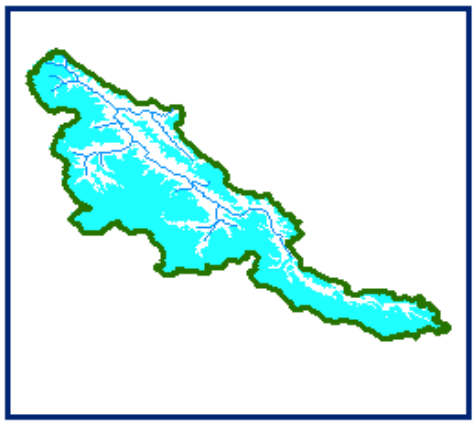
06 APRIL 2013



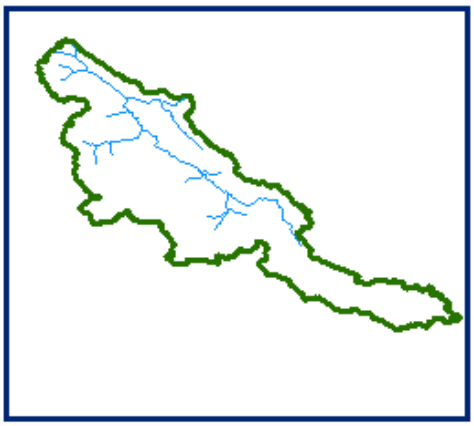
11 APRIL 2013



18 APRIL 2013



23 APRIL 2013



DATA NOT AVAILABLE

SNOW

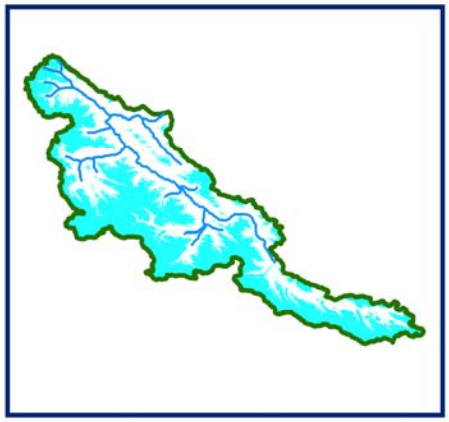
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

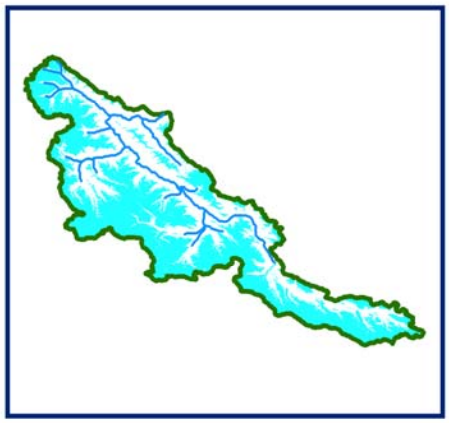
DATA USED

06 APRIL 2013
04 APRIL 2013



DATA USED

14 APRIL 2013
18 APRIL 2013
13 APRIL 2013



DATA USED

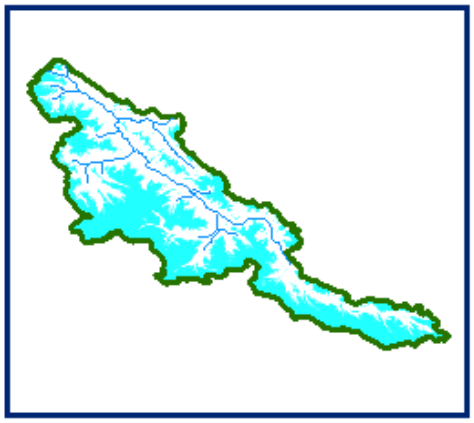
23 APRIL 2013

SNOW

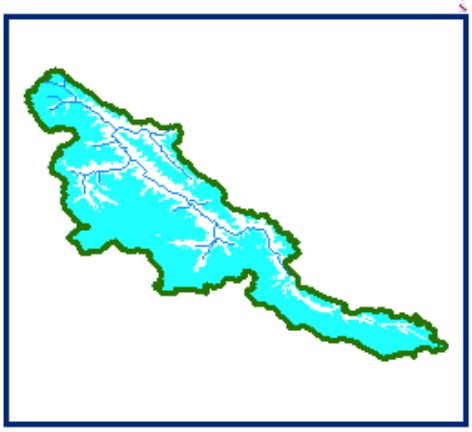
0 25 50 100 150 200

Kilometers

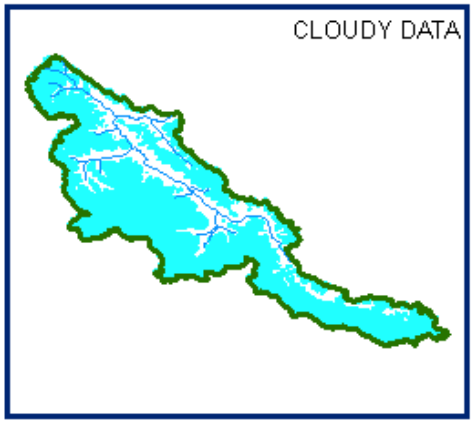
SNOW COVER MAP : SHASGAN BASIN



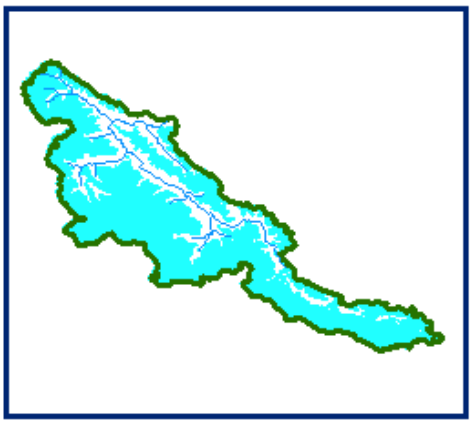
03 MAY 2013



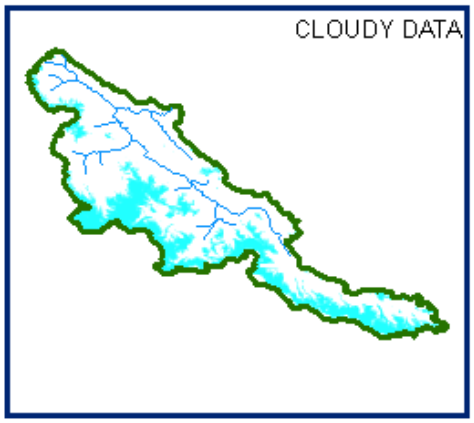
10 MAY 2013



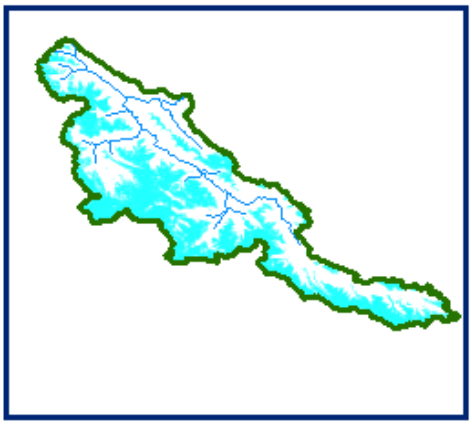
15 MAY 2013



18 MAY 2013



24 MAY 2013



31 MAY 2013

SNOW

0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

DATA USED

10 MAY 2013
03 MAY 2013

DATA USED

18 MAY 2013
17 MAY 2013
15 MAY 2013

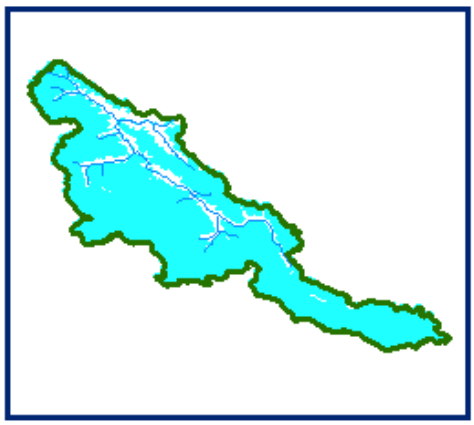
DATA USED

31 MAY 2013
24 MAY 2013
22 MAY 2013

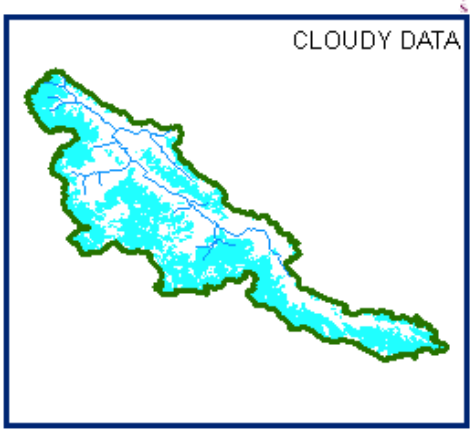
SNOW

0 25 50 100 150 200
Kilometers

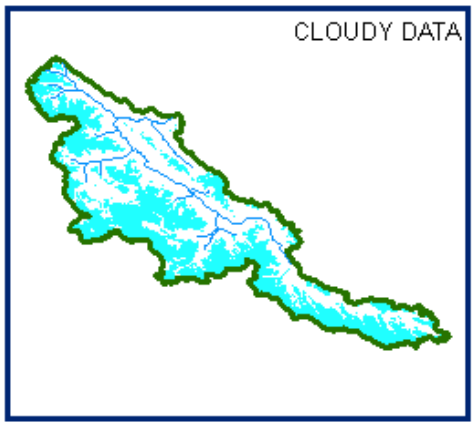
SNOW COVER MAP : SHASGAN BASIN



01 JUNE 2013

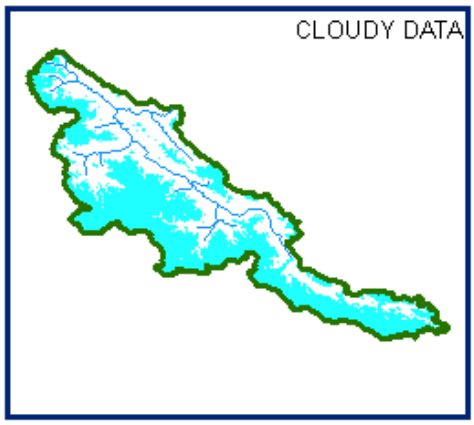


06 JUNE 2013

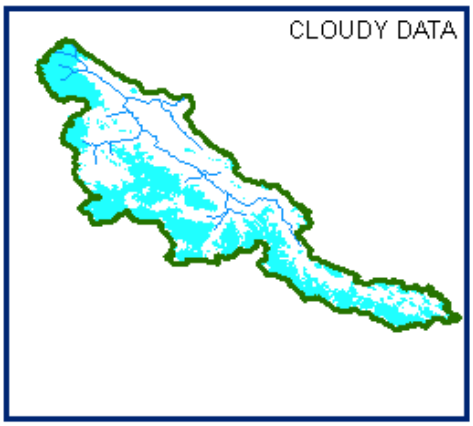


12 JUNE 2013

20 JUNE 2013



25 JUNE 2013



30 JUNE 2013

SNOW

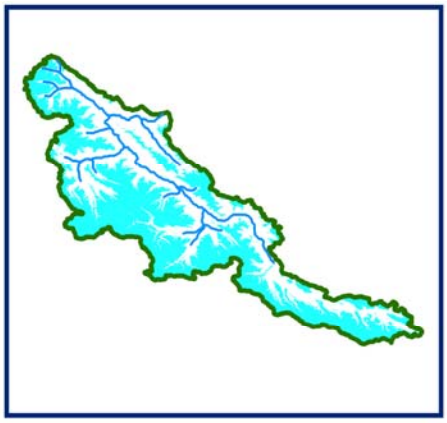
0 25 50 100 150 200

Kilometers

10 DAILY SNOW COVER MAP: SHASGAN BASIN

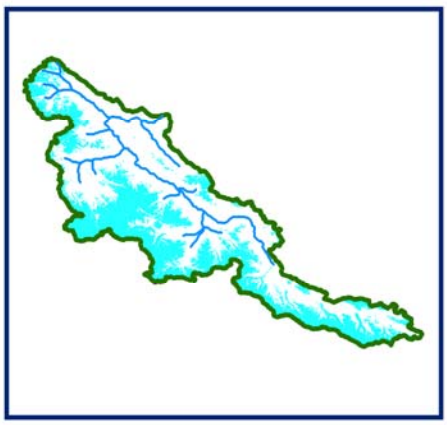
DATA USED

01 JUNE 2013
08 JUNE 2013
10 JUNE 2013



DATA USED

20 JUNE 2013
12 JUNE 2013
11 JUNE 2013



DATA USED

25 JUNE 2013
30 JUNE 2013
22 JUNE 2013

SNOW

0 25 50 100 150 200

Kilometers