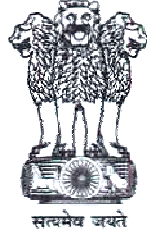


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Date: Sep 05, 2021

No: 13-FL-2021-ASSAM/17

Dear Sir,

Sub: Assam Heavy Rains 2021- Near Real Time Flood Mapping using satellite data

Please refer to our earlier mail dated 02nd Sep 2021 regarding Near Real Time Flood Inundation Mapping project using satellite data. So far we have sent 16 flood maps covering floods in part of Assam State. Heavy incessant rains in upper reaches of Assam followed by rise in water levels in Brahmaputra and its tributaries during the last week of Aug 2021 has led to inundation/water logging in Parts of Assam State. We have analysed Sentinel-1A SAR satellite data of 03rd Sep 2021 (1800 Hrs IST) and an inundation map for 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 Bhuvan portal (bhuvan-noeda.nrsc.gov.in/disaster/disaster.php; ndem.nrsc.gov.in) NDEM portal for better visualisation 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,
(K H V Durga Rao)

As per the distribution list enclosed in the report.

Assam Heavy Rains – 2021

1.0 Background

Floods were reported in Assam due to heavy rains followed by rise in water levels of Brahmaputra & its tributaries during the last week of Aug, 2021. According to ASDMA, Govt. of Assam, Bongaigaon is the worst affected district in current spell followed by Chirang and Dhemaji districts. According to Central Water Commission, River Jia Bharali at NT Road Xing in Sonitpur district, Beki River at Beki Rd bridge at Barpeta district are reported to be flowing in severe flood situation. (Source: CWC, newsmedia)

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. Sentinel-1A SAR satellite data of 03rd Sep 2021 (1800 Hrs IST) is acquired & analysed. (Refer Table-1).

Table-1 Satellite Data acquired over Flood Affected Area

S No	Date	Satellite / Sensor	Status
1	07-06-2021(0600 Hrs)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
2	09-06-2021(0600 Hrs)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
3	28-06-2021(1800 Hrs)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
4	01-07-2021(0600 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
5	03-07-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
6	10-07-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
7	13-07-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
8	13-07-2021(2100 Hrs IST)	NOVASAR-1	Analysed and 1 flood map was sent.
9	15-07-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
10	22-07-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
11	27-08-2021(0600 Hrs IST)	RADARSAT-2 SAR	Analysed and 1 flood map was sent.
12	27-08-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
13	28-08-2021(0600 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.

14	30-08-2021(0600 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map was sent.
15	31-08-2021 (1400 Hrs IST)	MODIS AQUA	Analysed and 1 flood map was sent.
16	01-09-2021(1800 Hrs IST)	RADARSAT-2 SAR	Analysed and 1 flood map was sent.
17	03-09-2021(1800 Hrs IST)	Sentinel-1A SAR	Analysed and 1 flood map is being sent.

3.0 Data Analysis

Satellite data is rectified and inundation layer is extracted. Further, inundation map was composed for part of Assam state based on the analysis of Sentinel-1A SAR satellite data of 03rd Sep 2021 (1800 Hrs IST). The inundation layer is integrated with district boundary layer, for extracting district-wise inundation statistics which are shown in the Table-2.

4.0 Observations

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

- Satellite data covers part of Assam State
- Major Inundation was observed in Marigaon, Nowgong, Kamrup, Darrang & Karimganj districts.
- **The Inundation may include water accumulation in low lying areas due to heavy incessant rainfall.**

Table-2:

S.No.	DISTRICT	Flooded Area (Ha)
1	MARIGAON	23422
2	NOWGONG	7985
3	KAMRUP	6112
4	DARRANG	5584
5	KARIMGANJ	5473
6	CACHAR	4544
7	EAST KAMRUP	3837
8	BISWANATH	2943
9	GOLAGHAT*	2338
10	SONITPUR	1825
11	NALBARI	1215
Total Flooded Area (Ha)		65279

Note:

- Flood inundation may include rain water accumulation / flood water in low lying areas.
- Districts with inundation less than 1000 ha are not included in the statistics
- *partially covered in satellite data

Distribution List:

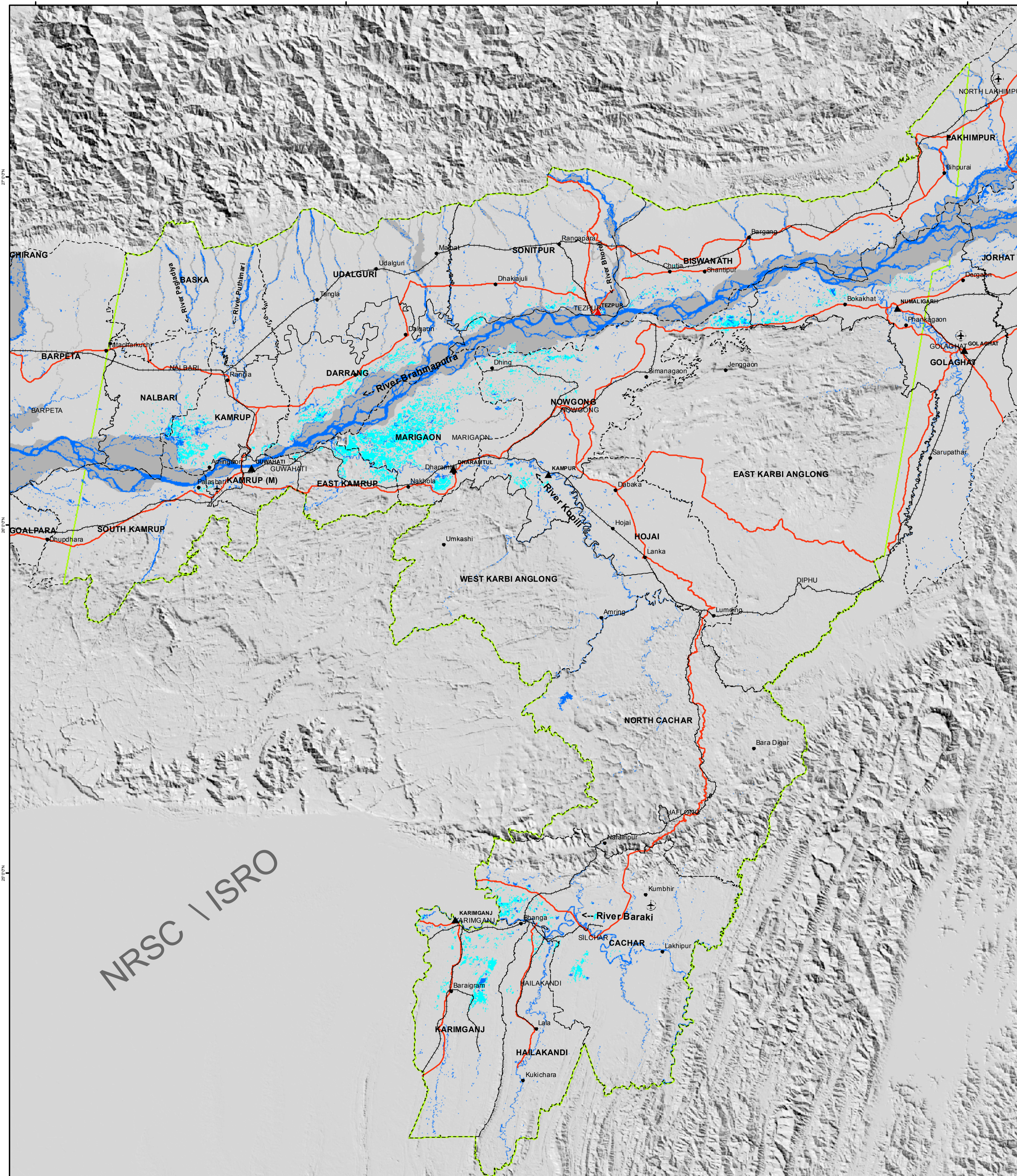
1	MHA	<ol style="list-style-type: none">1. Joint Secretary, NDM, Ministry of Home Affairs, North Block, New Delhi - 110 001. (Through e-mail).2. NDM control Room, Ministry of Home Affairs, North Block, New Delhi - 110 001 (Through e-mail).
2	NODAL MINISTRIES	<ol style="list-style-type: none">1. Chairman, Central Water Commission, Sewa Bhavan, R K PURAM, New Delhi-1100662. ADGM (H & A), 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. (Hard copy of the map through NESAC/ARSAC also).2. Scientific Officer, Assam State Remote Sensing Application Centre (ARSAC) Govt of Assam, Guwahati, Assam Fax: 0361-452455 (with a request to disseminate the information to the concerned user depts.)
4	ISRO/DOS	<ol style="list-style-type: none">1. Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail)2. Programme Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail)3. Associate Director, EDPO, ISRO Head Quarters, Antariksha Bhavan, New BEL Road, Bangalore-560094. (e-mail)
5	NRSC	<ol style="list-style-type: none">1. Deputy Director (RSA) & Project Director, RRES2. Associate Director, NRSC3. Director, NRSC

Flood Inundated Areas in part of Assam State

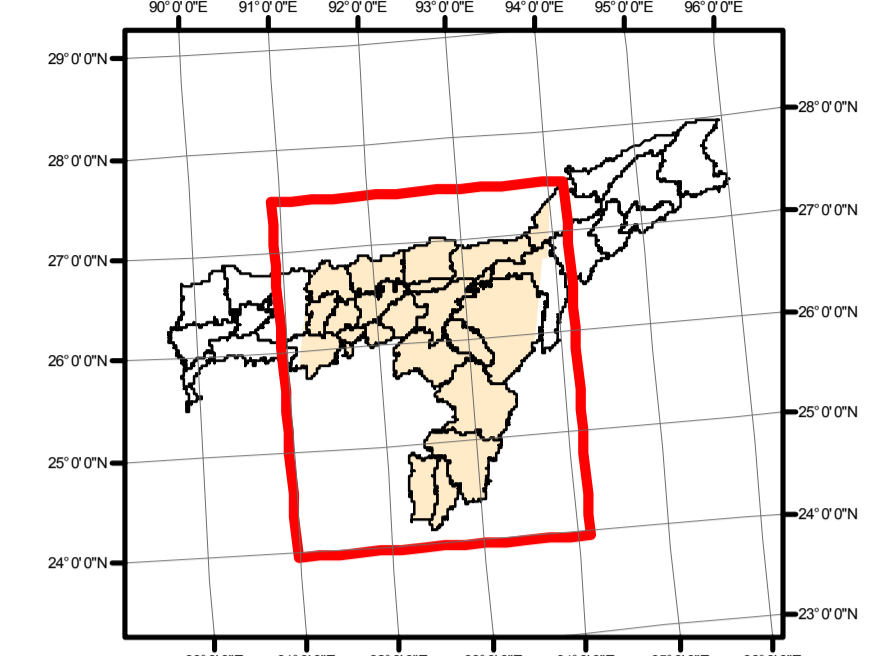
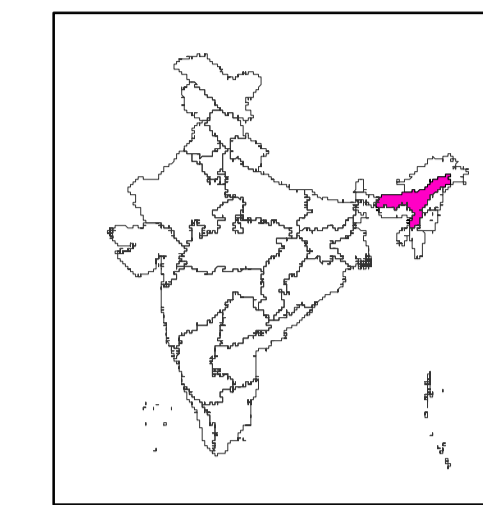
Based on the analysis of SENTINEL-1A SAR satellite data of 03-Sep-2021 (1800 Hrs)

DISASTER EVENT ID: 13-FL-2021-ASSAM
MAP ID: 2021/17

Date of Issue : 05.09.2021



Location Map



About the Event

Floods were reported in Assam due to heavy rains followed by rise in water levels of Brahmaputra & its tributaries during the last week of Aug, 2021. According to ASDMA, Govt. of Assam, Bongaigaon is the worst affected district in current spell followed by Chirang and Dhemaji districts. According to Central Water Commission, River Jia Bharali at NT Road Xing in Sonitpur district, Beki River at Beki Rd bridge at Barpeta district are reported to be flowing in severe flood situation.

(Source: CWC, newsmedia)

Satellite Observations

This map highlights the inundation in 11 districts of Part of Assam State as on 03 Sep 2021

Satellite data used

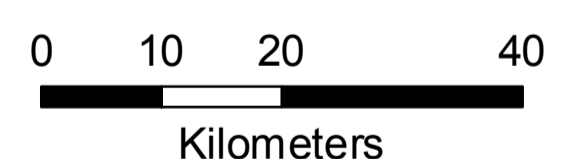
Pre Flood:	Post Flood:
Satellite:ResourceSat-2	Satellite:Sentinel-1A
Sensor: AWiFS	Sensor: SAR
Date of Pass: 01-Feb-2021	Date: 03-09-2021 (1800 hrs IST)

Other data used

NRC Landuse/Landcover Data
Background data -- Shaded Relief

Legend

- Airport
- Settlement
- State boundary
- District boundary
- Railway Line
- National Highway
- Other Major Roads
- Normal river / Water bodies
- River Bank
- Flood Inundation
- Area Covered By Satellite
- CWC River Gauge- Normal Flood Situation
- CWC River Gauge- Severe Flood Situation



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.

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



Note: When publishing this map as part of any report, source may be indicated as " NRSC (2021) - Flood Inundated areas in part of Assam State (as on 03 Sep 2021)" dated 05.09.2021 Map no : 2021/17, NRSC/ISRO, Hyderabad

NRSC | ISRO