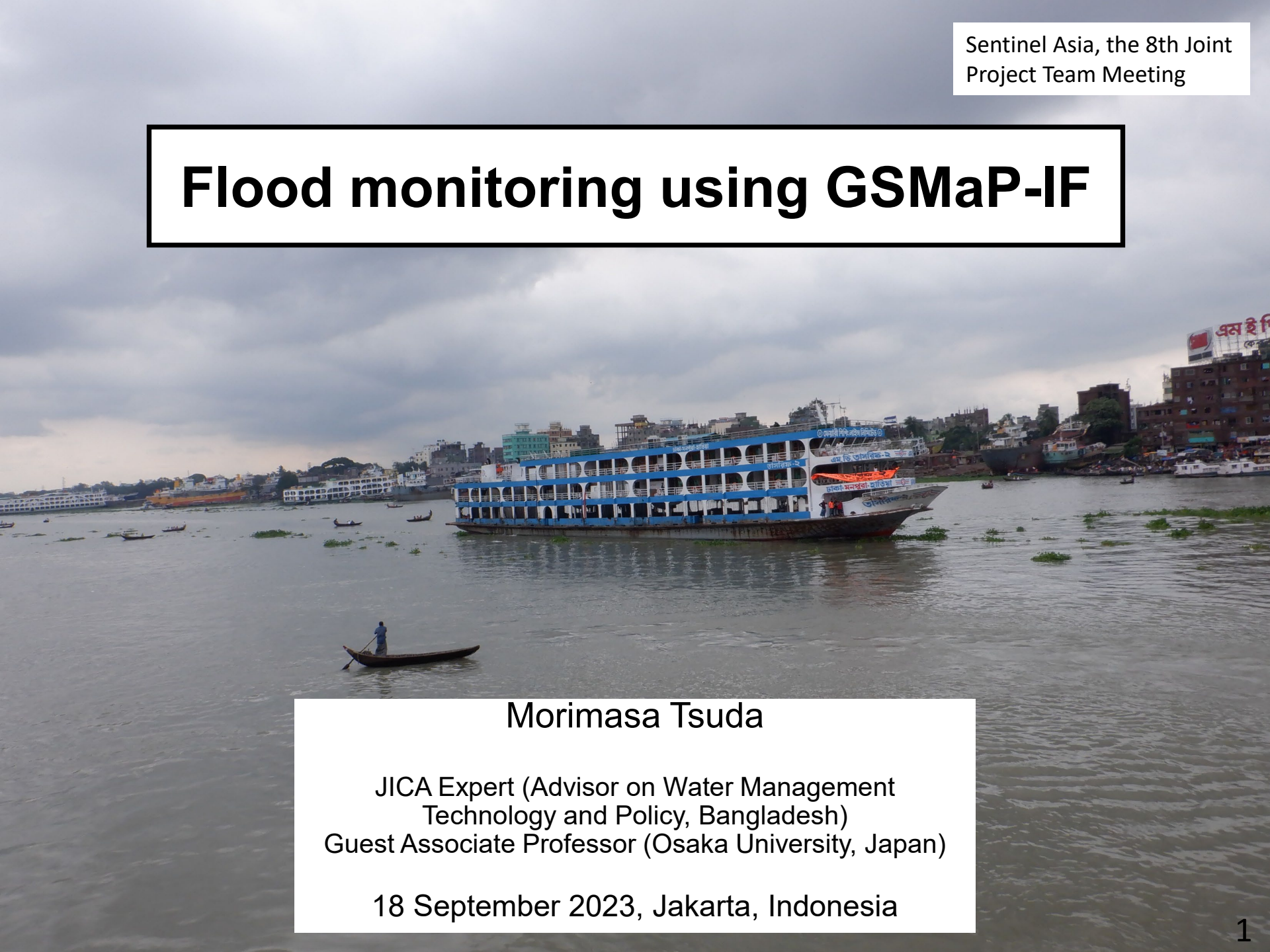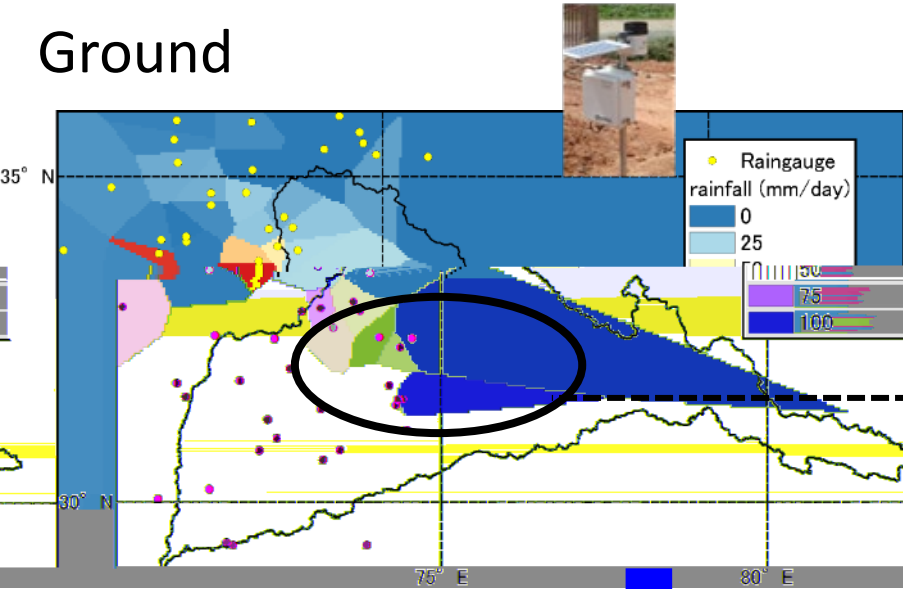# Flood monitoring using GSMaP-IF

Morimasa Tsuda

JICA Expert (Advisor on Water Management Technology and Policy, Bangladesh)
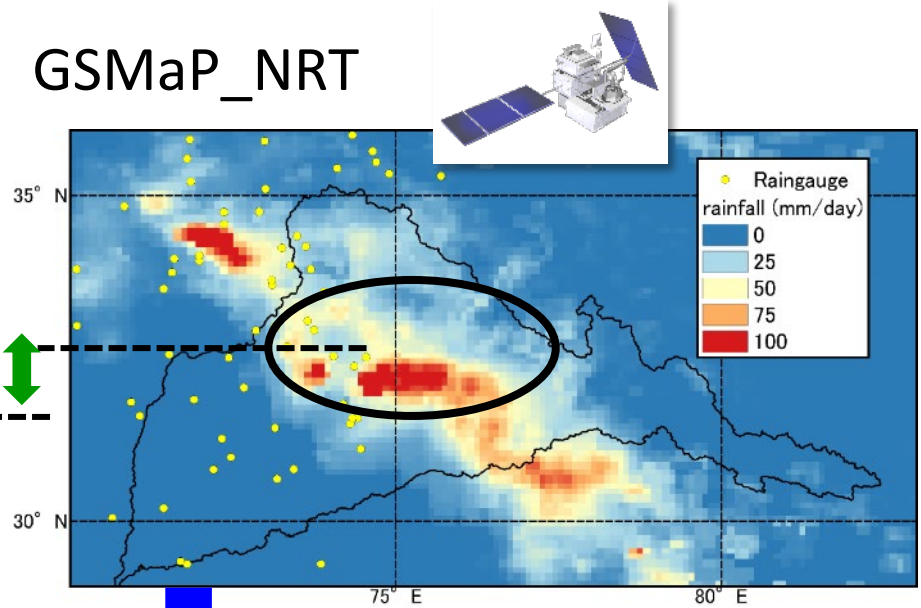Guest Associate Professor (Osaka University, Japan)

18 September 2023, Jakarta, Indonesia
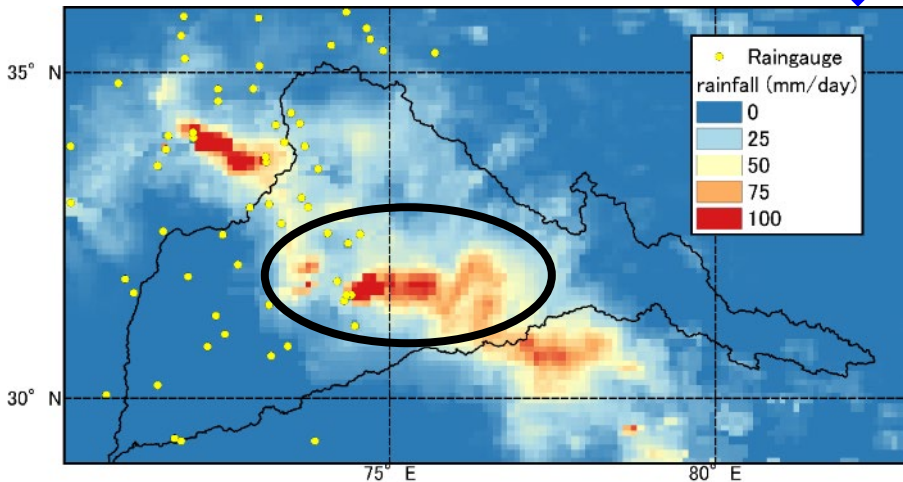
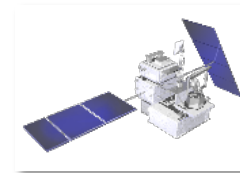# Bias correction of Satellite precipitation(GSMaP)

Ground

GSMaP_NRT

Corrected GSMaP
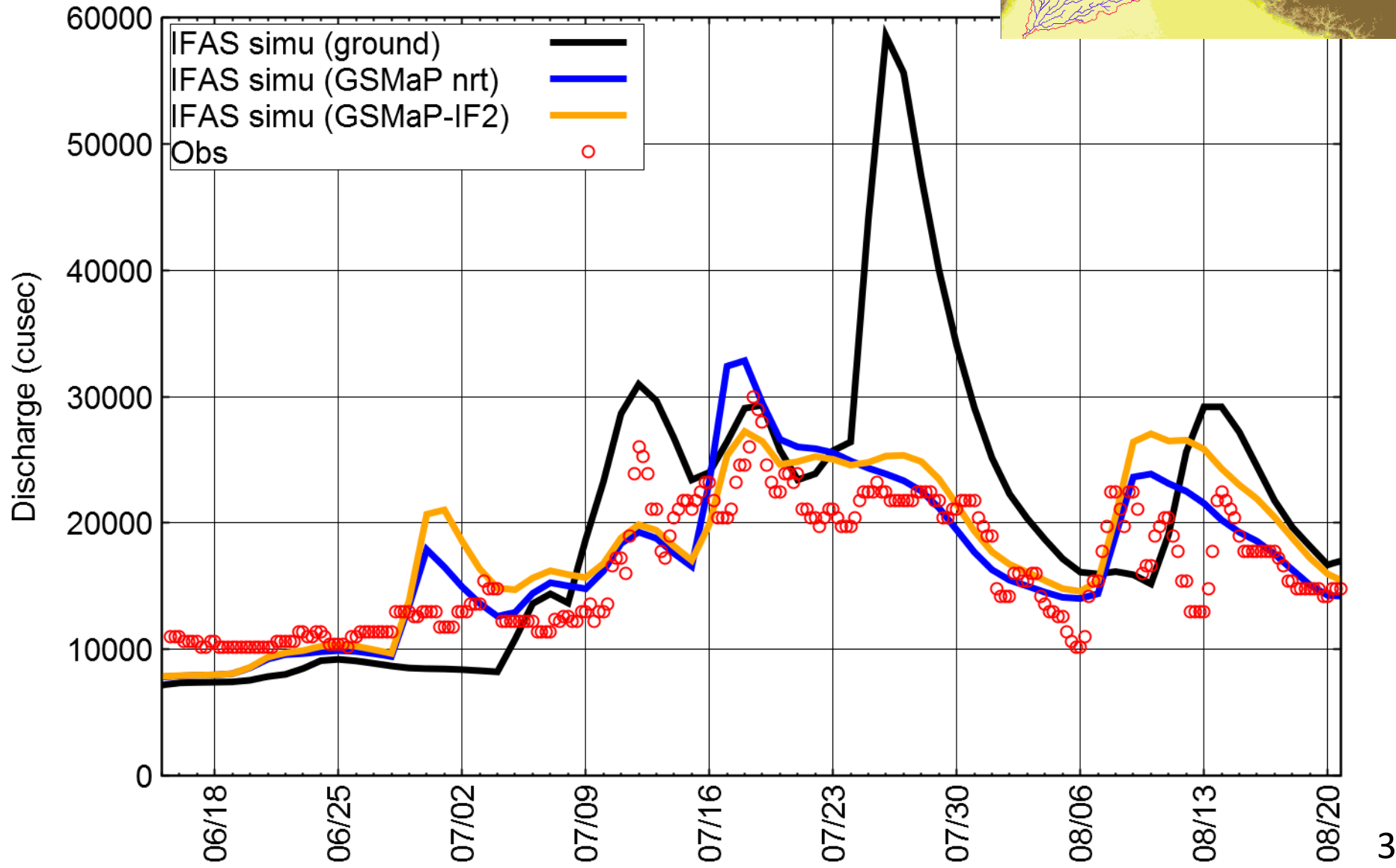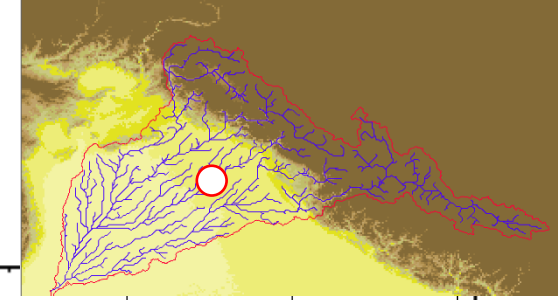(GSMaP-IF)

Bias correction
(GSMaP-IF)

GSMaP: Global Satellite Mapping of Precipitation by JAXA

2

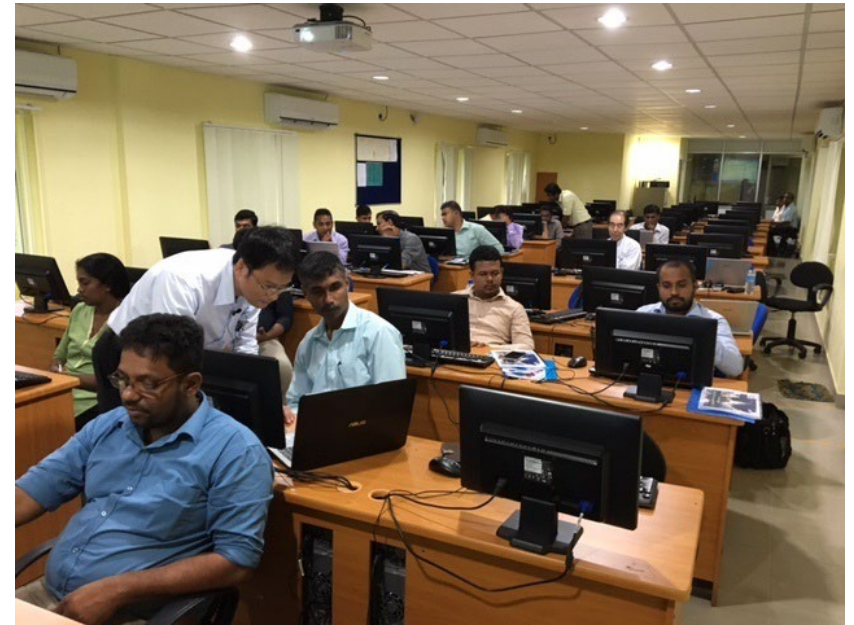# Simulation of river discharge with GSMaP-IF

GSMaP Bias correction training by SAFE (Space Applications for Environment) prototyping projects

Mekong River Commission (2016)

"Deploying GSMaP for Decision Support in Transboundary Catchments in the Lower Mekong Basin"

Sri Lanka Irrigation Department (2016)

"Developing and Implementing an Operational Prototype for Advanced Flood Forecasting, Early Warning, and Data Sharing System in the Kalu Ganga Basin, Sri Lanka"

Ganges, Brahmaputra, Meghna river basins
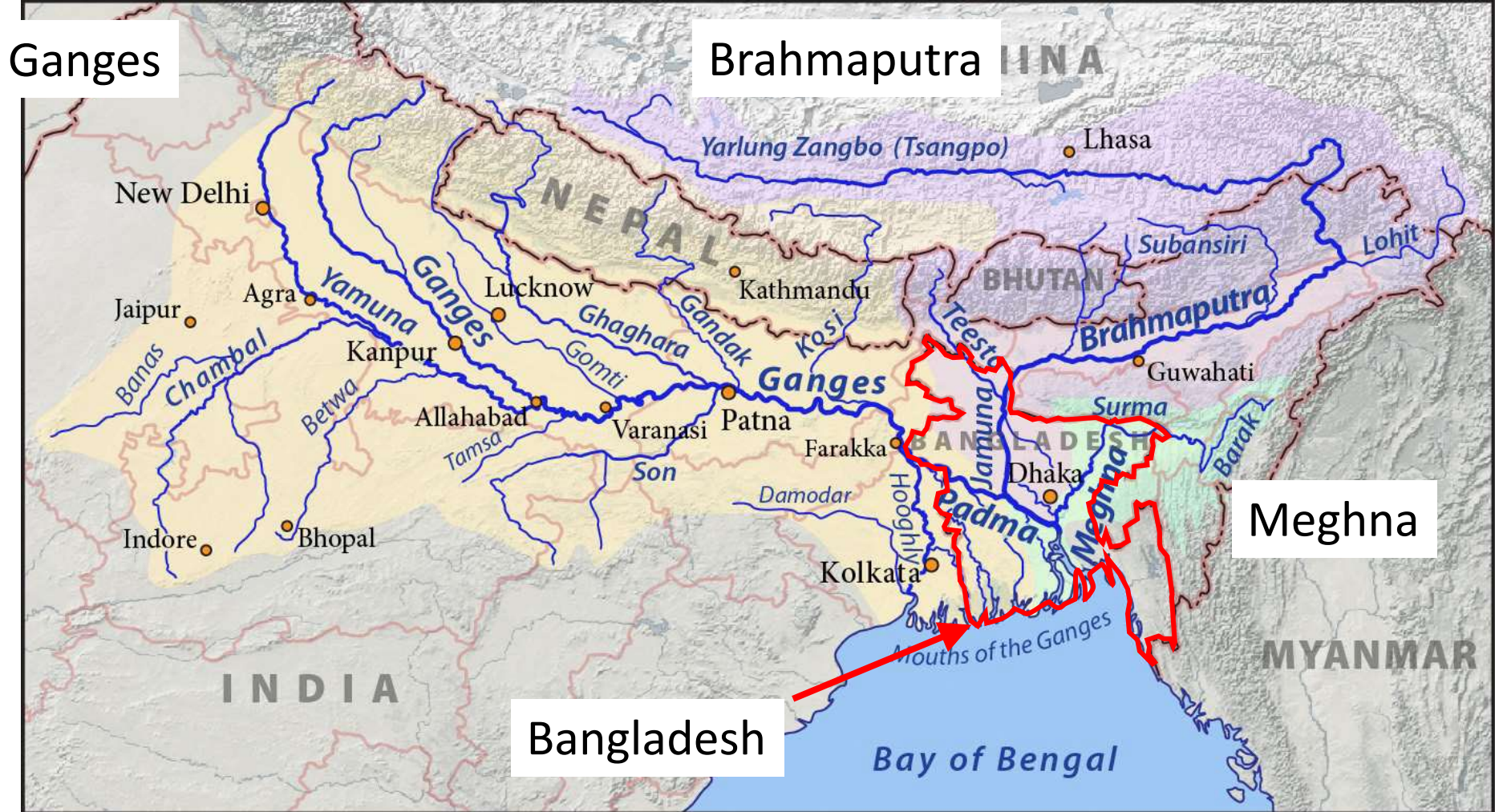
Total catchment area of three basins : 1.72 million km2

Haor region at North Eastern Bangladesh

North Eastern region

Elevation (EL.m)
10

0
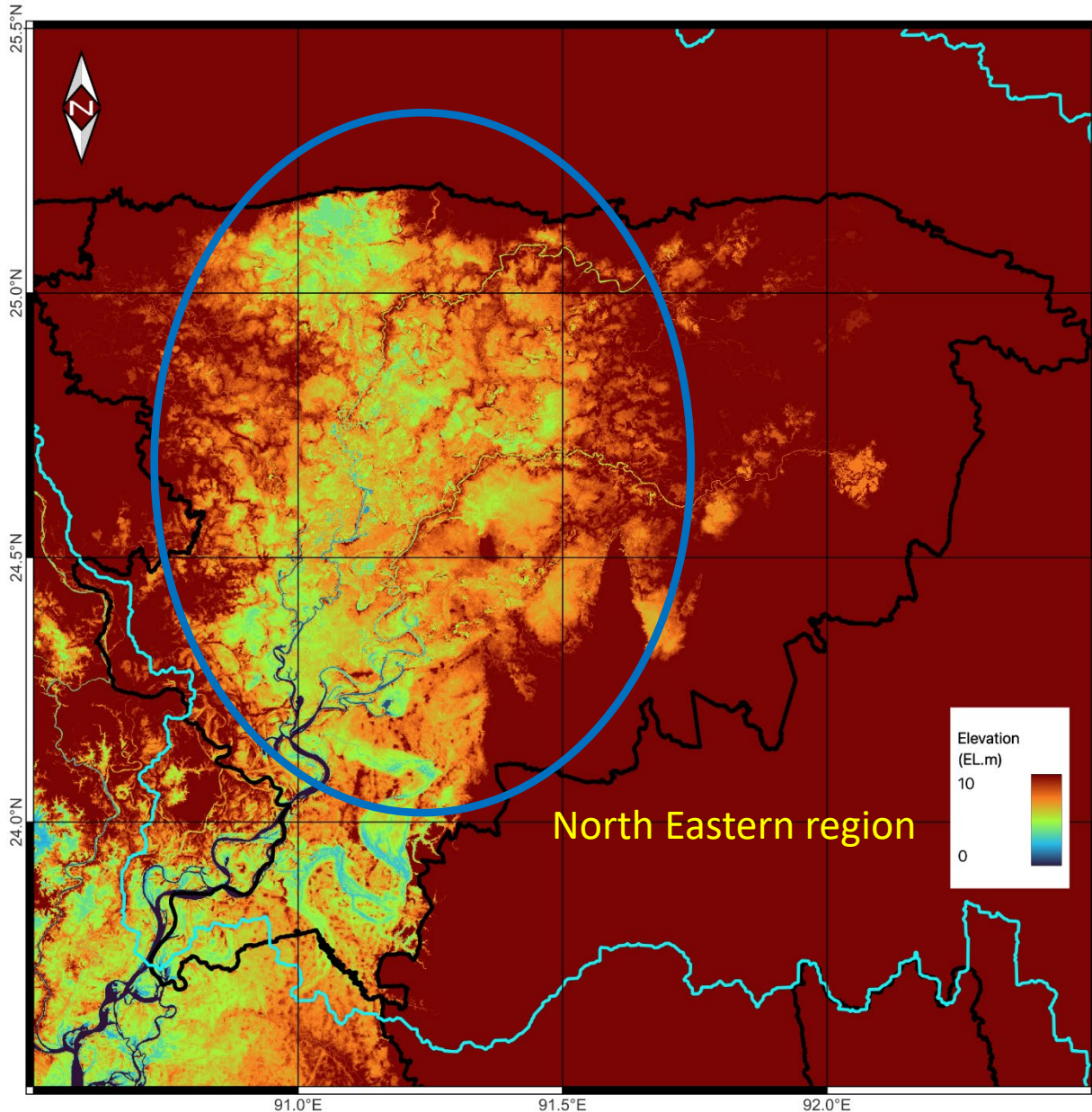
Only 1-4m above the mean sea level
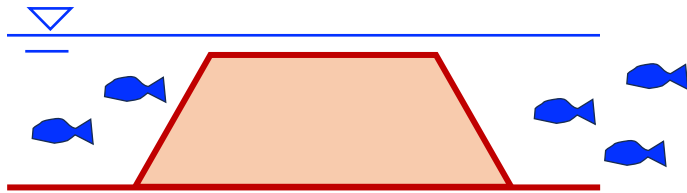
Wet Season

Dry Season
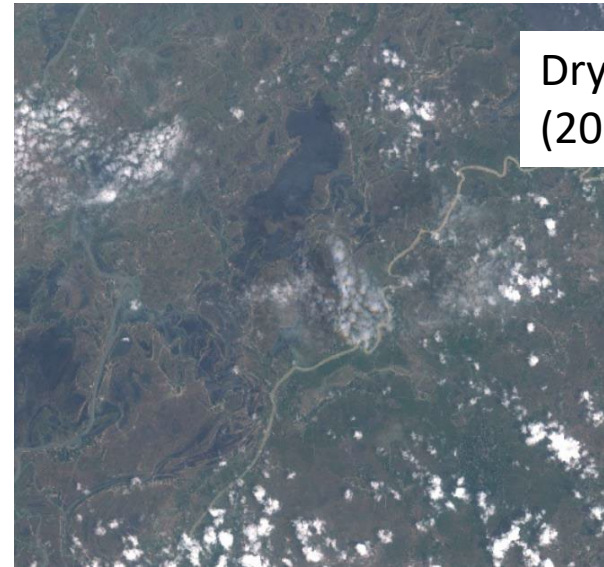

Paddy field

MERIT Hydro by Tokyo Univ.

6

Flood control by submergible embankment

Before harvesting in May : Protection
of cropland by embankment
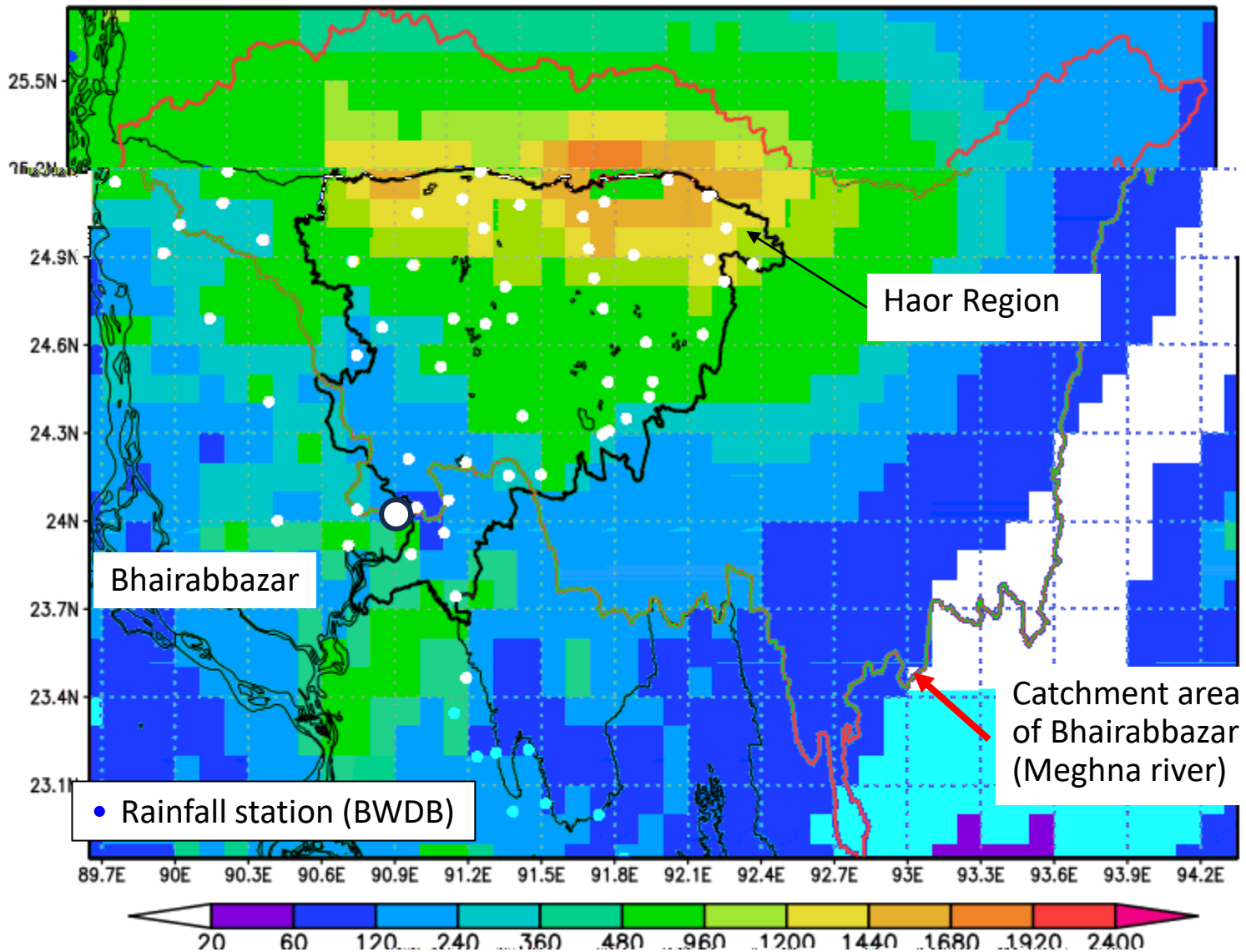

After May : Fishery work

Rui Beel Haor (2023 January)

Dry season
(2022 May)
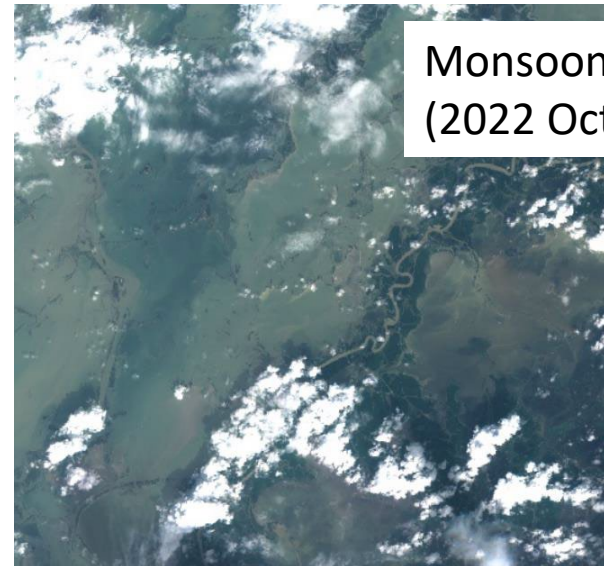
Monsoon season
(2022 October)

Heavy rainfall outside observation network

GSMaP NRT 2022 June01-June30 (mm)

Haor Region

Bhairabbazar

Catchment area of Bhairabbazar (Meghna river)

• Rainfall station (BWDB)

2022 Monsoon flood in Haor area

JAXA ALOS2 image

Water Level at upstream of Haor region
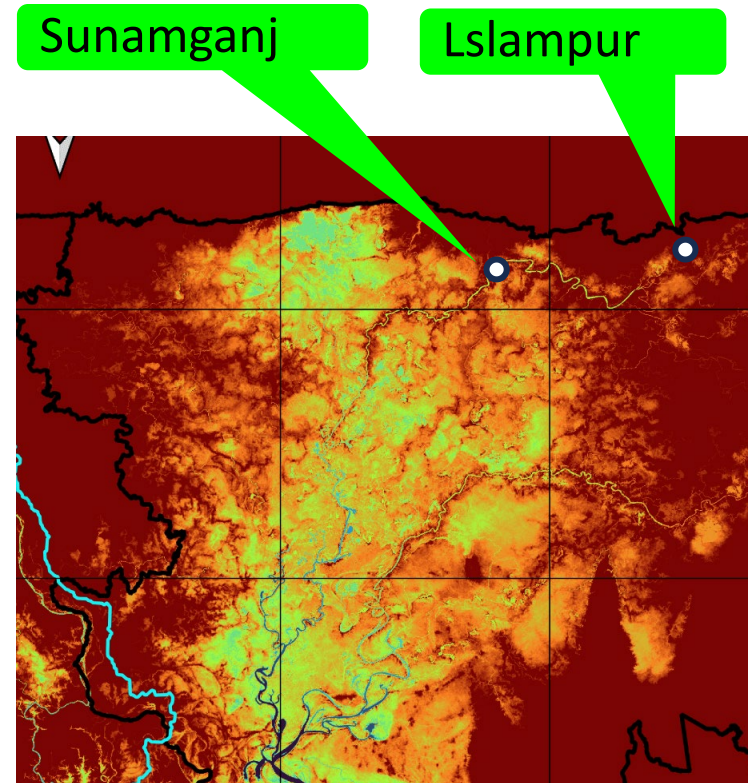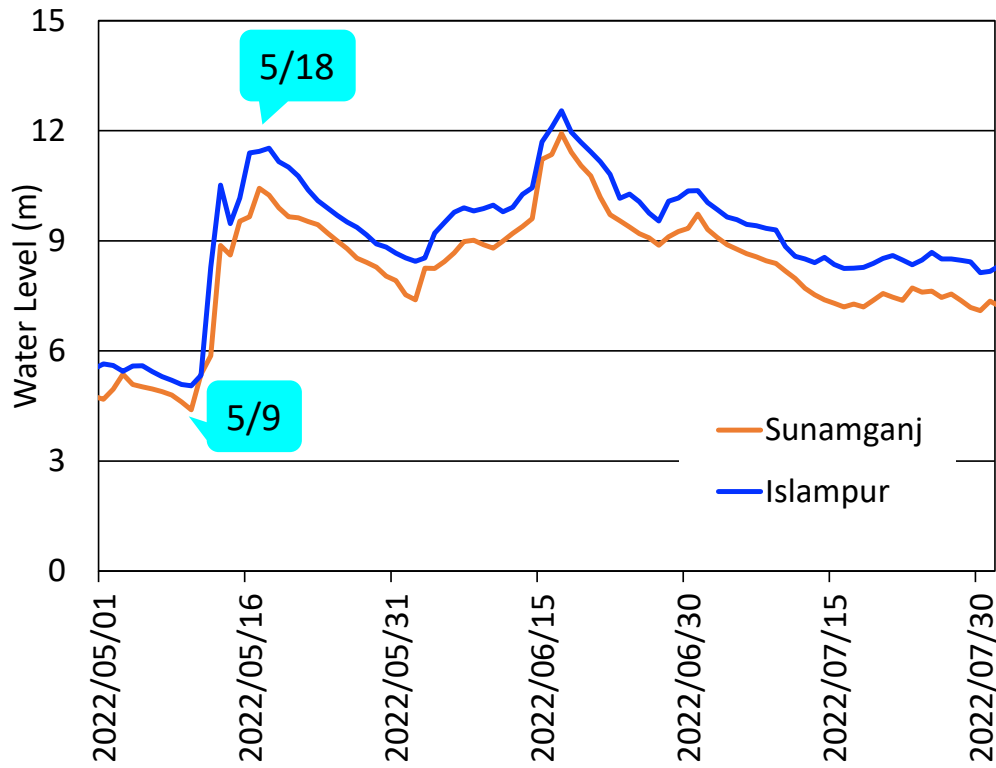
Daily rainfall (12 May 2022)

GSMaP NRT: 2022 05/12
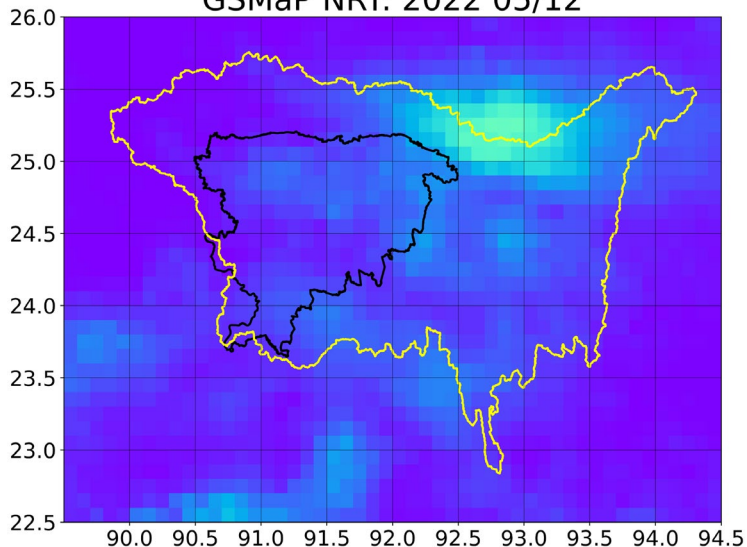
GSMaP IF2: 2022 05/12
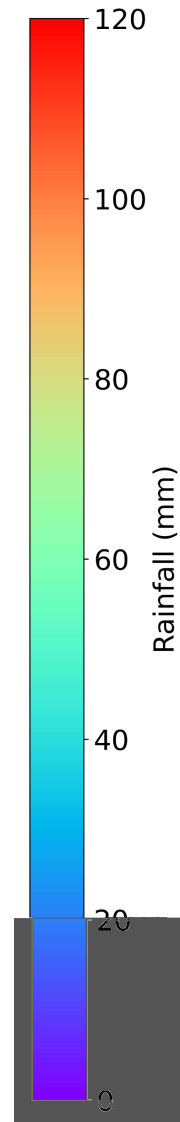
Corrected by ground rainfall
In Bangladesh

GSMaP IF4: 2022 05/12

Corrected by ground rainfall
In Bangladesh

Ground (BWDB + SOHMON): 2022 05/

Black: BWDB
White: SOHMON

Supported by Prof. Terao
of Kagawa Univ. Japan

Rainfall (mm)

"Data was provided by the Bangladesh /
Northeastern India Meteorological Data Archive from the web site at
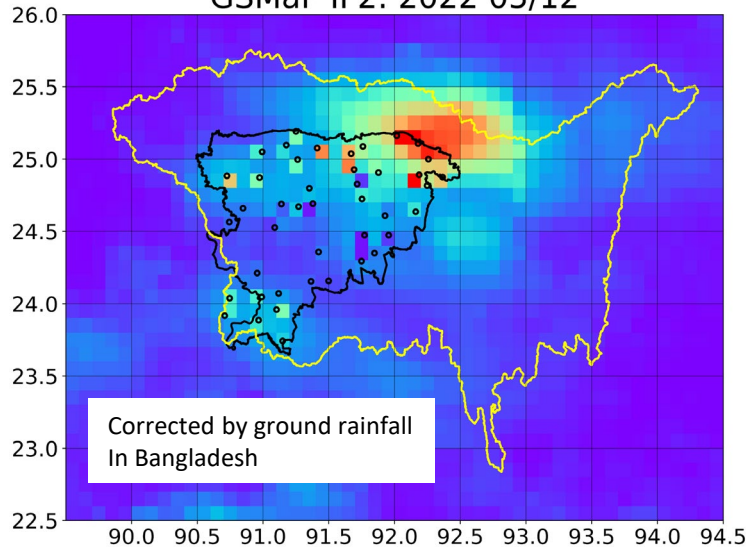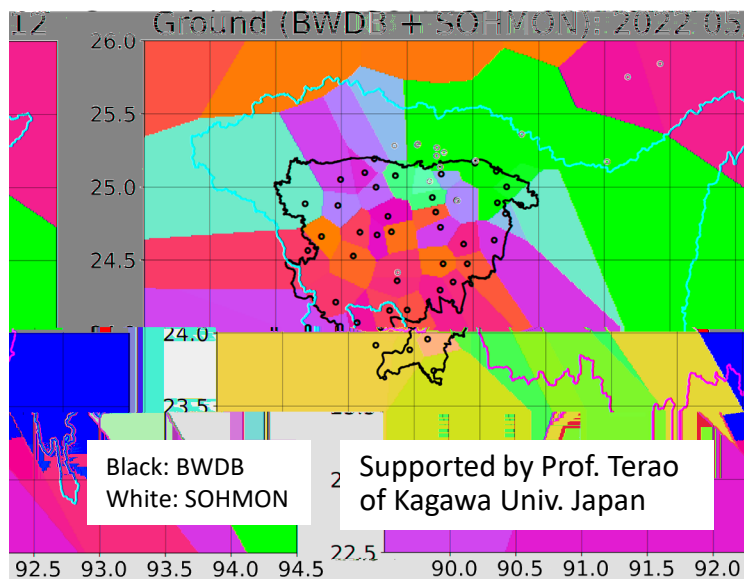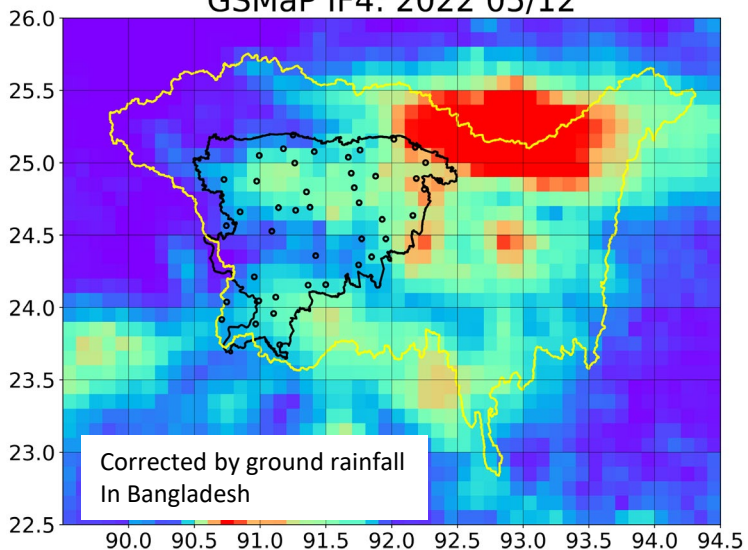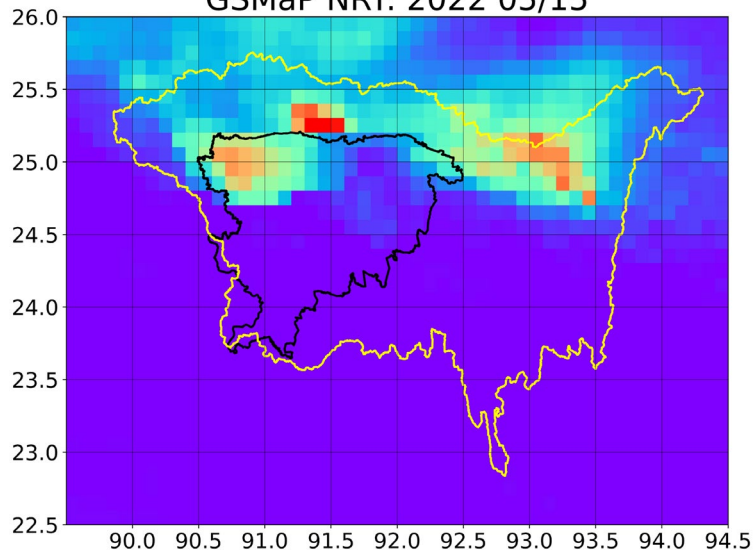http://rfweb.ed.kagawa-u.ac.jp/dav/gbm_jp/data/DATABASE/".

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Daily rainfall (15 May 2022)

GSMaP NRT: 2022 05/15

GSMaP IF2: 2022 05/15

Corrected by ground rainfall
In Bangladesh

GSMaP IF4: 2022 05/15

Corrected by ground rainfall
In Bangladesh

Ground (BWDB + SOHMON): 2022 05/15

Black: BWDB
White: SOHMON

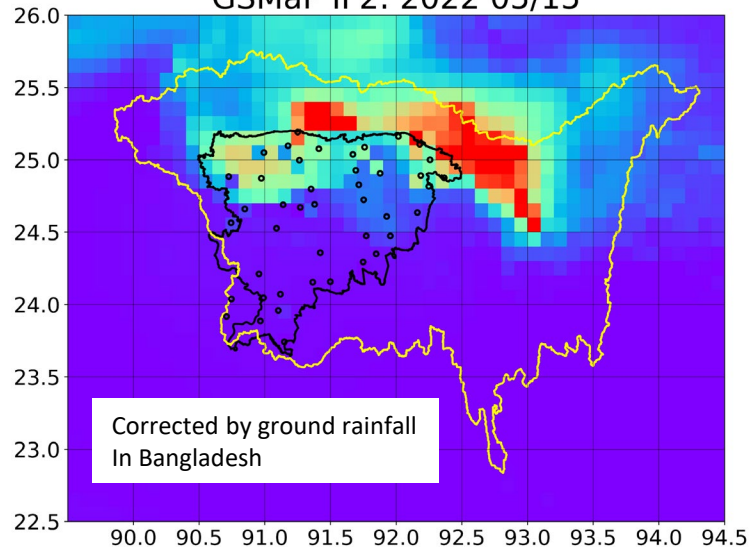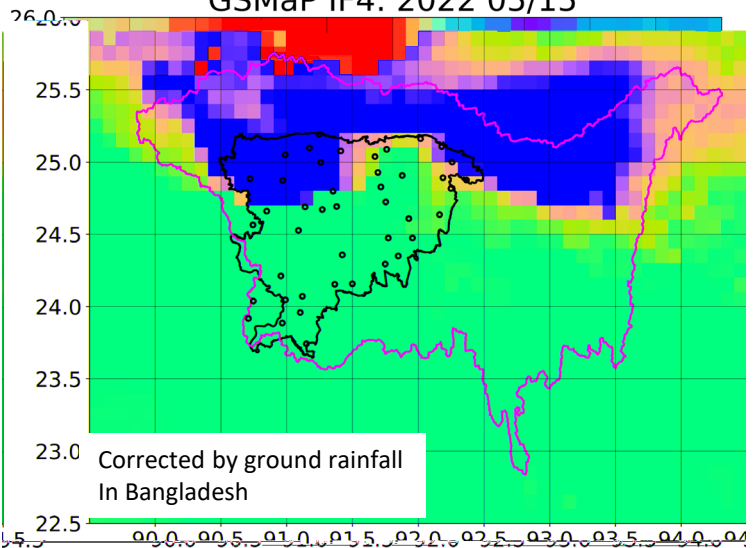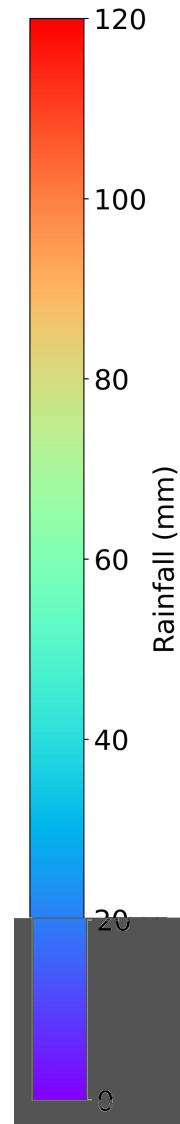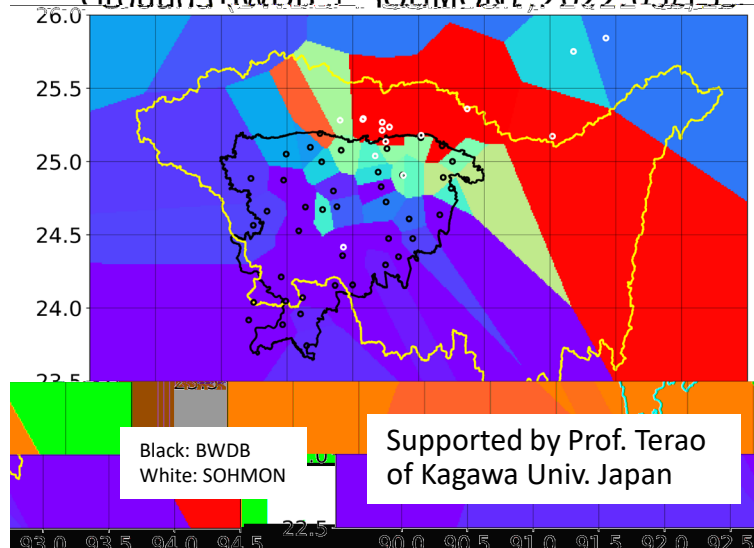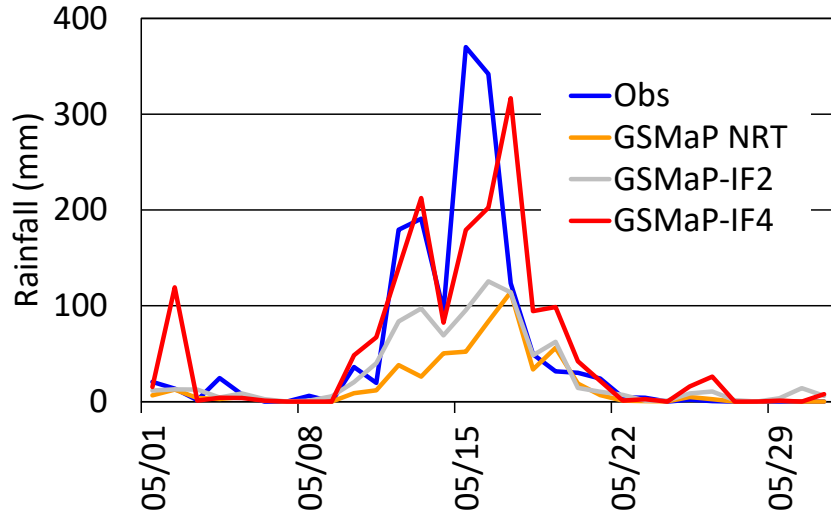Supported by Prof. Terao
of Kagawa Univ. Japan

Rainfall (mm)

"Data was provided by the Bangladesh /
Northeastern India Meteorological Data Archive from the web site at
http://rfweb.ed.kagawa-u.ac.jp/dav/gbm_jp/data/DATABASE/".

12

Comparison to observed rainfall outside observation network

Khliehriat

Cherrapunjee

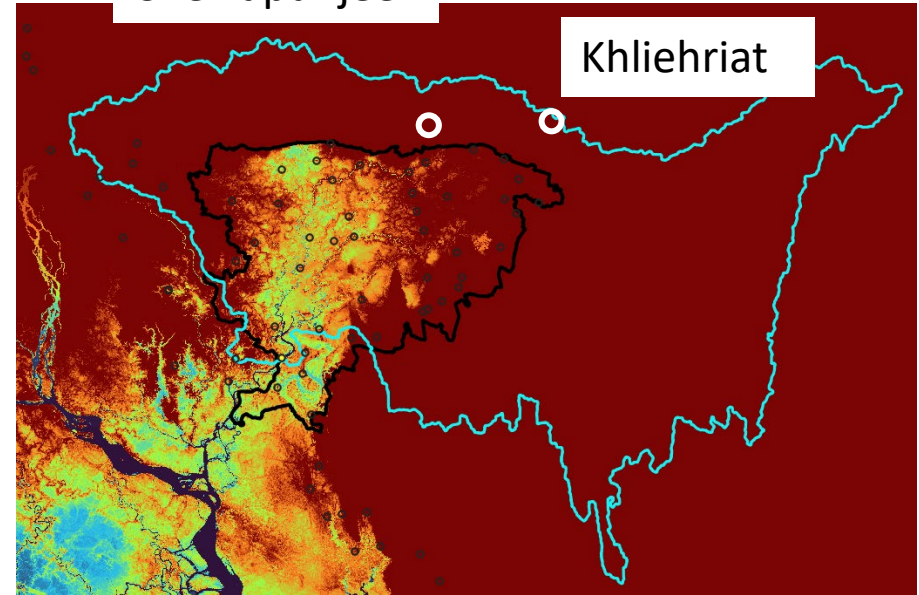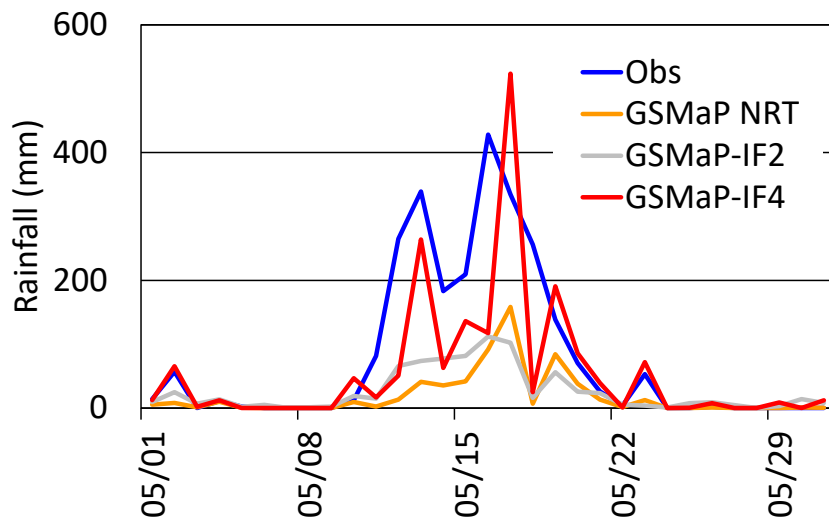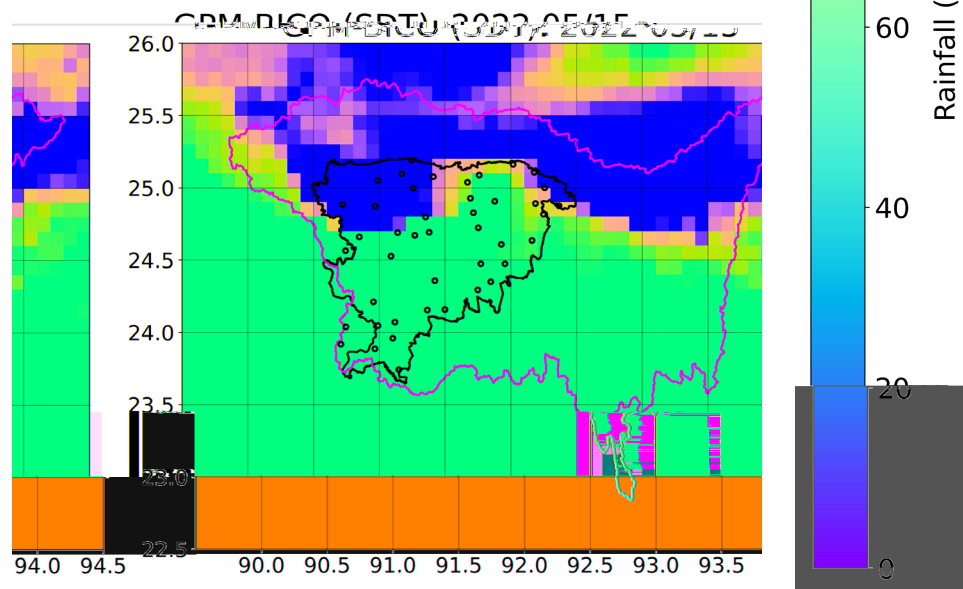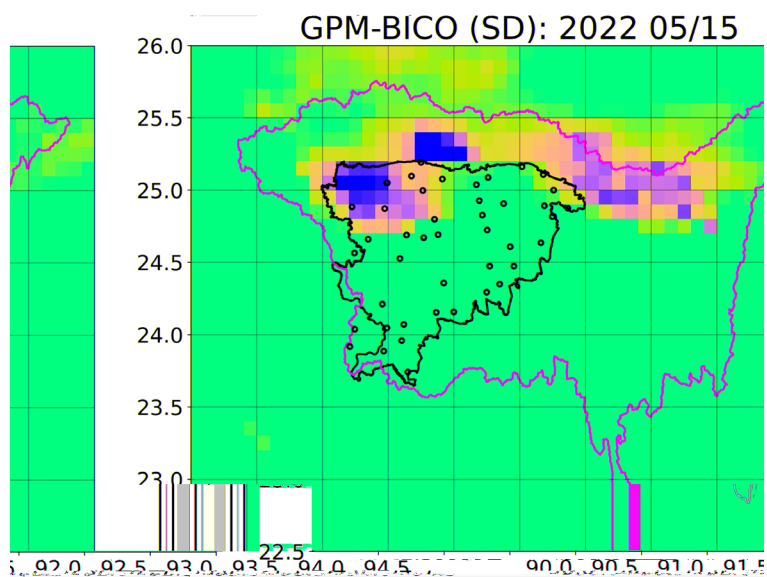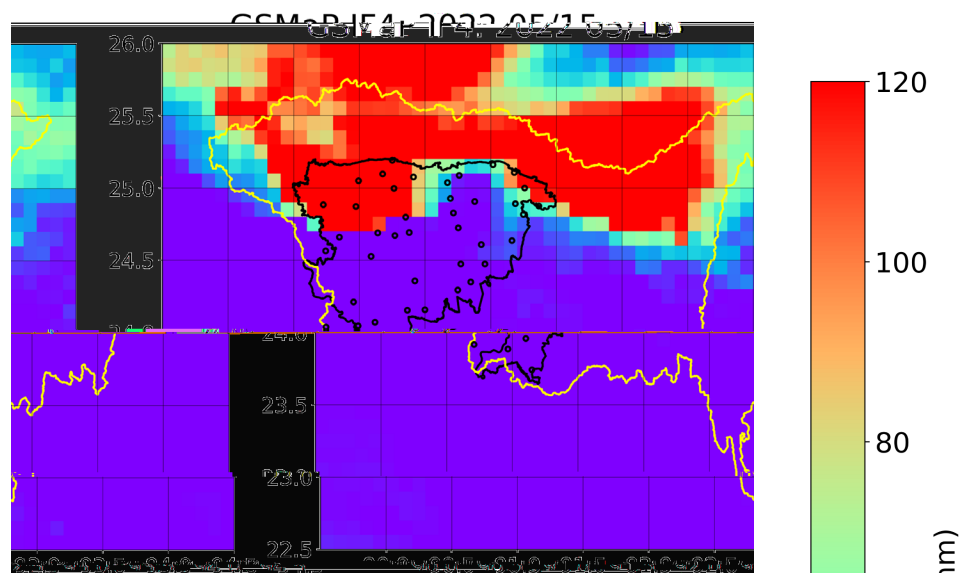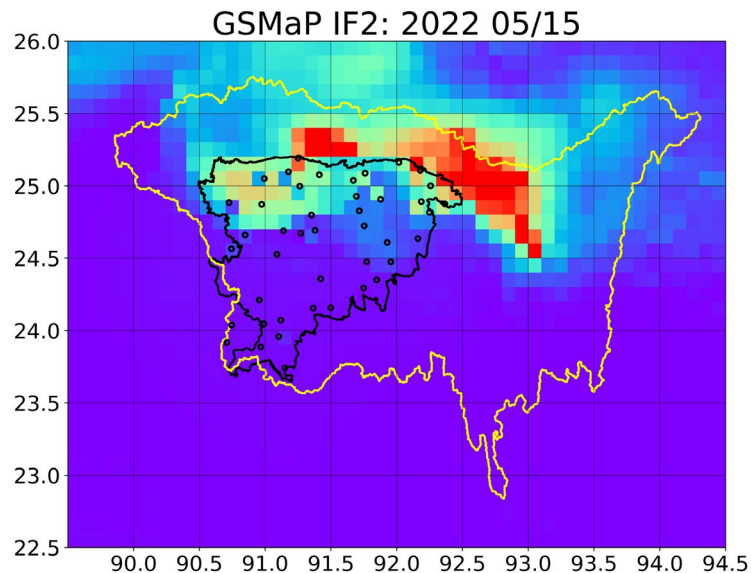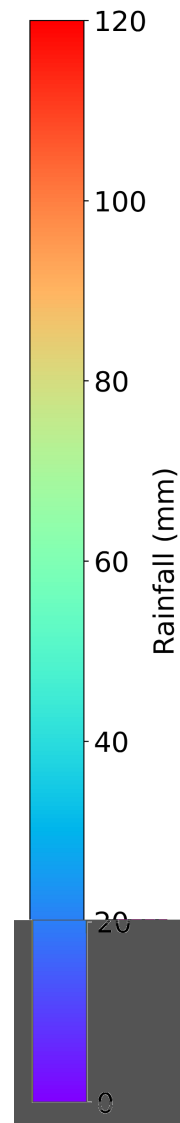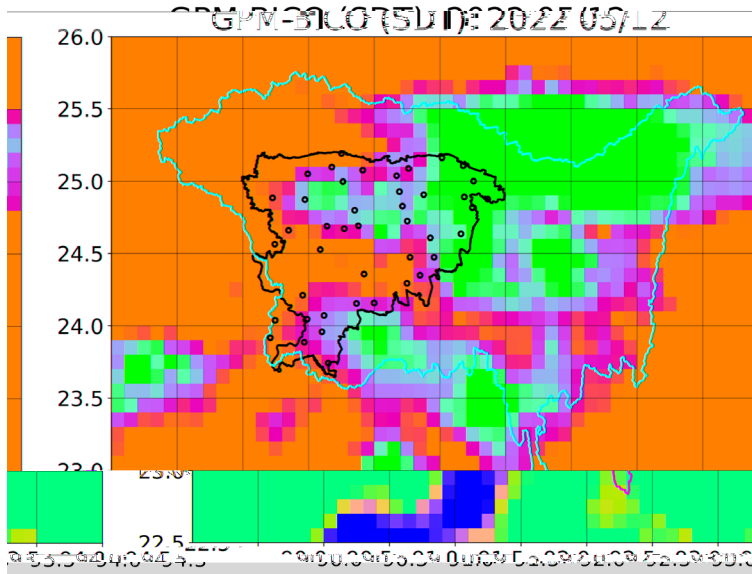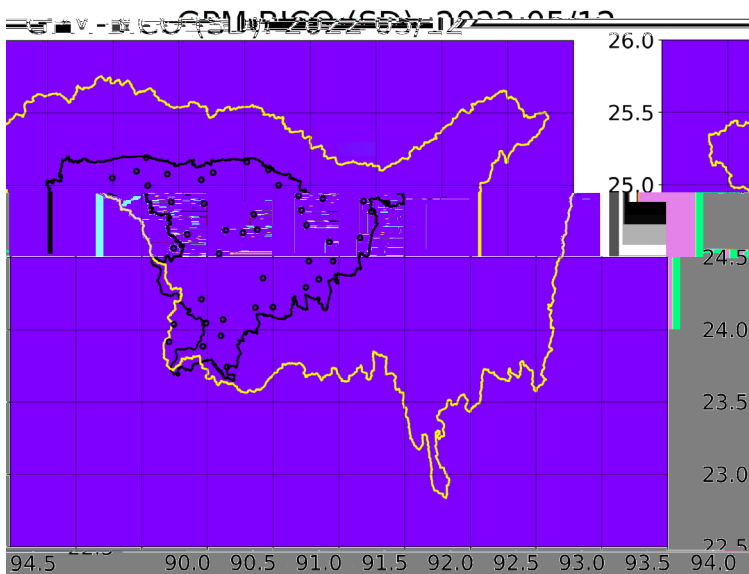Supported by Prof. Terao of Kagawa Univ. Japan

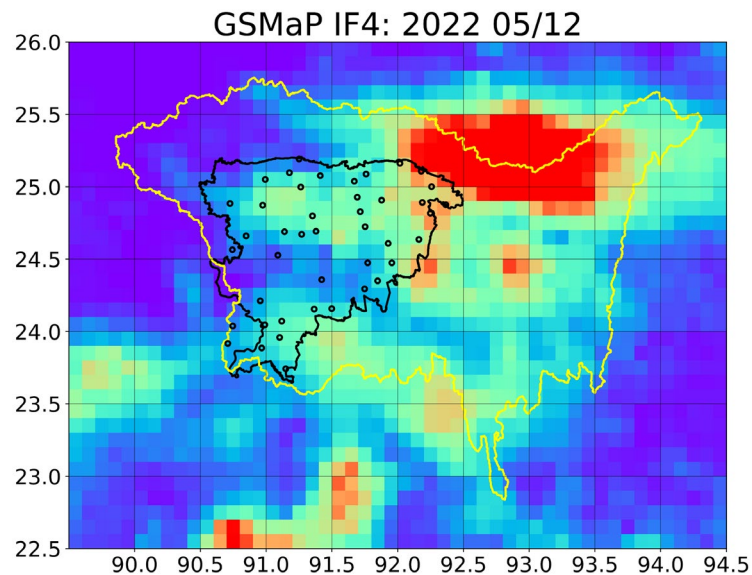"Data was provided by the Bangladesh / Northeastern India Meteorological Data Archive from the web site at http://rfweb.ed.kagawa-u.ac.jp/dav/gbm_jp/data/DATABASE/".

13

Comparison with GPM-BICO tool (15 May 2022)

GPM-BICO tool: Operationalization of bias-corrected satellite observations via GPM IMERG products in the Mekong River Commission (MRC) Riverine Flood Forecasting System (https://github.com/Servir-Mekong/GPM-BICO)

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Comparison with GPM-BICO tool (12 May 2022)

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Summary

- Rainfall information outside of observation network is important for flood management at transboundary basin

- GSMap-IF was developed by UNESCO Pakistan project funded by Jica's ODA. Copyright of the GSMaP-IF model program is jointly owned by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Japan Aerospace Exploration Agency (JAXA)

- GSMaP-IF provides several correction methods. Users need to consider which method is suitable for their target basin