



South Asia Flash Flood Guidance System Operational Training (Step-4) (New Delhi, India, 5-7 June 2018)

A Flash Flood Case Study- Bhutan

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Outline

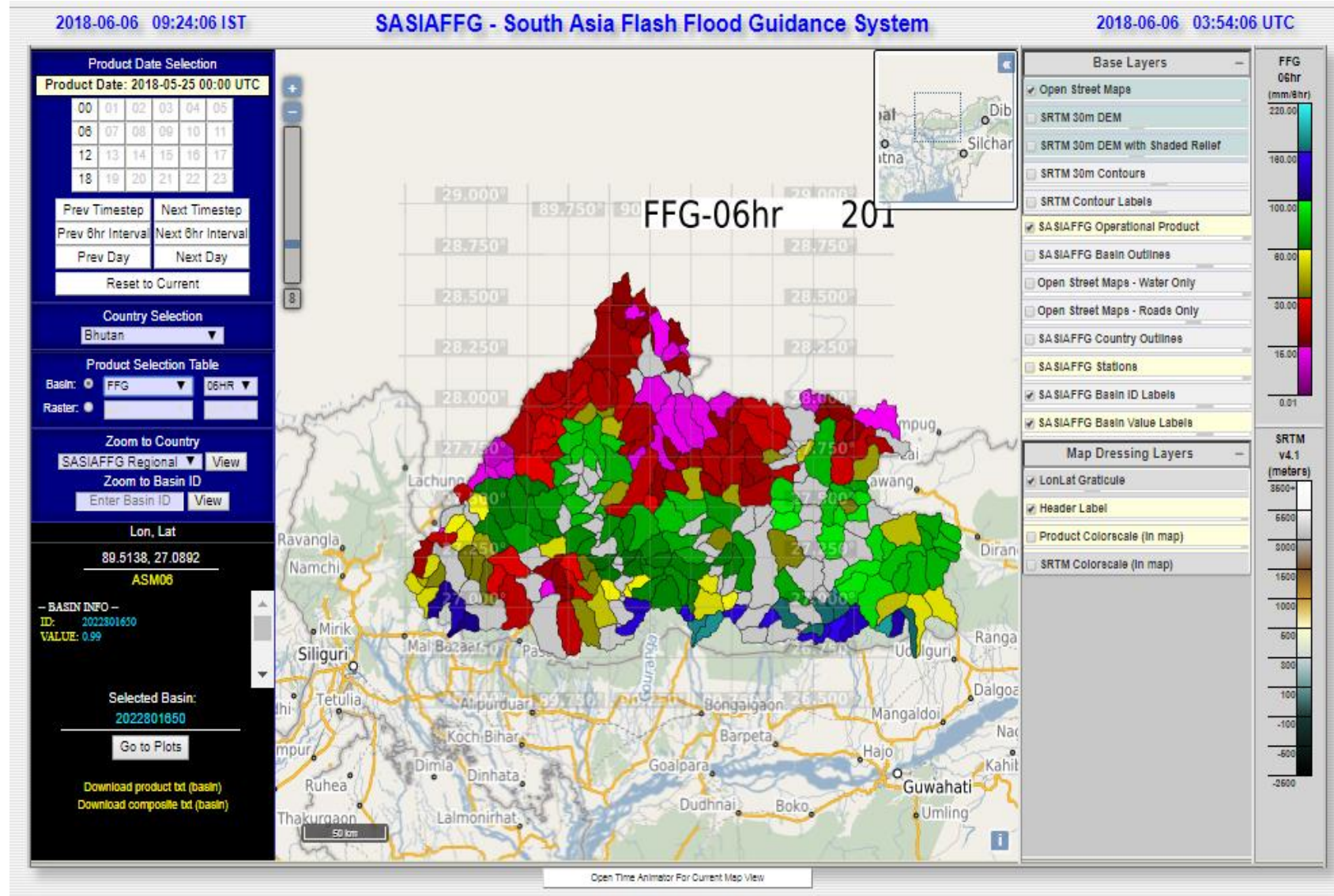
1. Flash Flood Case Study- (Phuntsholing/Chukha)
2. Flash Flood Case Study- (Samtse)
3. Verification of case study

Case study

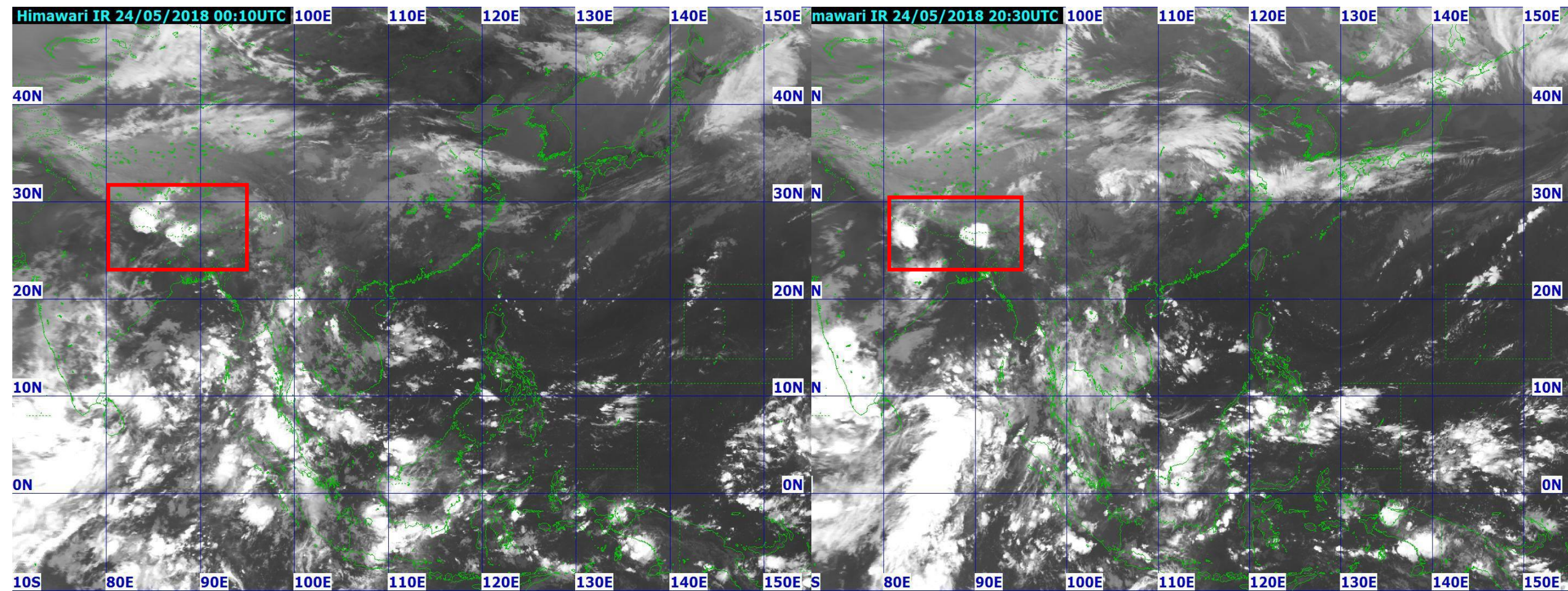
1. FFG system

2. Information:

- Observation
- WRF
- Satellite
- Global products...

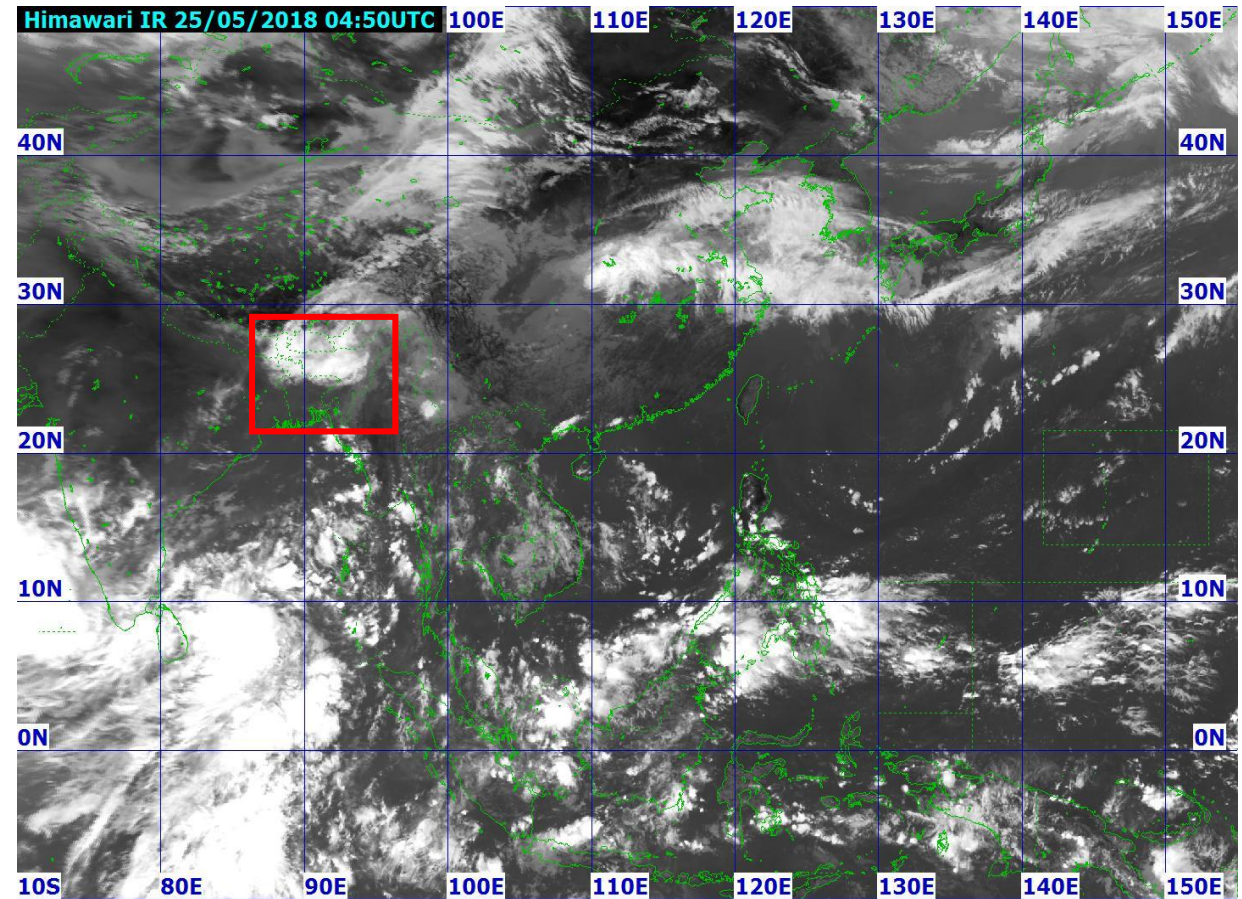
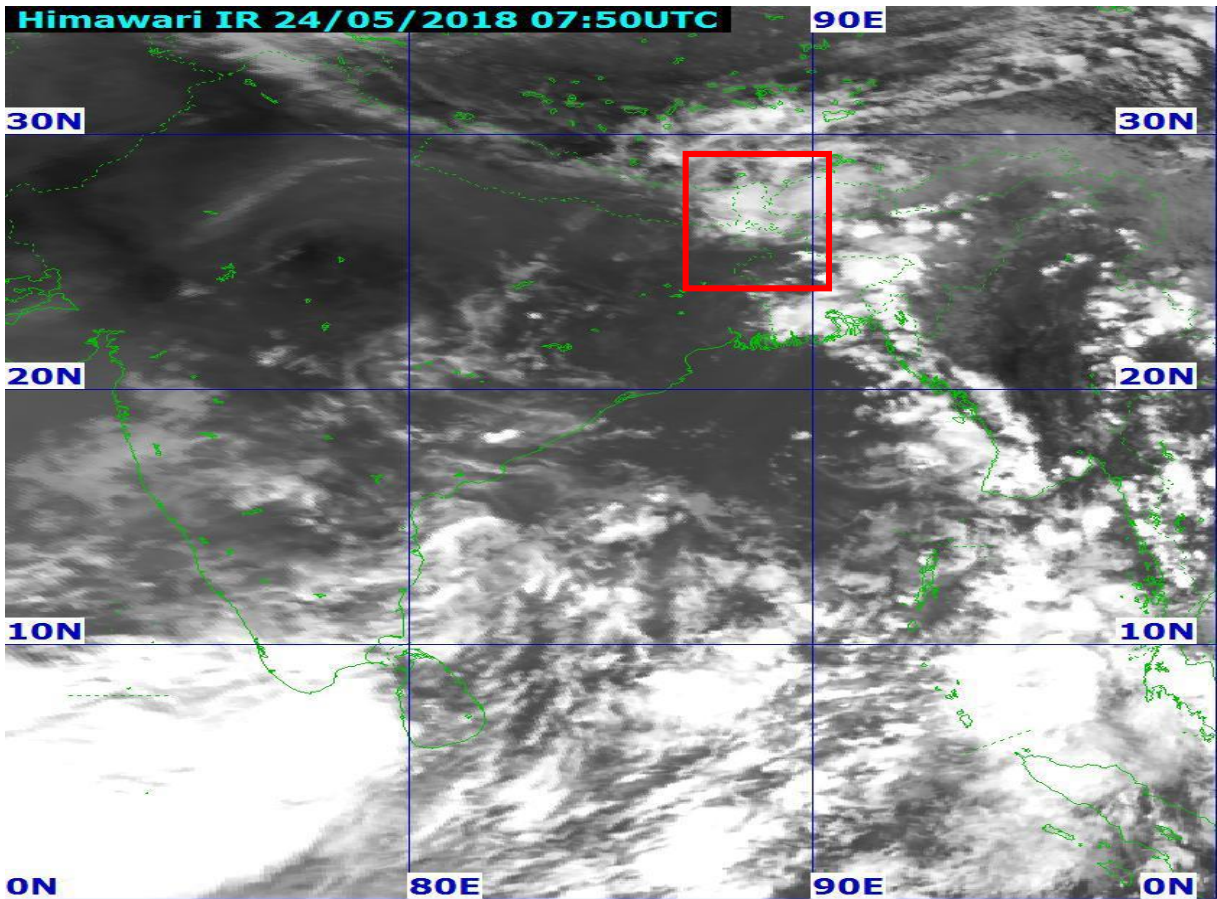


Hamawari-8/9 Satellite



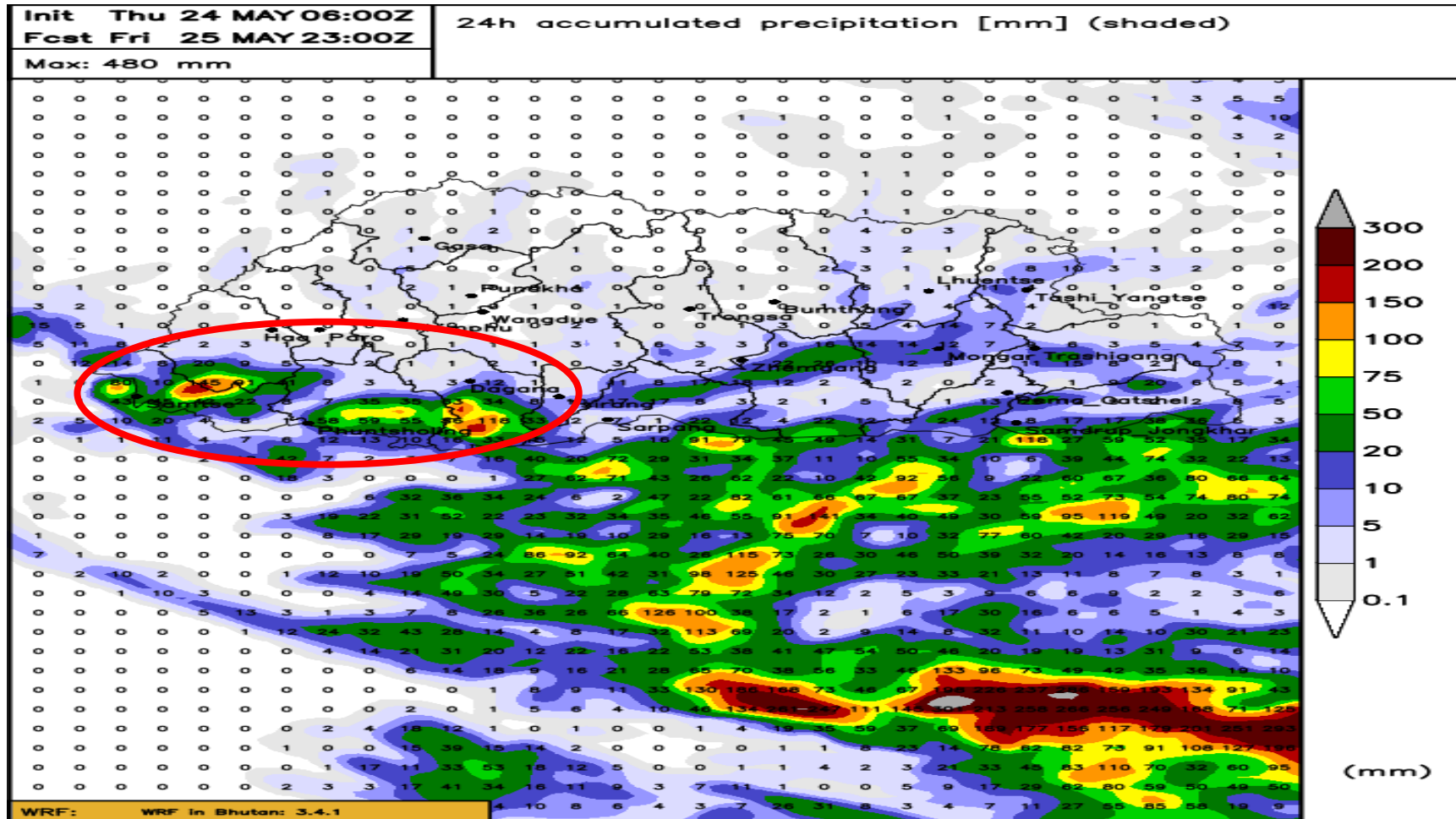
Slow movement of a system had caused more rainfall and Flash Flood (Samtse and Phuntsholing)

Hamawari-8/9 Satellite Images:24-25/05/2018



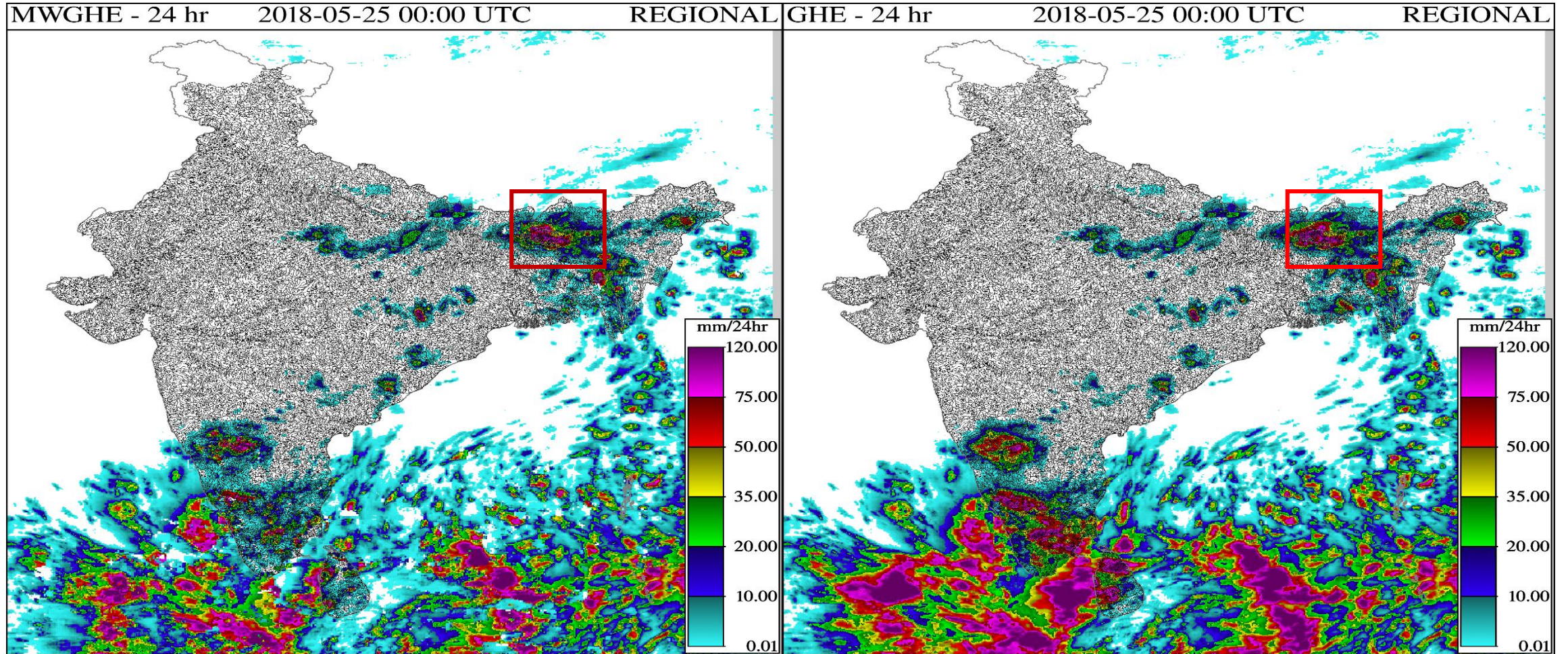
Slow movement of a system on 25th May 2018 had caused more rainfall and Flash Flood (Samtse and Phuntsholing)

WRF Model precipitation-24 to 25/5/2018

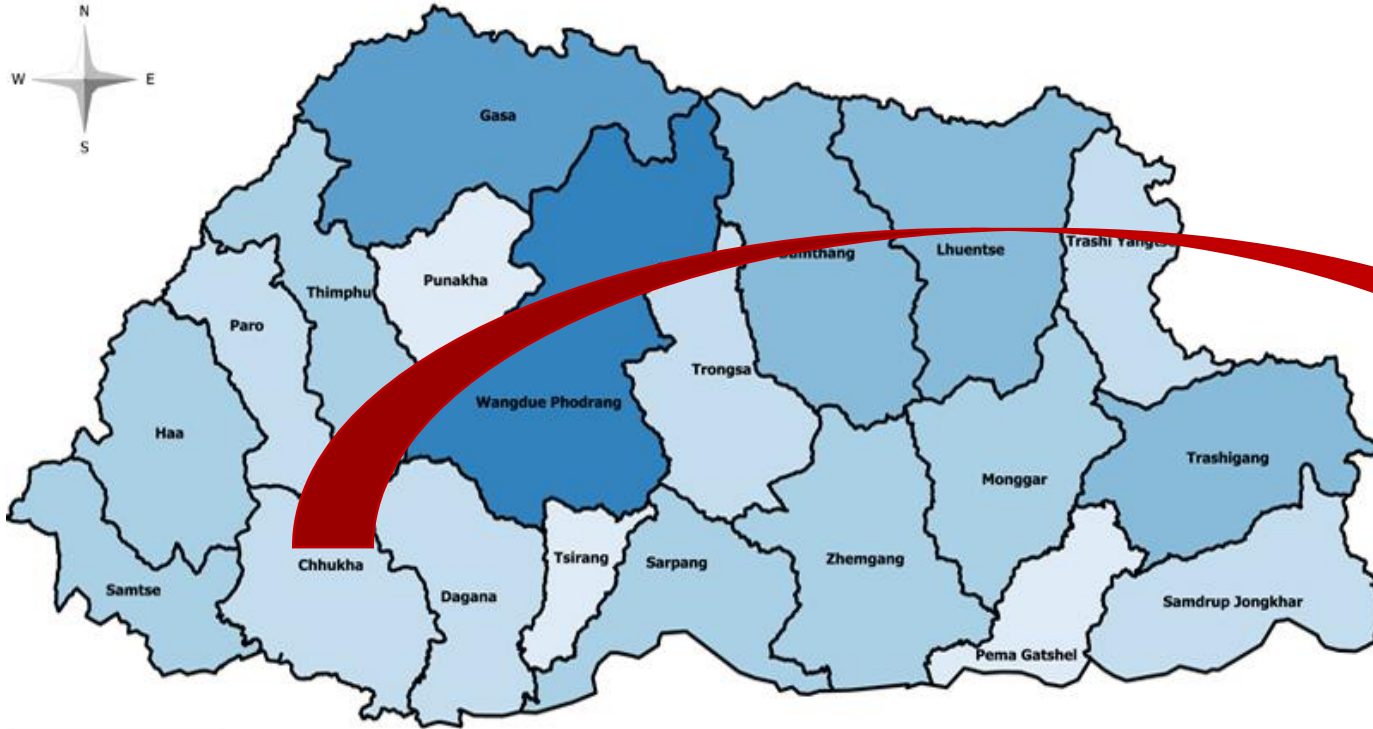


WRF showing good signature of more rainfall in southern: Samtse and Phuntsholing

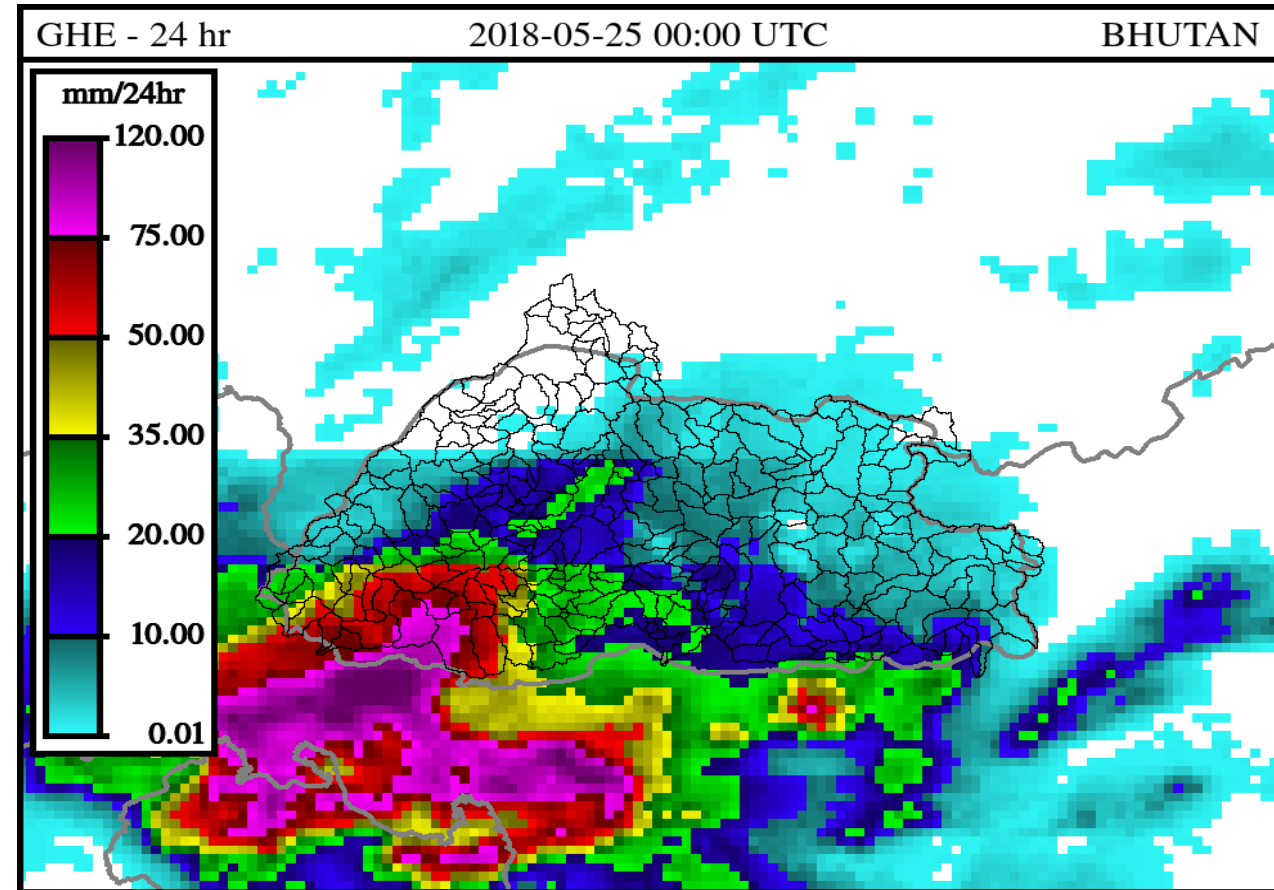
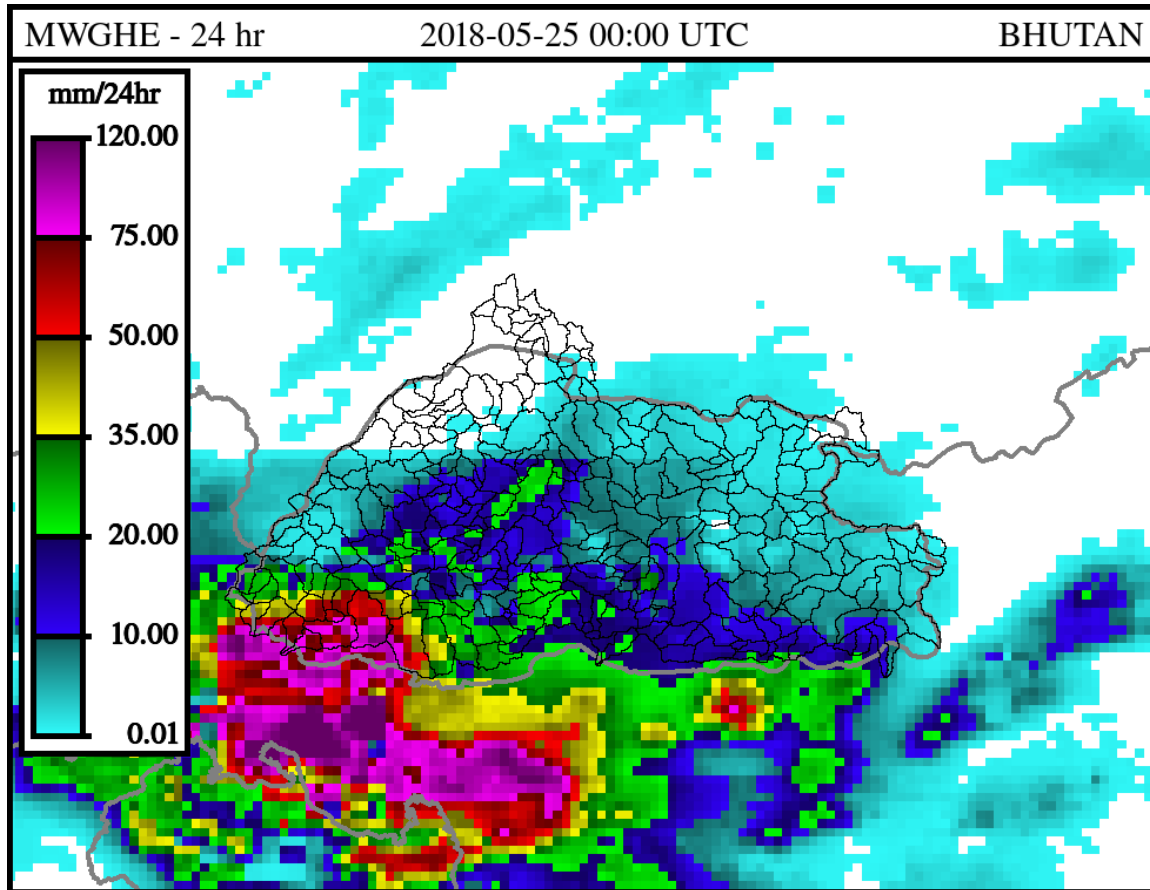
MWGHE and GHE Regional: 24-25/05/2018



Case Study- Phuntsholing- 24-25/05/2018

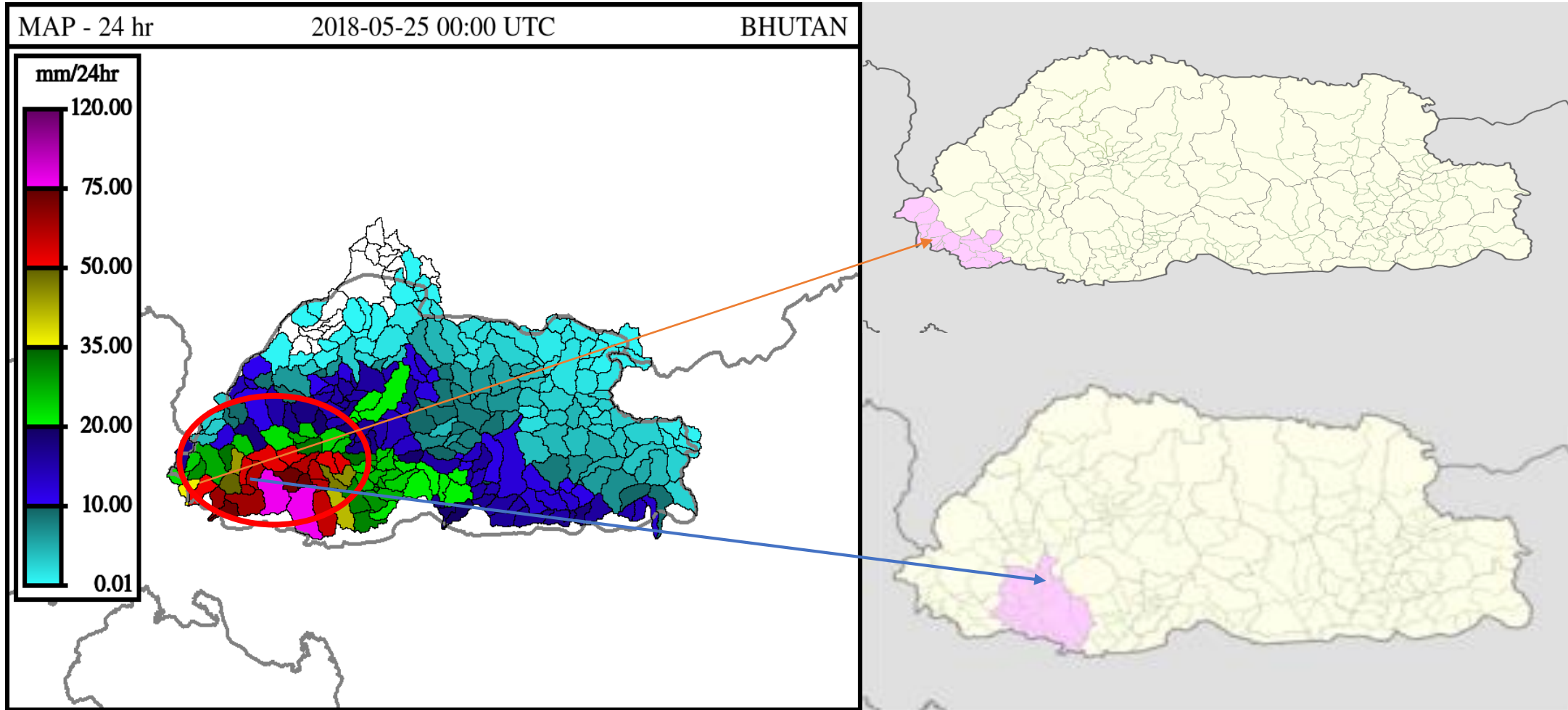


MWGHE and GHE- 24-25/05/2018

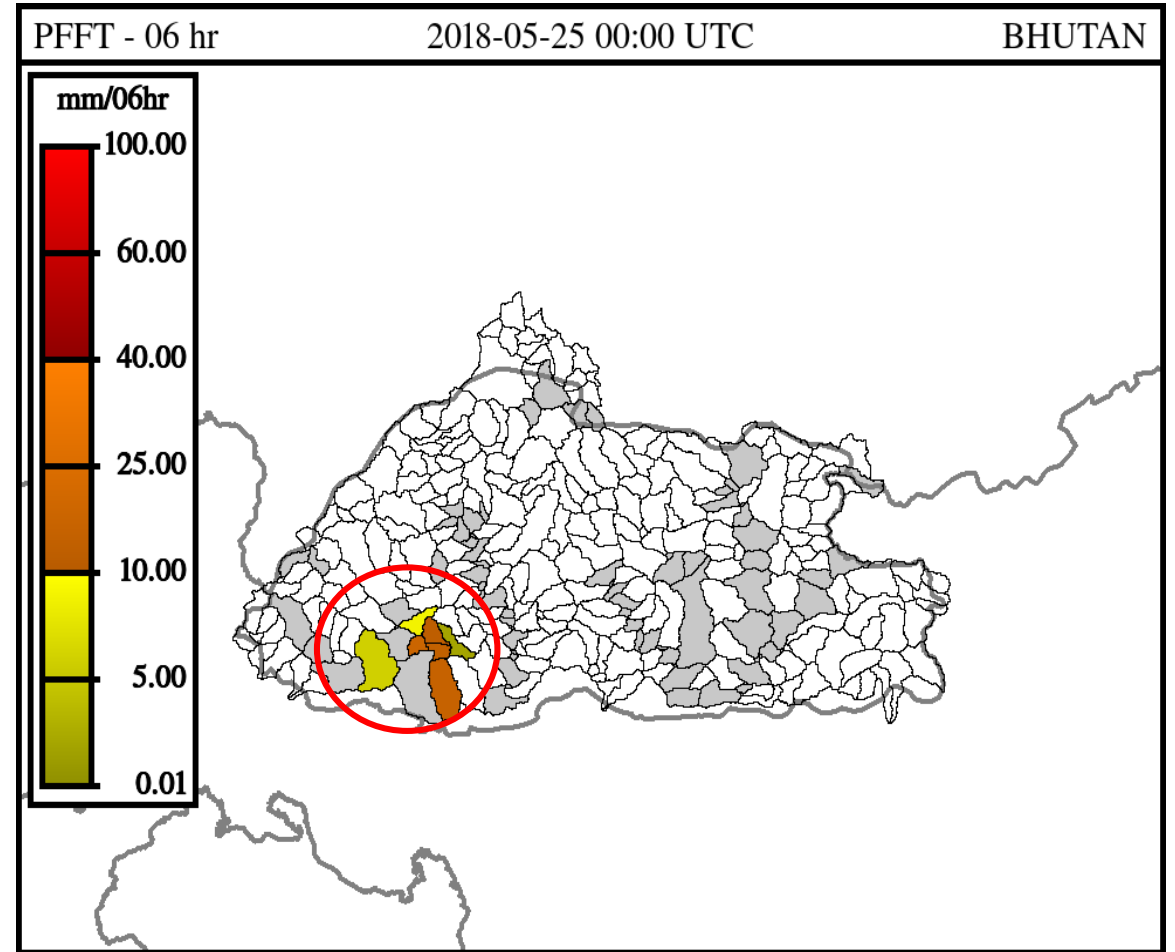
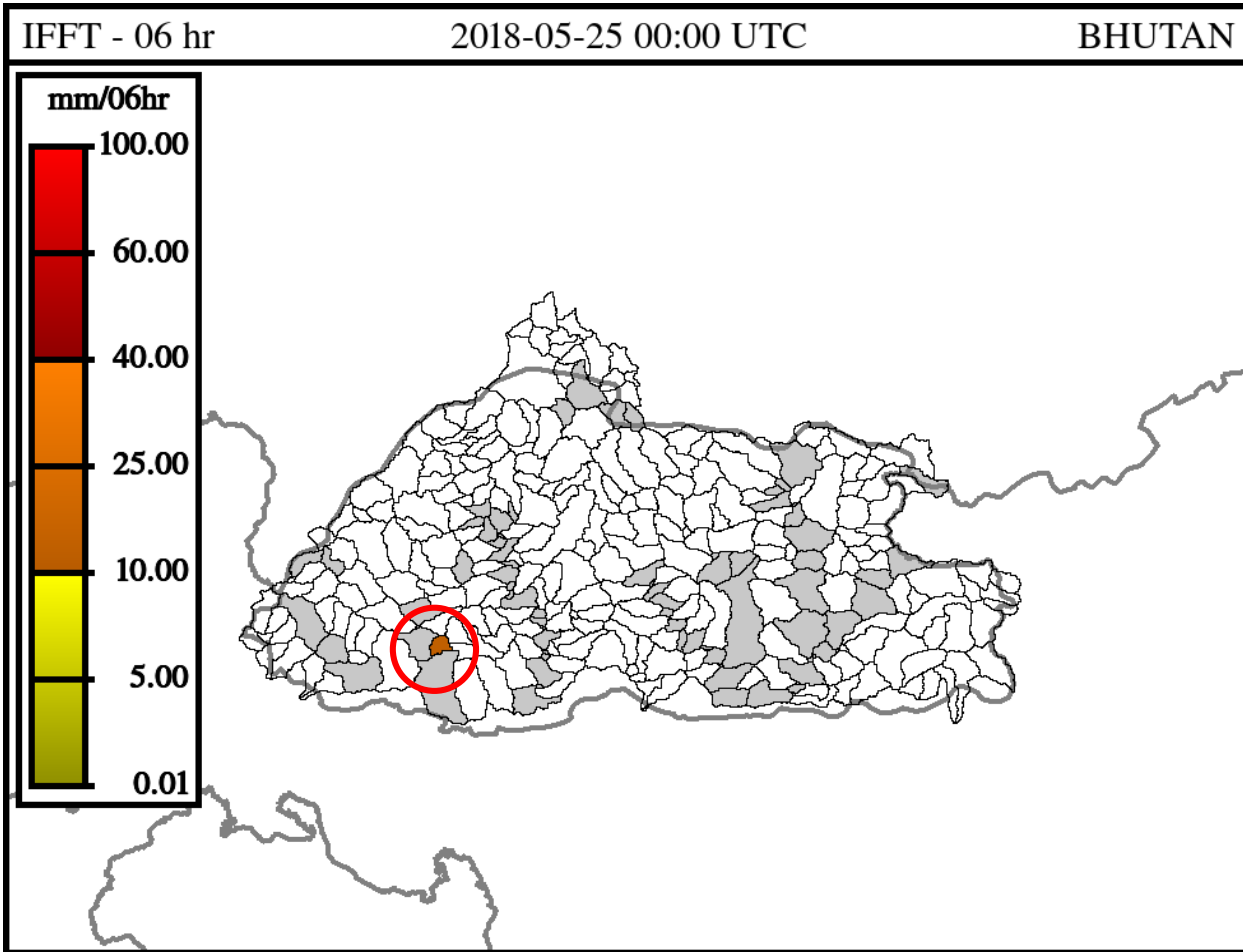


MWGHE and GHE showing more accumulation rain in southern (Samtse and Phuntsholing) parts of Bhutan

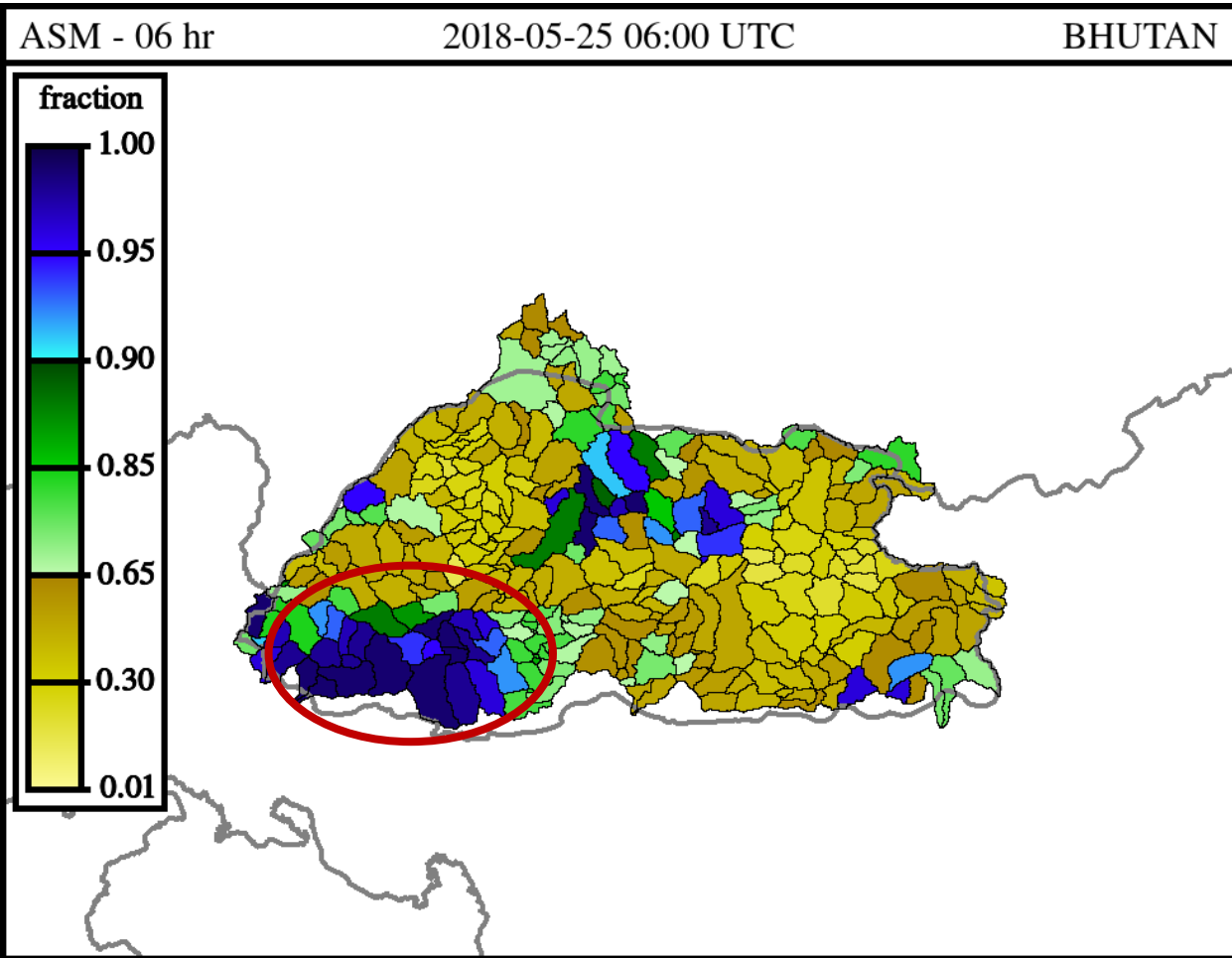
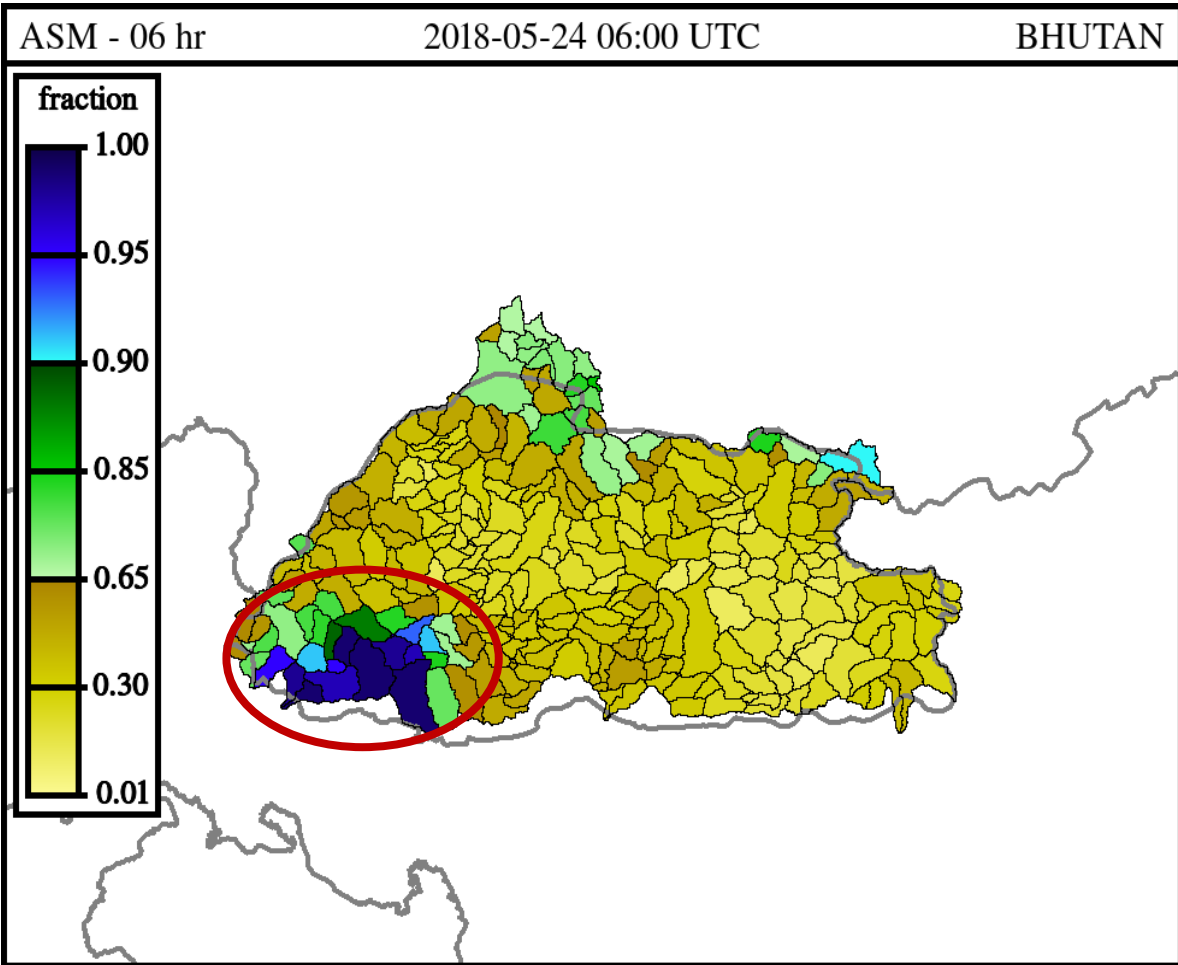
MAP for dated: 24-25/05/2018



IFFT and PFFT in southern parts of Bhutan



Average Soil Moisture (ASM): 24-25/05/2018



FFG-Gram plot demo - 1-hr, 3-hr, and 6-hr durations - Basin: 2022801650

Start: 2018-05-24 00:00 UTC End: 2018-05-25 00:00 UTC

Product Date: 2018-05-25 00:00:00 UTC

00 06 12 18

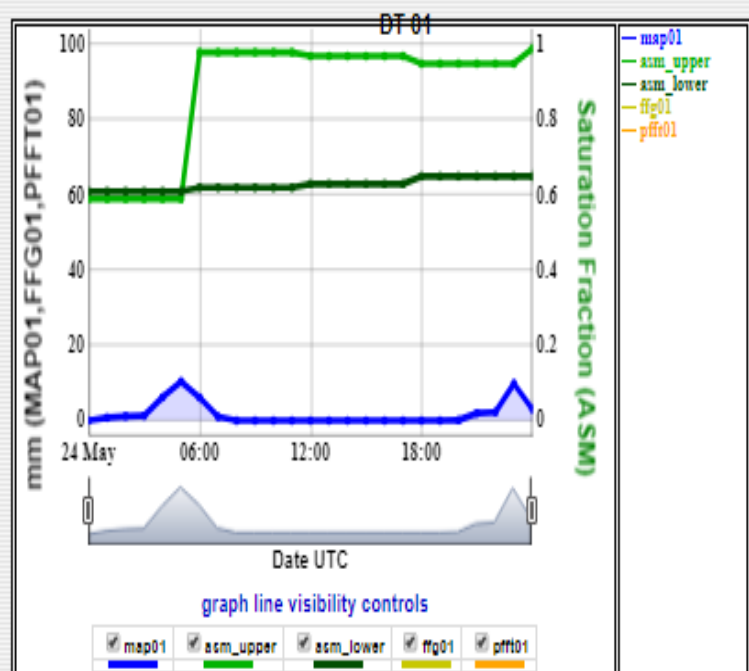
Prev 6hr Interval Next 6hr Interval

Prev Day Next Day

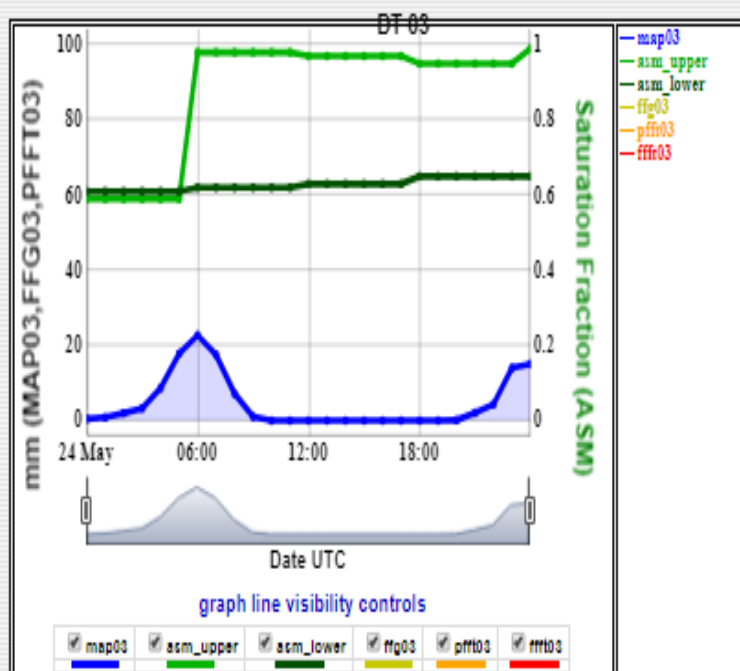
Reset to Current

Scope: 1 days

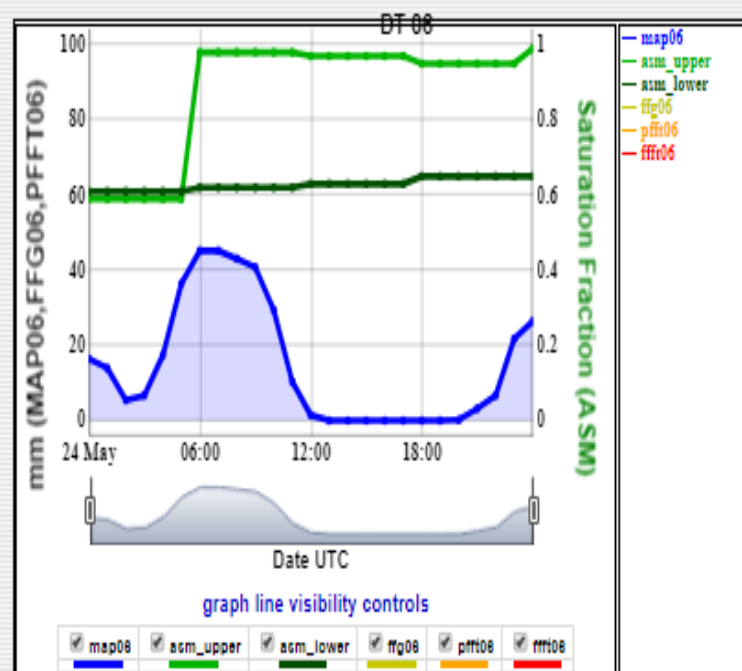
Basin ID: 2022801650



[Download timeseries](#)



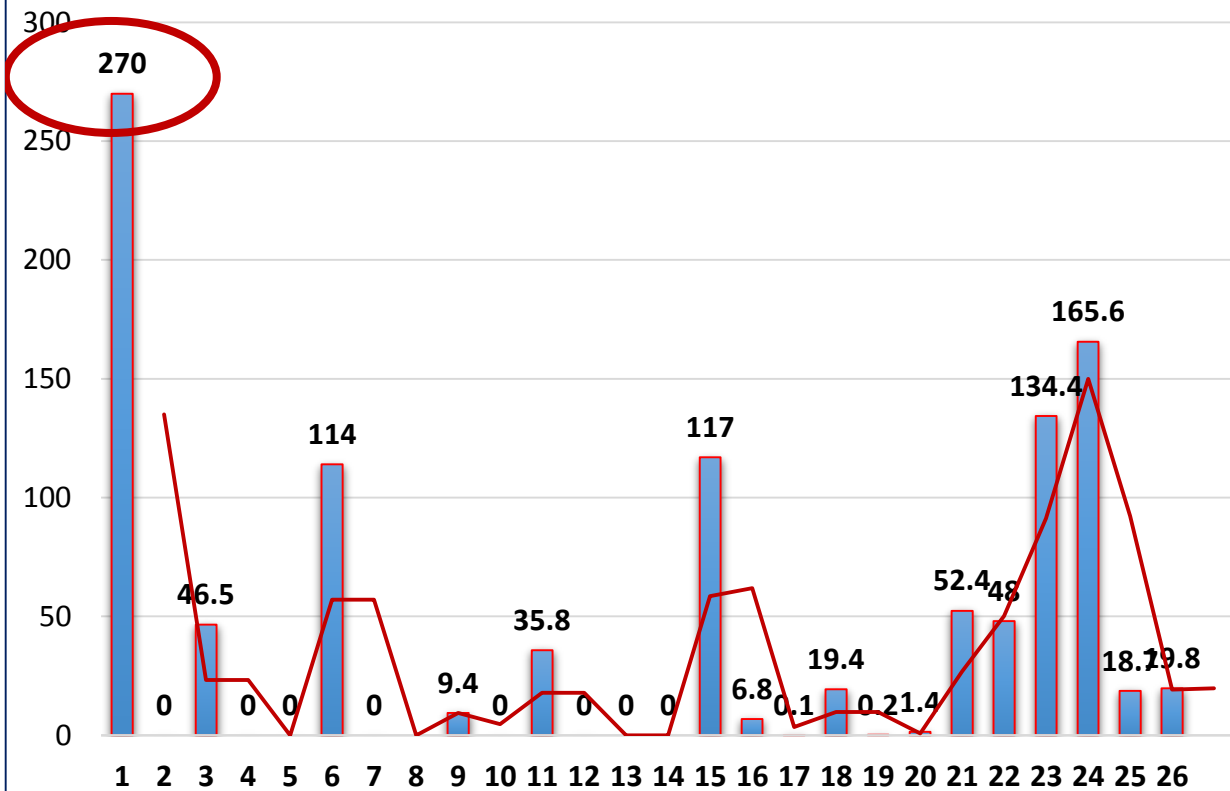
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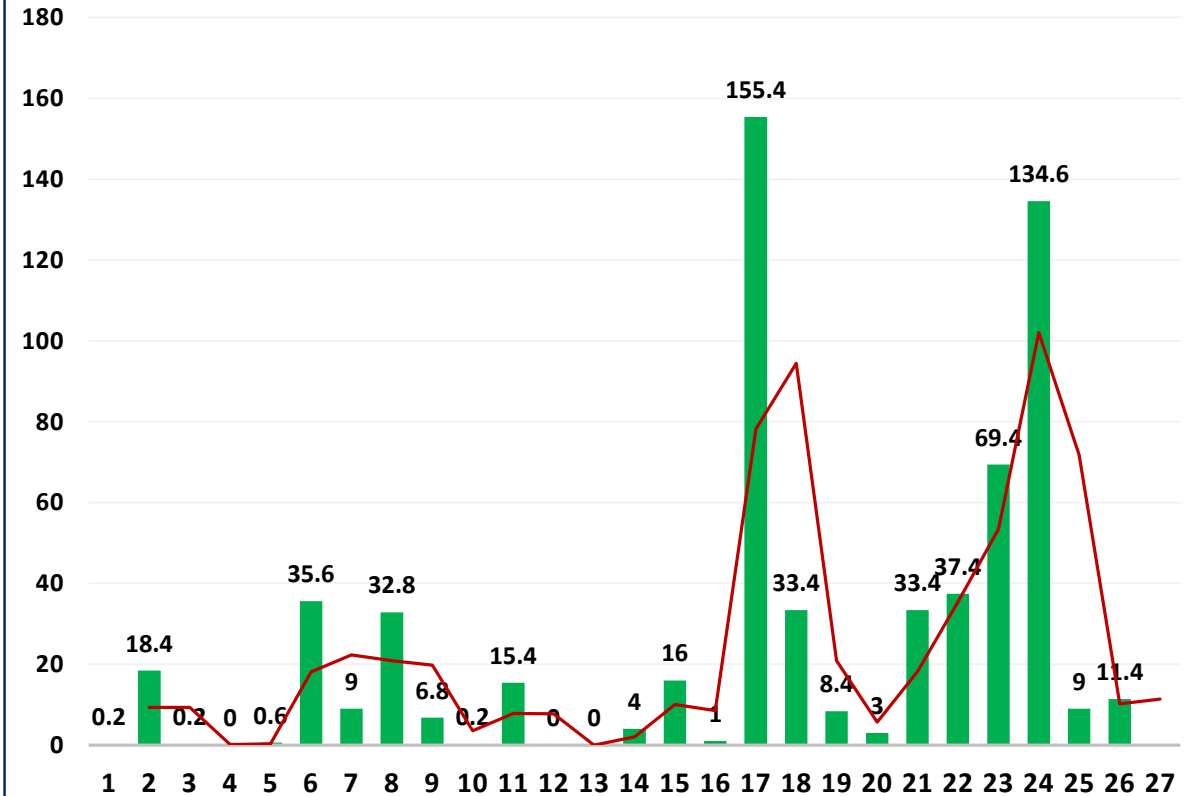
[Download timeseries](#)

Daily Rainfall for Phuntsholing and Samtse

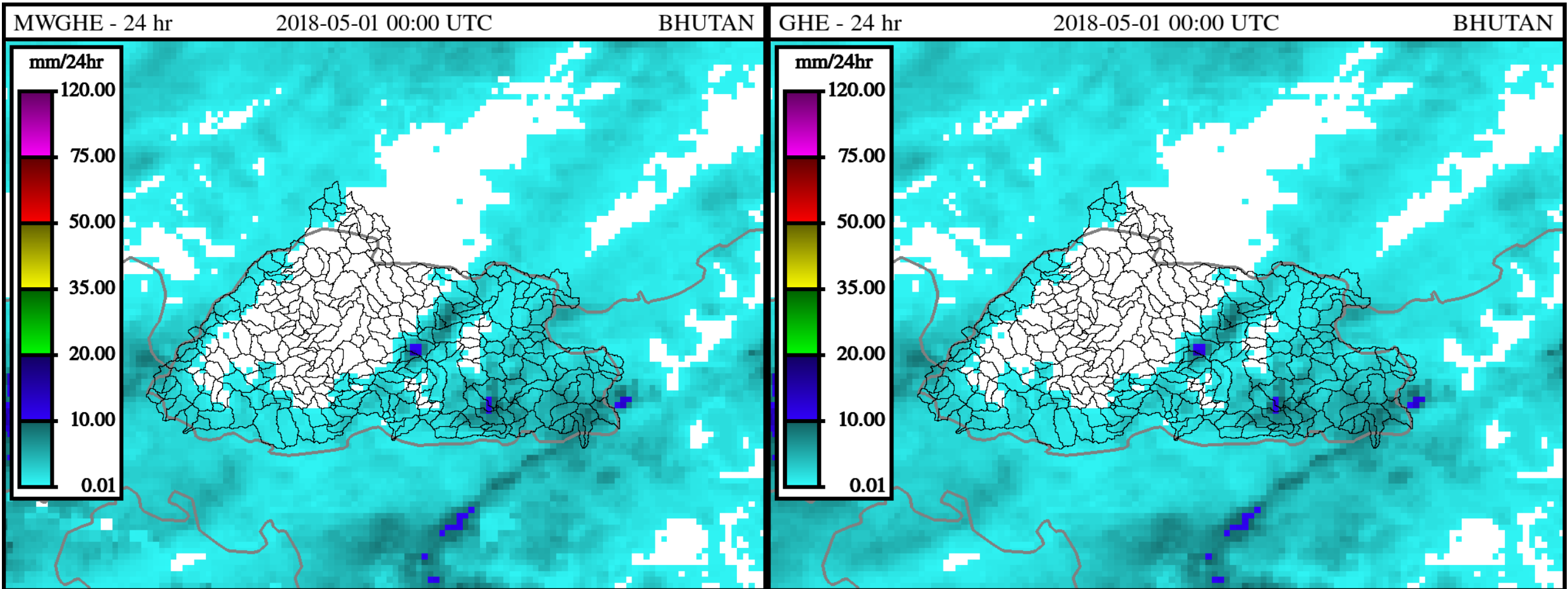
Daily recording of rain (mm) in P/ling: May 2018



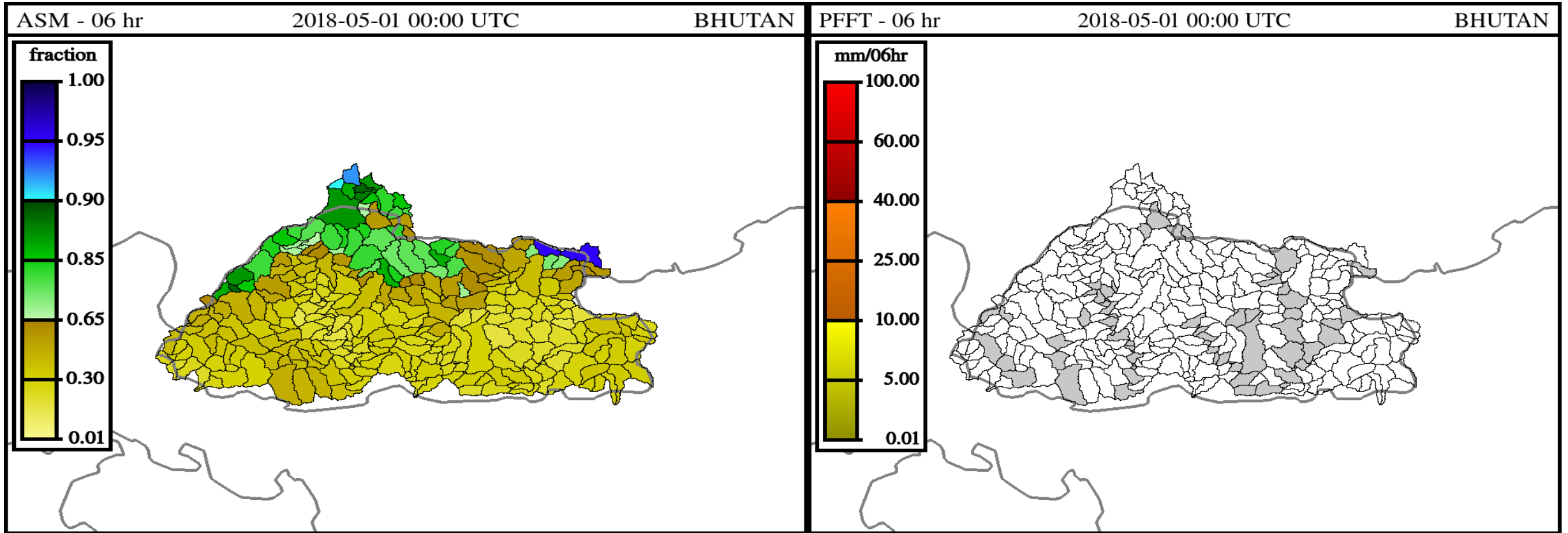
Daily recording of rain (mm) in Samtse: May 2018



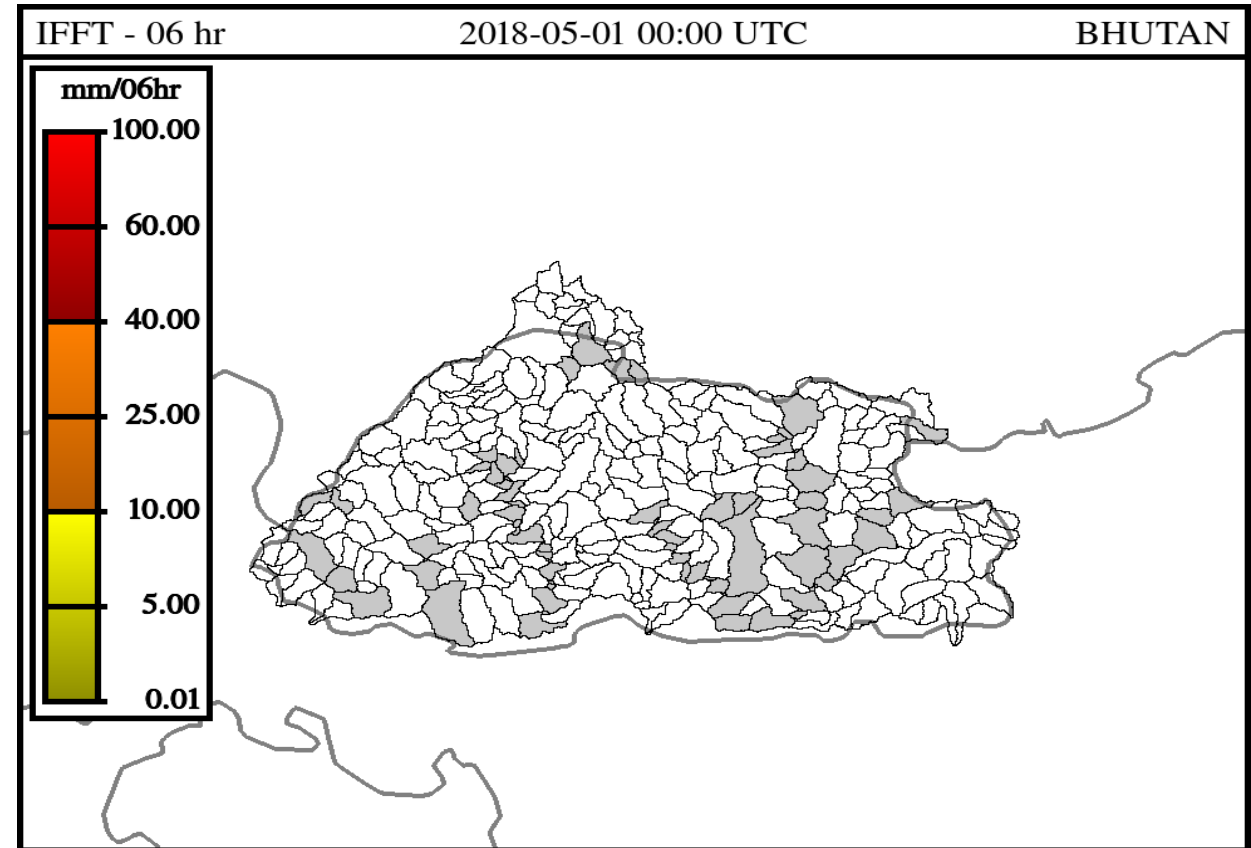
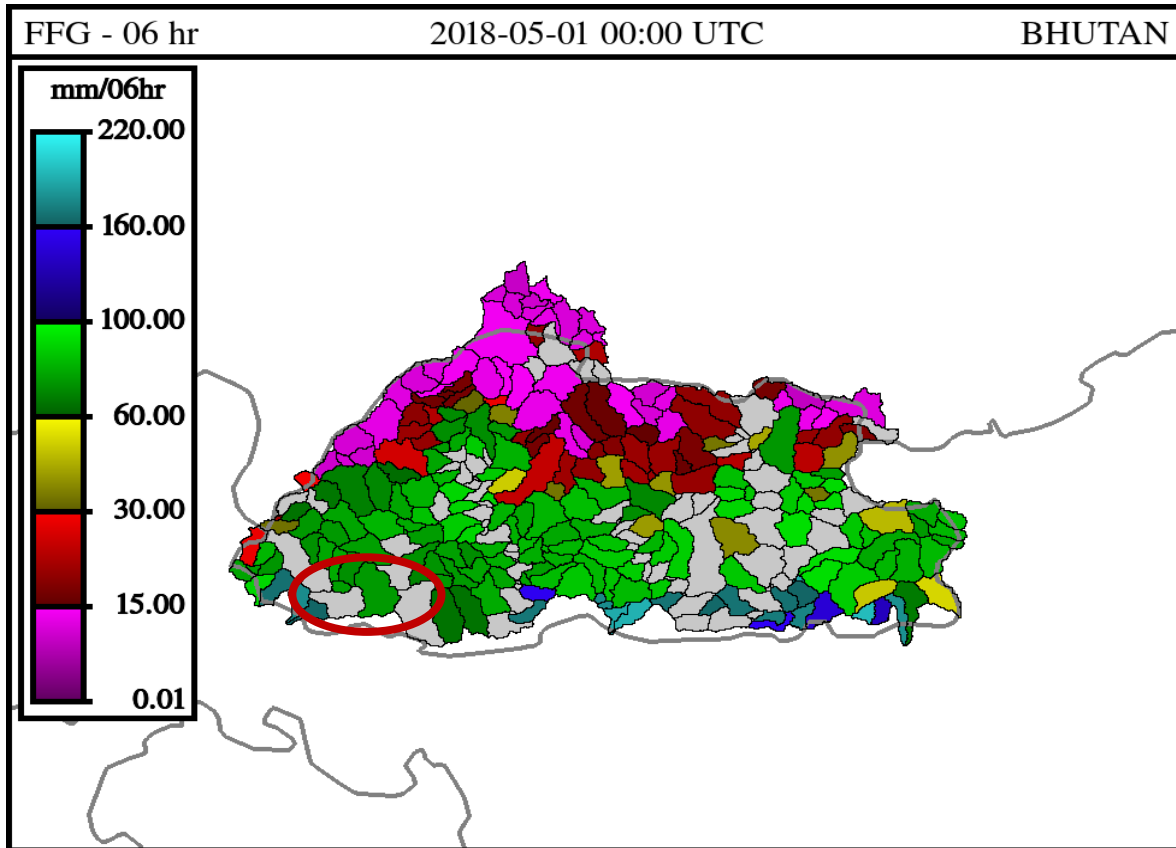
Case Study- 3 (01/05/2018)



ASM and PFFT- 01/05/2018



FFG and IFFT-01/05/2018



No Flash flood was reported that particular dated (01/05/2018) in Phuntsholing (FFG-60 to 100 mm) but actual rainfall recorded was 270 mm (24 hours)

FFG-Gram plot demo - 1-hr, 3-hr, and 6-hr durations - Basin:

Start: 2018-04-30 00:00 UTC End: 2018-05-01 00:00 UTC

Product Date: 2018-05-01 00:00 UTC

00 | 06 | 12 | 18

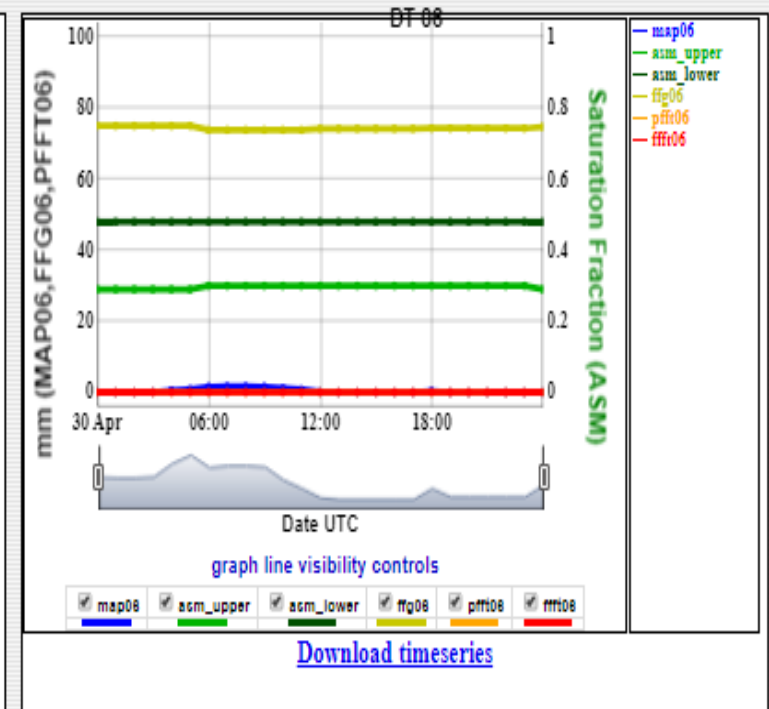
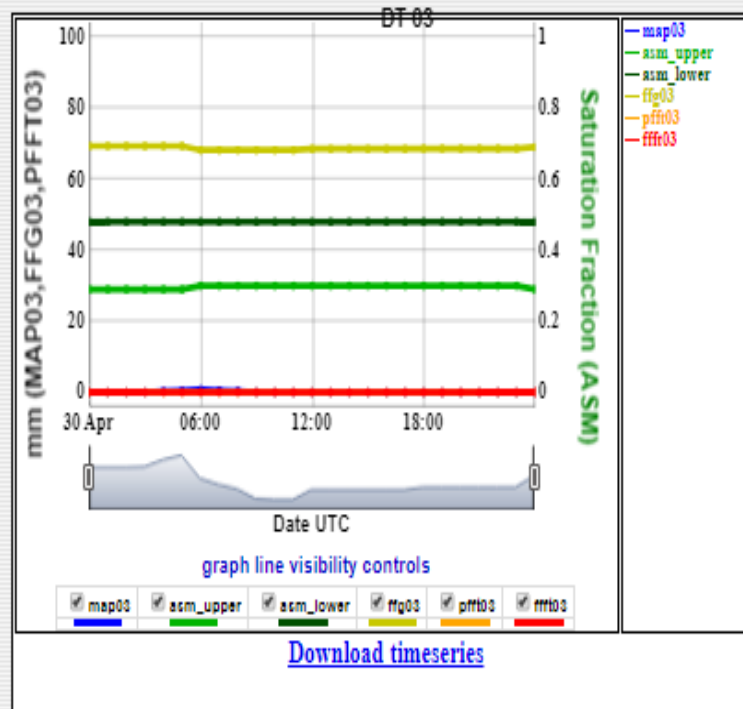
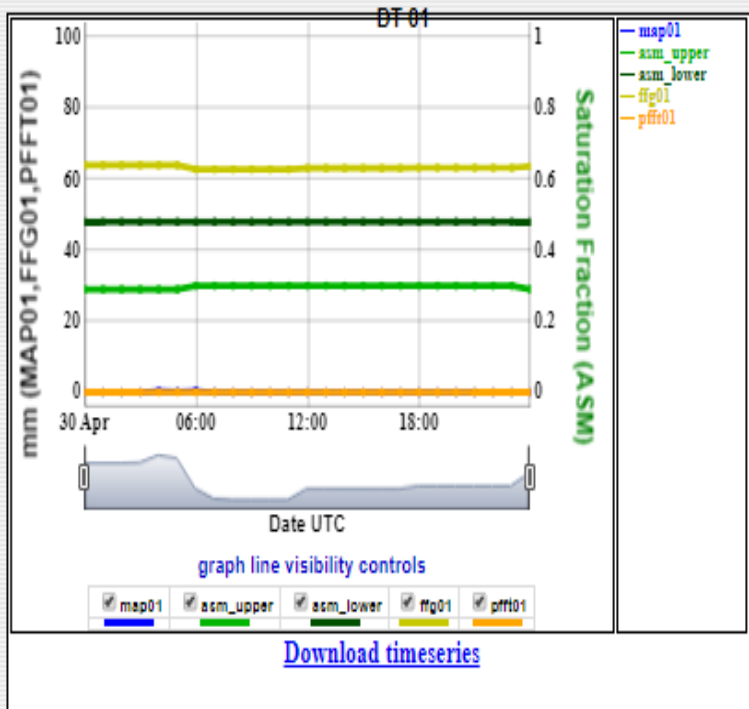
Prev 6hr Interval | Next 6hr Interval

Prev Day | Next Day

Reset to Current

Scope: 1 days

Basin ID: 2022801528



Conclusion- Case study

1. FFG is showing flash flood possibility on date 24-25 in Phuntsholing.
2. It was found when there is continue rainfall then only showing in FFG
3. On dated 1st and 17th May, there was no warnings are shown in FFG. Therefore, reason are not clearly known???
4. It was found both MWGHE and GH is performing well as showing good signature of the systems.
5. It was found during dated 1st and 17th there was more rain but FFG (MWGHE and GH) is not showing well? Reason unknown? Local affect...?

General-Precipitation and thunderstorms



National Center for Hydrology and Meteorology

Published by Sonam Tashi [?] · May 25 at 2:57am · 🌐



Weather update: 25/05/2018 (Time. 2.40 AM)

There is development of big weather systems in southern parts of country currently. So there is chances of more rain and thunderstorms is southern (Samtse and P/ling) and eastern parts of country during next 12 hours.

We are closely monitoring the weather systems and update to you all.

Flash Flood in Phuntsholing- 25/05/2018



Urban Flash flood in Thimphu: 04/06/2018



May be this system is caused by cloud out burst, so urban flooding in nearby Thimphu city was seen

Benefits/comment of FFG

1. FFG: Weather Forecasting purposes (MWGHE and GHE used for precipitation forecast).
2. FFG sometimes over estimate and sometimes under estimate.
3. FFG help/gives forecasters as additional guidance/addition source for Flash Flood/Flood prediction.

Verification of event of 24-25/05/2018

Question	Answer
1. Meteorological Observations- Extreme weather report	Western disturbance with slow moving system in Bhutan (Upper air cyclonic)
2. Hydrological observation	Discharge trend showing increasing from dated 24 th May 2018
3. Media Report of event	No Flash Flood warning was issued but issued weather advisory in Facebook and others (BBSC, Papers)
4. Impacts of Event (Death or damages)	No report of life lost but properties damaged was reported
5. Location of directory (More information about event)	Heavy rainfall event was reported in Southern parts (Samtse and Phuntsholing) of Bhutan
6. System evaluation (miss, hit, False alarm)	Normal weather Forecast was hit and Flash Flood warning not issued (Missed)

Thank you for your attention