

भारत सरकार
अन्तरिक्ष विभाग
राष्ट्रीय सुदूर संवेदन केन्द्र
बालानगर, हैदराबाद-500 625, आं.प्र. भारत
टेलिफोन : +040-23879572-76
+040-23879261-65
फैक्स : +040-23878648



Government of India
Department of Space
National Remote Sensing Centre
Balanagar, Hyderabad-500 625, AP India
Telephone : +040-23879572-76
+040-23879261-65
Fax : +040-23878648

Dr. A V Suresh Babu
Head, Flood Mapping & Hazard Assessment Division
Disaster Management Support Group

Phone: 040-23884544,
e-mail: flood@nrsc.gov.in

Date: June 22, 2023

Ref No: 2023/FL/AS/07

Dear Sir,

Sub: Assam Heavy Rains 2023- Near Real Time Flood Mapping using satellite data

Please refer to our earlier mail dated 21-Jun-2023 regarding mapping and monitoring of flood inundation in Near Real Time in Assam State using RISAT-1A (EOS-4) SAR CRS satellite data. Heavy incessant rains in many regions of Assam during the third week of June , 2023 has led to floods in Assam State. We have analyzed RISAT-1A SAR CRS satellite dataset of 21st June 2023 (1800 Hrs) and an inundation flood inundation map for part of Assam State is prepared. The map along with a brief report is enclosed herewith for your kind information. Since the image was acquired during/immediate to the rainfall event, large extents of wet areas were also observed.

Further, we request you to visit flood page in NDEM portal (<https://ndem.nrsc.gov.in>) and Bhuvan portal (<https://bhuvan-app1.nrsc.gov.in/disaster/disaster.php?id=flood>) for better visualization of flood extent in Assam State.

In addition, the flood layer in GIS ready format and inundation statistics are transmitted to Assam State Remote Sensing Application Centre and North Eastern State Application Centre by e-mail for further value addition and dissemination to user departments.

We will continue to keep a watch on the flood situation and update the information as and when required. Your support and active interaction is highly appreciated. Please provide feedback on the information being provided.

With kind regards

Yours sincerely,

(A V SURESH BABU)

As per the distribution list enclosed in the report.

Mapping and Monitoring of Flood situation in Assam State during 2023

1.0 Background

Floods were reported in Assam due to heavy rains followed by rise in water levels of Brahmaputra & its tributaries during the third week of June, 2023. (Source: CWC, News media, ASDMA-Assam)

2.0 Satellite Data

Flood Disaster Team is keeping a constant watch on the flood situation and checked the satellite data coverage over the affected areas RISAT-1A SAR CRS satellite dataset of 21st June 2023 (1800 Hrs) is acquired & analyzed. (Refer Table-1).

Table-1 Satellite Data acquired over Flood Affected Area

S No	Date	Satellite / Sensor	Districts affected
1	16.06.2023 (1800 Hrs)	Sentinel-1A SAR	Goalpara, Dhubri, Bongaigaon, Barpeta*, Kokrajhar, Kamrup Rural*, Chirang, Baksa, South Salmara Mancachar
2	17.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- MRS	Dhemaji, Tinsukia, Sibsagar, Charaideo, Dibrugarh
3	18.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Golaghat, Cachar, Biswanath*, Lakhimpur, Karimganj, Sonitpur, Jorhat*, Nagaon
4	16.06.2023 to 18.06.2023	Multi Satellite/ Sensor Data	Golaghat, Cachar, Goalpara, Biswanath, Dibrugarh*, Dhubri, Lakhimpur, Bongaigaon, Kokrajhar, Barpeta*, Karimganj, Sonitpur, Jorhat*, Nagaon
5	19.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Dibrugarh, Sibsagar, Tinsukia
6	20.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Barpeta, Kamrup Rural, Baksa, Cachar*, Karimganj, Nalbari, Bongaigaon, Goalpara*, Darrang, Marigaon
7	21.06.2023 (1800 Hrs)	RISAT-1A (EOS-4)- CRS	Cachar, Kamrup Rural*, Darrang, Karimganj, Nagaon, Baksa*

3.0 Satellite Data Analysis

Satellite data is rectified and flood inundation layer is extracted. Further, flood inundation map was composed for part of Assam state based on the analysis of RISAT-1A SAR CRS satellite dataset of 21st June 2023 (1800 Hrs). The cumulative flood inundation layer is integrated with district boundary layer, for extracting district-wise flood inundation statistics which are shown in the Table-2.

4.0 Observations from Satellite Images

Based on the analysis of satellite data, the following points were observed.

- Satellite data covers part of Assam State
- Major inundation was observed in Cachar, Kamrup rural*, Darrang, Karimganj, Nagaon and Baksa* districts.
- The Inundation may include water accumulation in low lying areas due to heavy incessant rainfall.

Table-2:

S. No.	District	Inundated Area (Ha)
1	CACHAR	18158
2	KAMRUP RURAL*	17791
3	DARRANG	14773
4	KARIMGANJ	12542
5	NAGAON	11886
6	BAKSA*	10585
7	MARIGAON	9978
8	NALBARI*	8207
9	UDALGURI*	8094
10	SONITPUR	6452
11	HAILAKANDI	4963
12	HOJAI	4616
13	BISWANATH*	3880
14	KAMRUP METRO	1824
15	GOLAGHAT	862
16	KARBI ANGLONG*	749
17	WEST KARBI ANGLONG	175
Total		135535

Note:

-Flood inundation may include rain water accumulation / flood water in low lying areas/ swampy areas.

-Districts with inundation less than 100 ha are not included in the statistics

- * Partially covered in satellite data.

Distribution List:

1	MHA	<ol style="list-style-type: none">1. Joint Secretary, NDM, Ministry of Home Affairs, North Block, New Delhi - 110 001. (Through e-mail).2. NDM control Room, Ministry of Home Affairs, North Block, New Delhi - 110 001 (Through e-mail).3. DG, NDRF, New Delhi
2	NODAL MINISTRIES	<ol style="list-style-type: none">1. Director, FCA, Central Water Commission, Sewa Bhavan, R K PURAM, New Delhi-1100662. Deputy Director General, Hydrology, India Meteorological Department, Mausam Bhavan, New Delhi -110003
3	STATE	<ol style="list-style-type: none">1. Additional Chief Secretary & Relief Commissioner, Govt. of Assam, Janatha Bhavan, Assam Secretariat, Dispur, GUWAHATI-781005. Scientific Officer, Assam State Remote Sensing Application Centre (ARSAC) Govt of Assam, Guwahati, Assam Fax: 0361-452455
4	ISRO/DOS	<ol style="list-style-type: none">1. Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.2. Programme Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.3. Associate Director, EDPO, ISRO Head Quarters, Antariksh Bhavan, New BEL Road, Bangalore-560094.
5	NRSC	<ol style="list-style-type: none">1. Group Director, DMSG, NRSC2. Deputy Director (RSA) & Project Director, RRES3. Director, NRSC

Based on the analysis of RISAT1A-CRS-SAR Satellite Image of 21-06-2023 (1800 Hrs IST)

Map

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About the Event

Floods were reported in Assam during the third week of June, 2023 due to heavy rains. River Puthimari at Baksa and Kamrup, River Suklai at Baksa, River Brahmaputra at Kamrup and River Beki at Barpeta were reported to be flowing above danger level. (Source: ASDMA, CWC, News Media)

Satellite Observations:

This map highlights the inundation in 17 districts of Assam as on 21-Jun-2023 (1800 Hrs).

Satellite Data Used

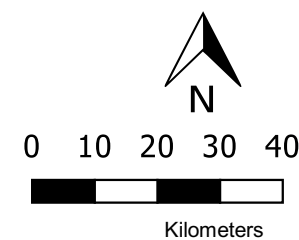
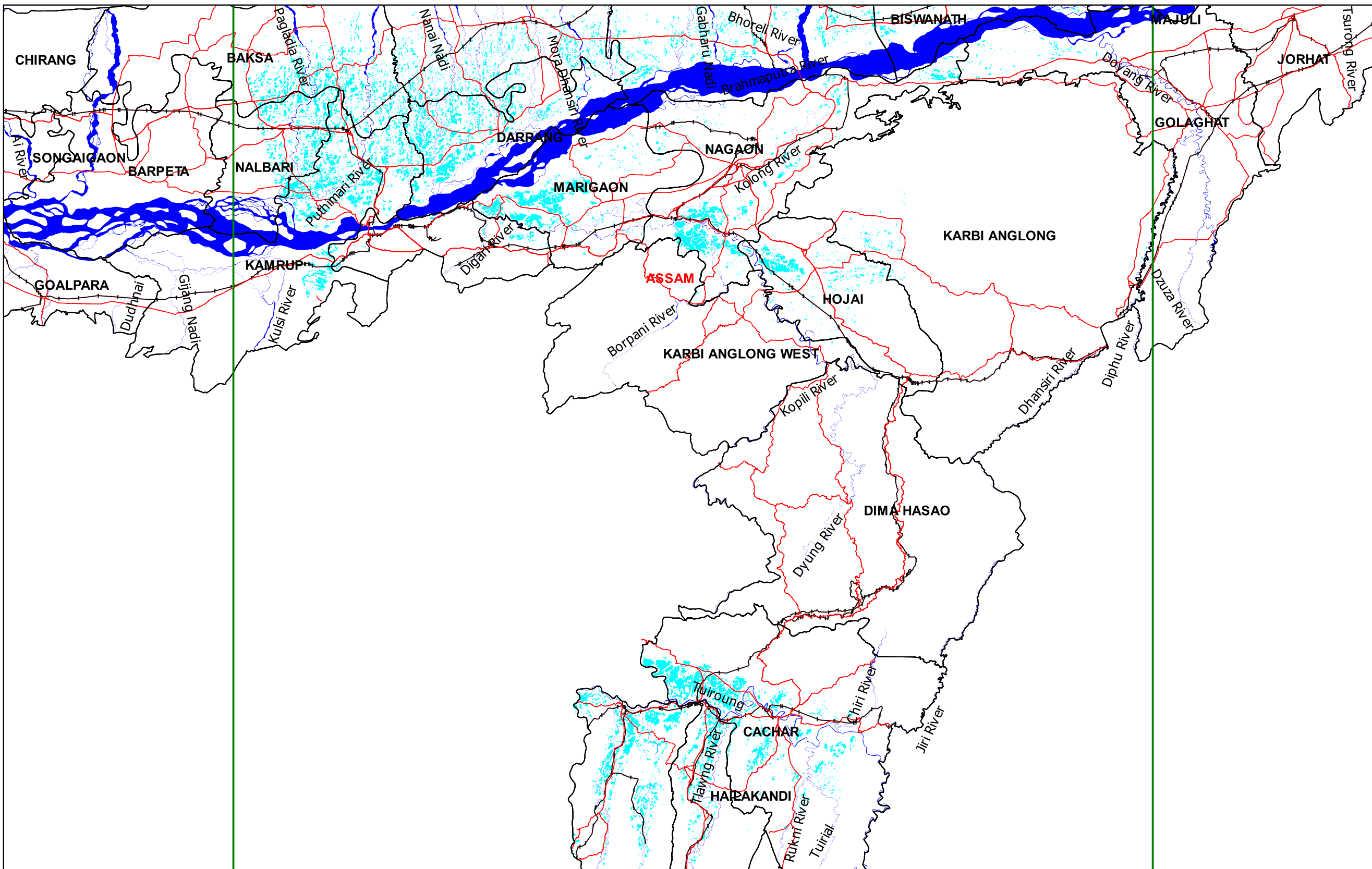
Pre Flood Data
Satellite: Resourcesat-2 AWiFS
Date of Pass: 15-03-2023

Post Flood Data

Satellite: RISAT1A-CRS-SAR
Date of Pass: 21-06-2023

Other data used

NRSC Landuse/Landcover Data of 2018-19, Bhuvan Geospatial Legacy Data



- District Boundary
- Major Roads
- Railway Line
- River
- Flood Inundation
- Satellite Data Coverage

Disclaimer : This product is prepared on rapid mapping mode for immediate use and sharing amongst official agencies. This provides preliminary results. Flood inundation may include rain water accumulation / flood water in low lying areas. All geographic information has limitations due to the scale, resolution, date and interpretation of the original source materials. No ground verification is done

Citation ' NRSC (2023) - Flood Inundated areas in Part of assam State (as on 21-06-2023)' dated 2023 Map no : 2023/FL/AS/07/21062023, NRSC/ISRO,Hyderabad

RRES
National Remote Sensing Centre,
ISRO Dept. of Space,
Govt. of India
Hyderabad- 500 037
E-Mail: flood@nrsc.gov.in
www.nrsc.gov.in



Location Map