生きる、を支える科学技術
NIED 防災科研

Radar rainfall estimation using public data:
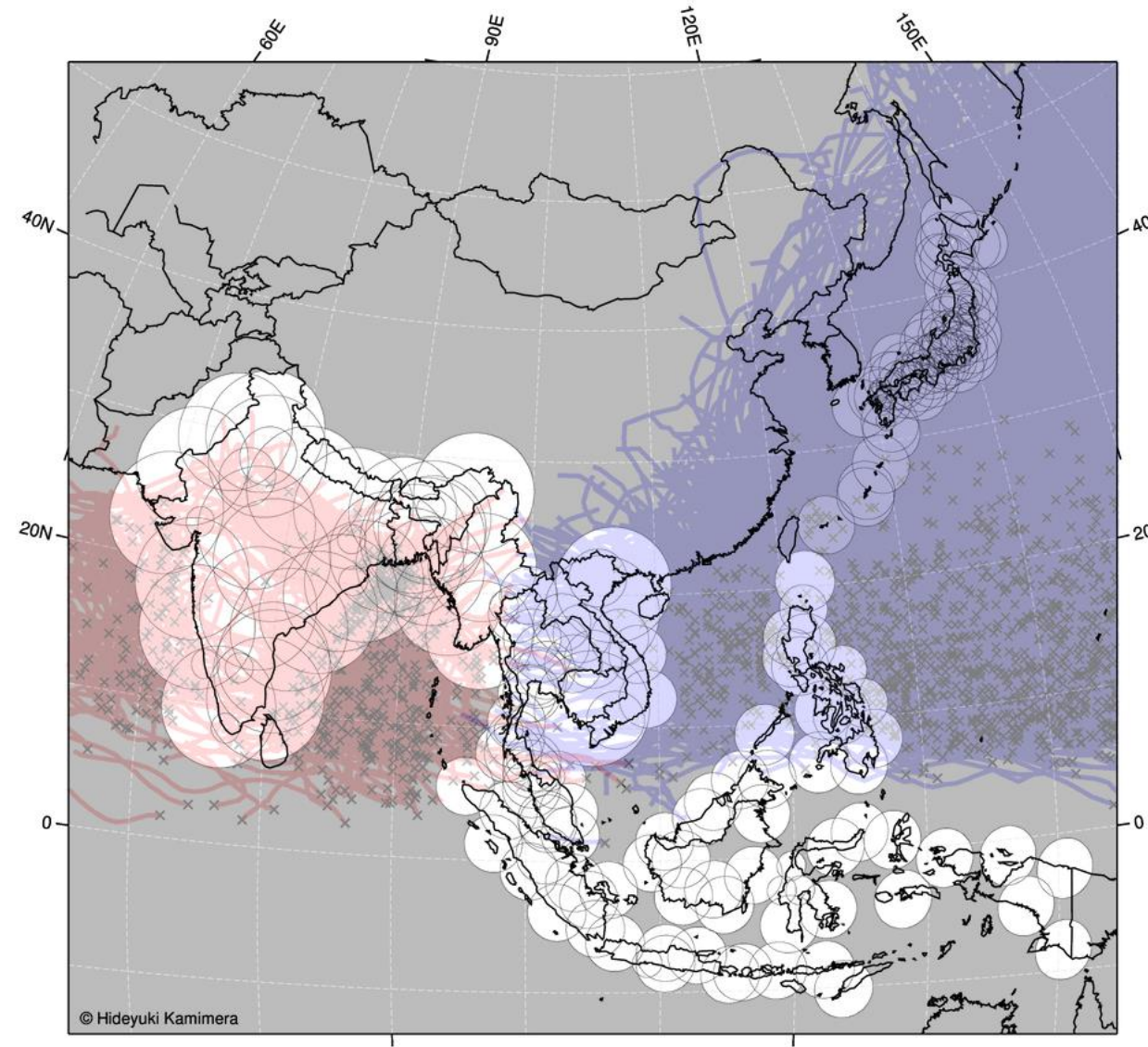# A challenge for the Meghna River basin

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1: National Research Institute for Earth Science and Disaster Resilience (NIED), Tsukuba, Japan
2: Kagawa University, Takamatsu, Japan
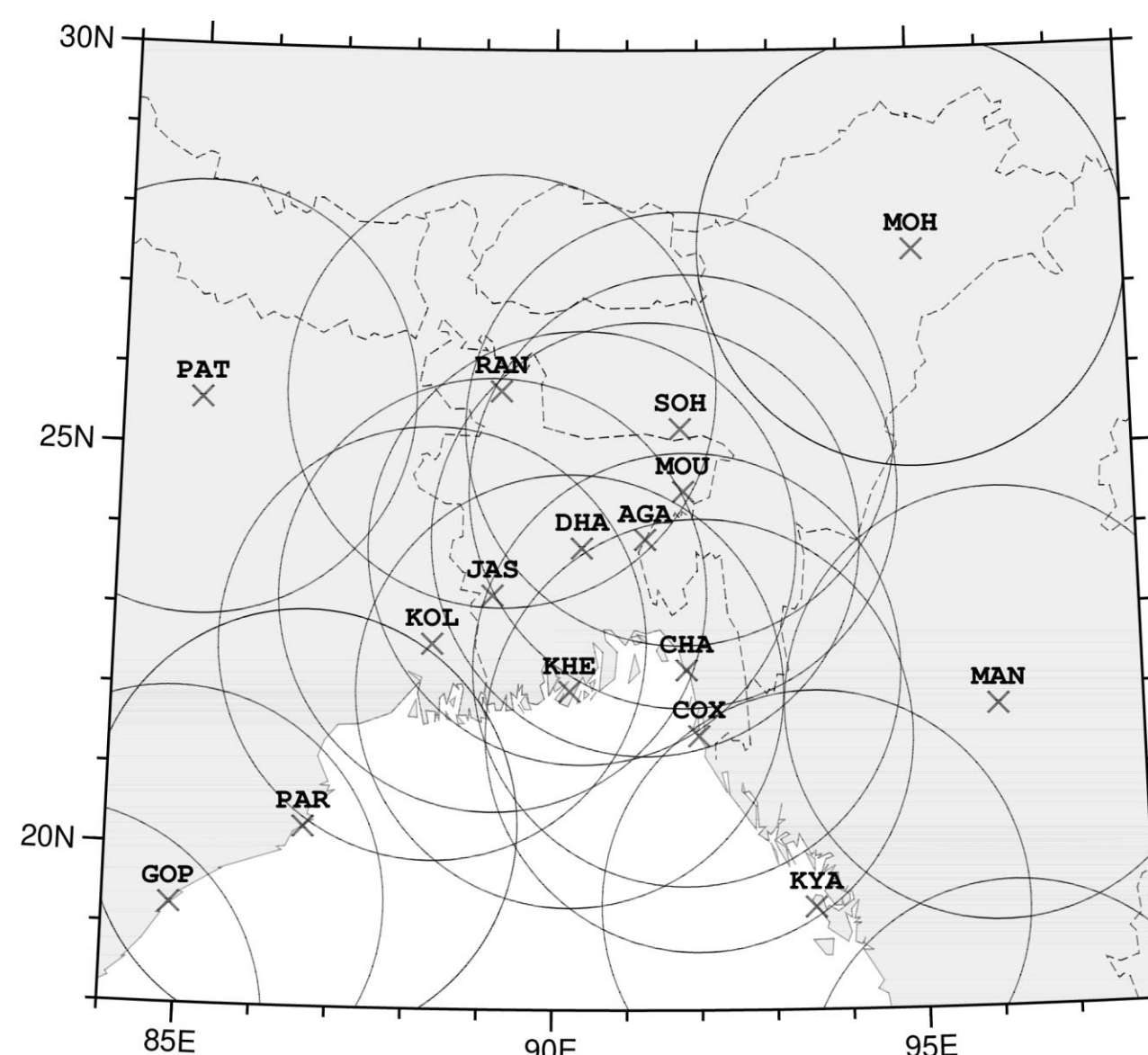Corresponding Author: kamimera@bosai.go.jp

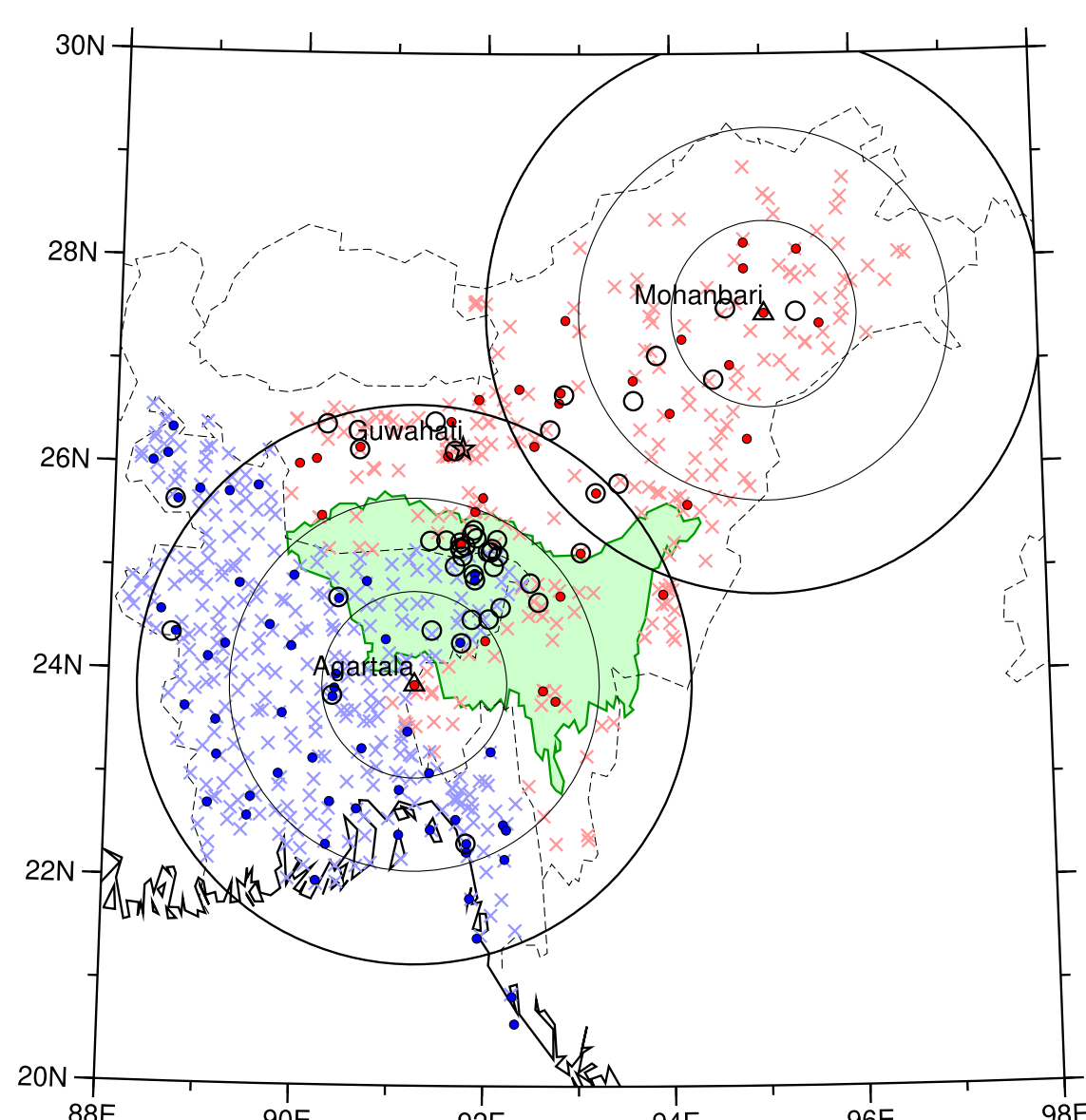## BRAIN: Borderless Radar Information Networking over South and Southeast Asia

Kamimera (2020; 2021)

Network of weather radars in the northeast Indian subcontinent

Kamimera and Yamane (2025)

Radars and rain gauges around the Meghna River basin



Kamimera and Yamane (2025)

Purpose and method

Purpose: This study aims to elucidate the spatio-temporal patterns of rainfall over the northeast Indian subcontinent based on a year-round series of weather radar measurements.

Method:
1. Data collection and checking
   - PPI images (GIF format) of 500-km and 150-km range radar reflectivity are downloaded every 10 minutes from the IMD web site. It started on February 18, 2023.
   - Frequency of electromagnetic waves is 2.7 or 2.9 GHz (S-band), single polarization, and the elevation angle for the 500-km range PPI is 0.5 degree and that of the 150-km range PPI is 0.2 degree.
2. Observation information is extracted from the PPI images.
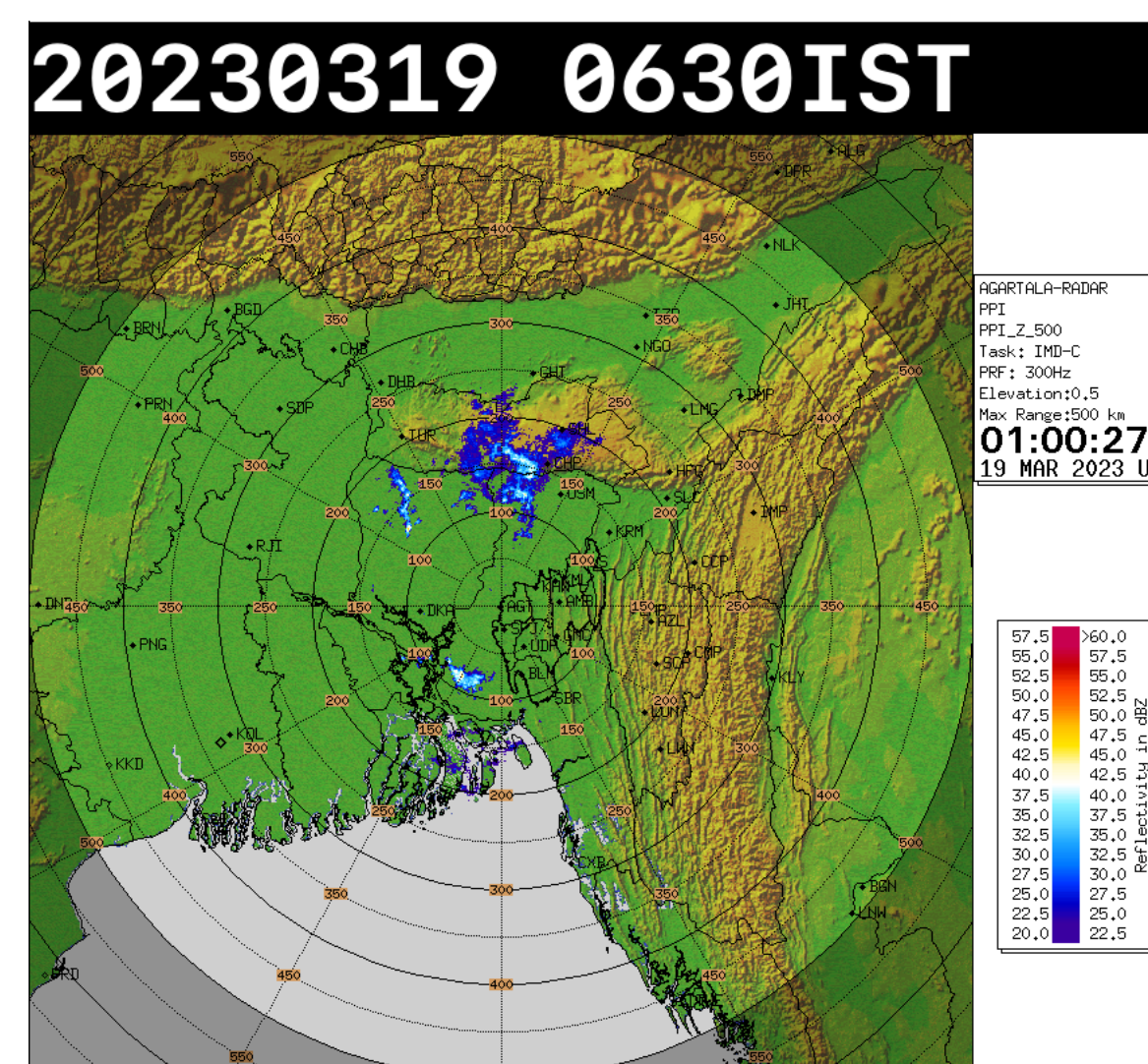3. The extracted observation information is analyzed.

Radar data availability

Availability of radar images at Agartala (Tripura, left) and Mohanbari (Assam, right)
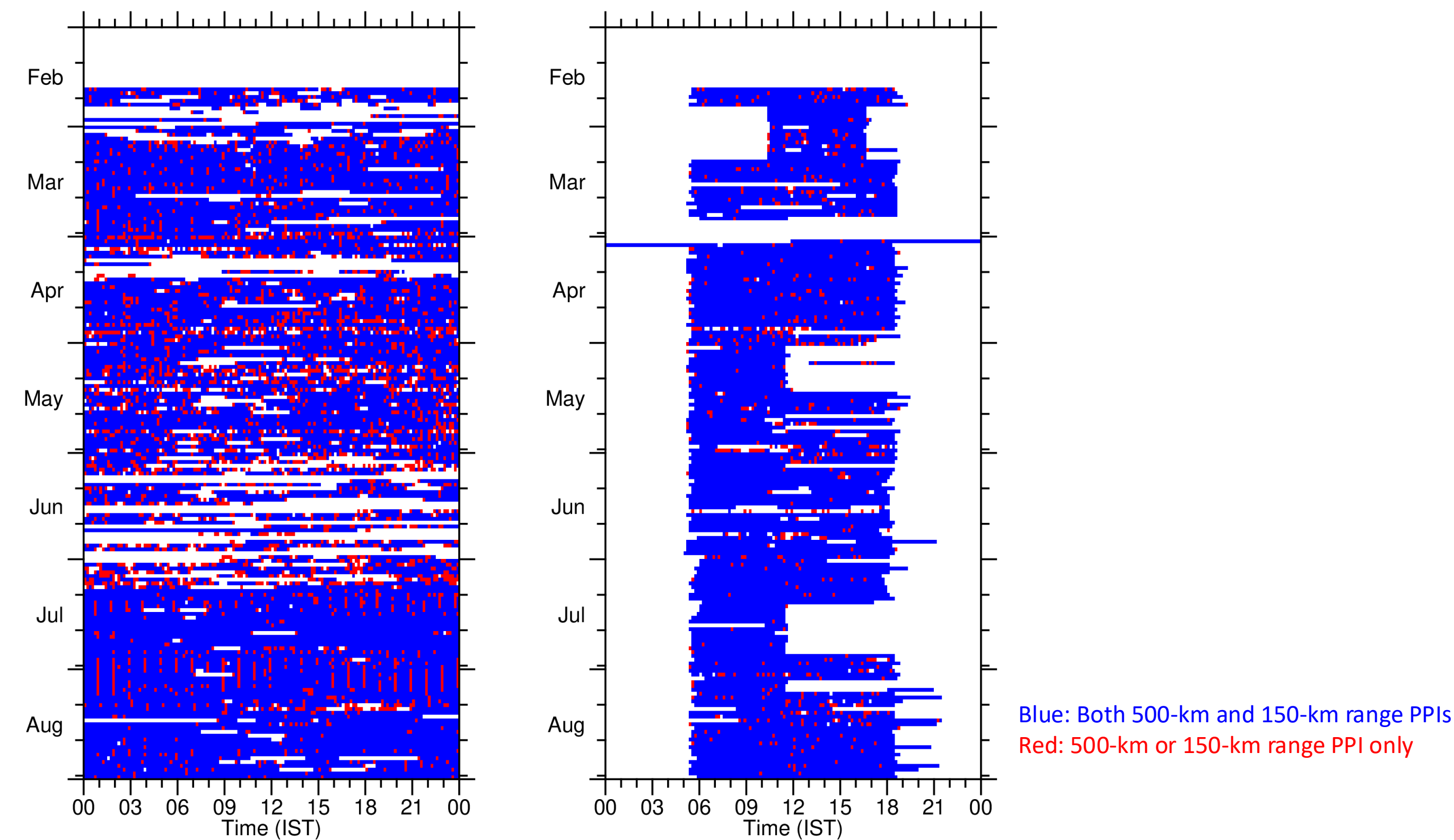
Blue: Both 500-km and 150-km range PPIs
Red: 500-km or 150-km range PPI only

## Extraction of observation information

Observation information: Color information indicating radar reflectivity

Coastline, lines indicating national and state borders, division boundaries, points indicating the location of a city and letters indicating the name of the city, straight lines indicating 12 directions, range rings and letters attached to them indicating distances are overwritten on the observation information.

Such pixels are called **non-observation value pixels**; other pixels are called **observation value pixels** in this study.

Geographical patterns of POA

POA: probability of appearance of radar reflectivity echoes
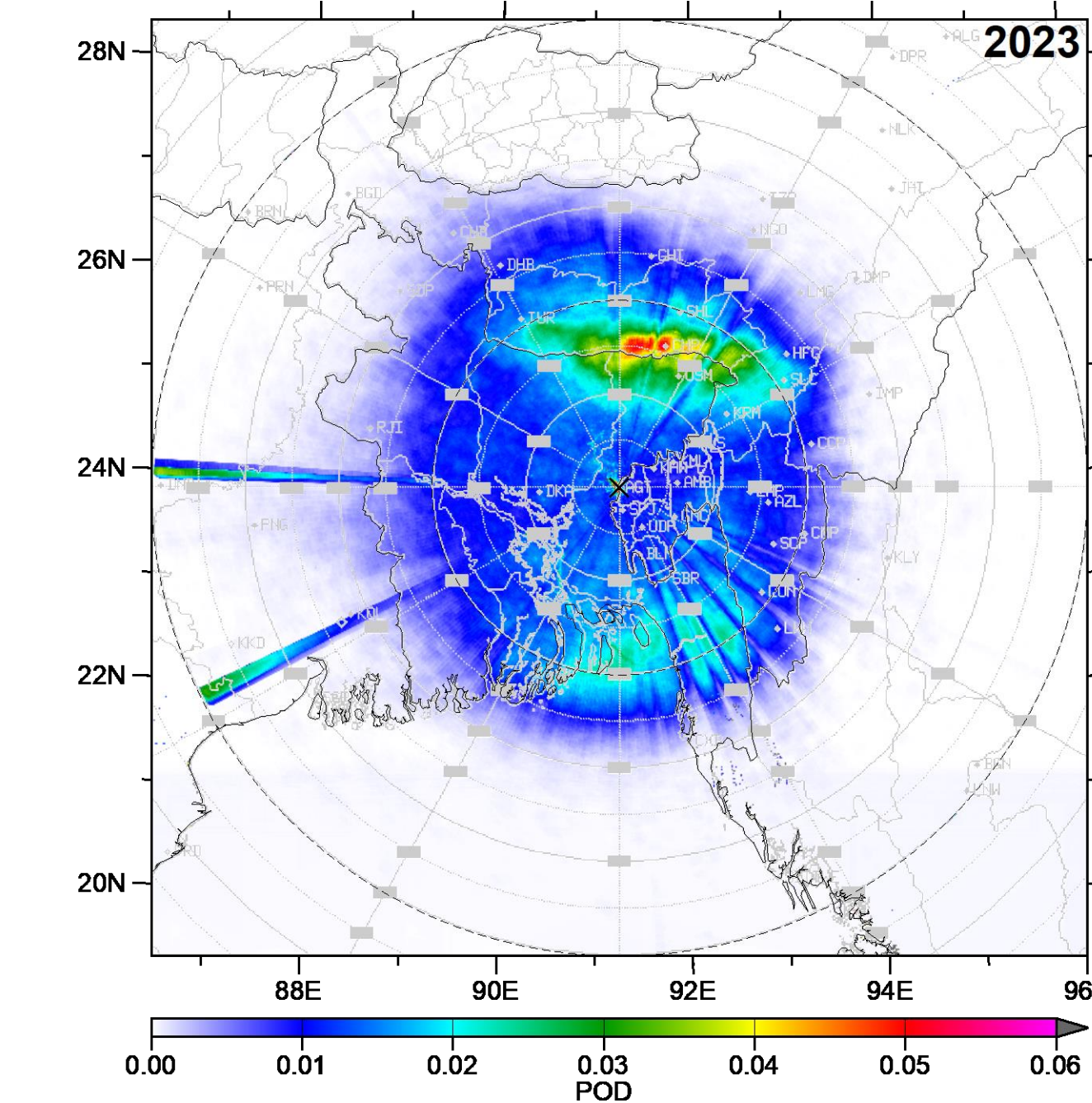
Entire period

According to the geographical pattern of the POA over the entire study period, it seems that the radar can observe precipitation particles in the atmosphere within the 200-km range (hereafter the domain). Two areas with the higher POA are recognized in the domain. The one is around the Indian state of Meghalaya in the northern part of the domain. The other is over the region from the Bay of Bengal to the Bangladeshi division of Chattogram to the east in the southern part of the domain.

Month of maximum POA

The most months of maximum POA are June in the northeastern half of the domain including the states of Meghalaya, Assam and Mizoram in India and the division of Sylhet in Bangladesh. In the southwestern half of the domain including the greater part of Bangladesh, the most months of maximum POA are August.
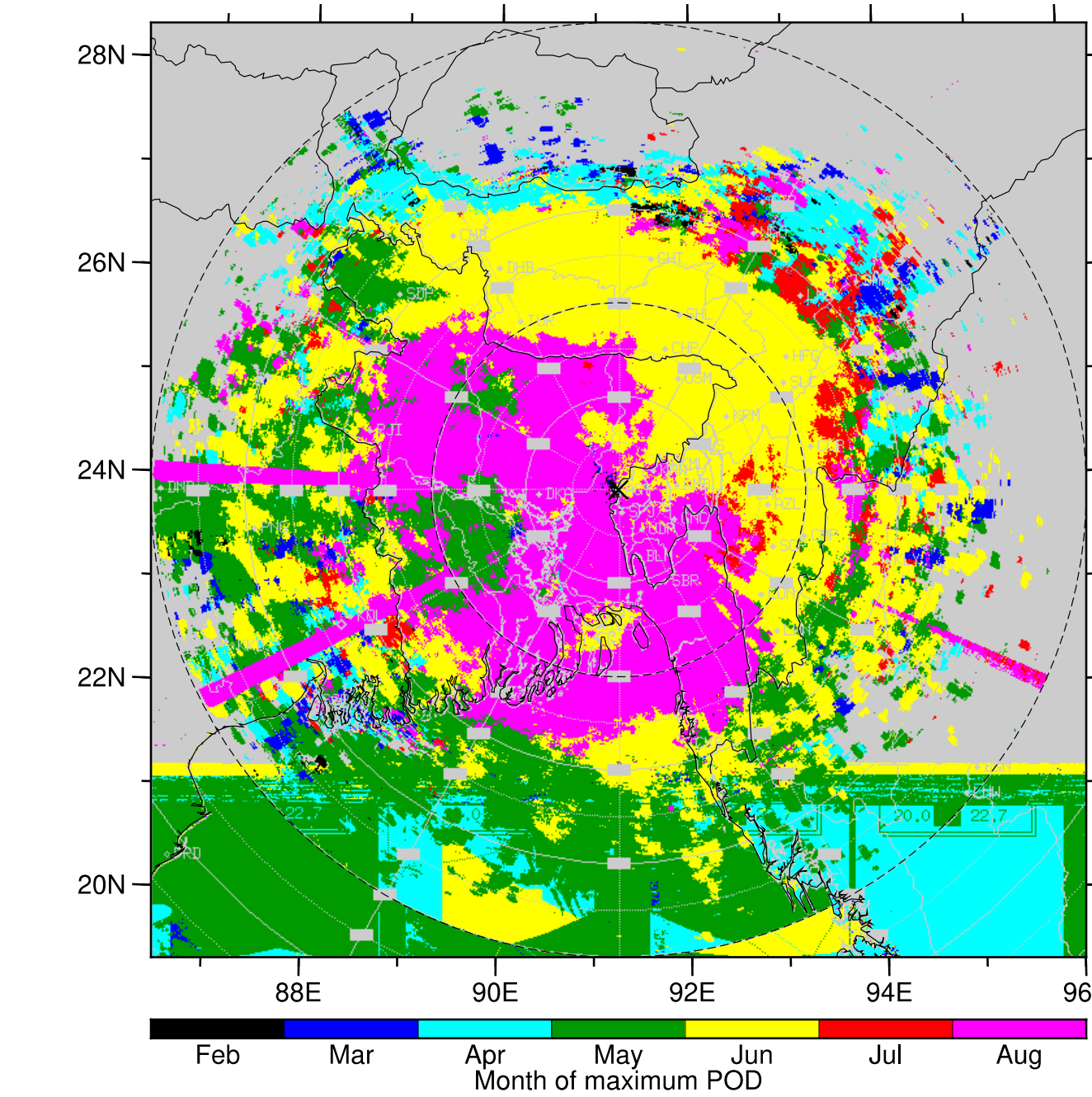
Hour of maximum POA

In the northern part of the domain from Meghalaya to southern Assam in India, the most times of maximum POA are between 00 and 06 LT. In the central part of the domain from Bangladesh to the Indian states of Tripura and Mizoram, the most times of maximum POA are between 15 and 21 LT. In the southern part of the domain over the Bay of Bengal, the most times of maximum POA are between 06 and 09 LT.

Eighth WMO International Workshop on Monsoons (IWM-8), Pune, India, 17–21 March 2025