

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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1. Flash Flood Case Study- (Phuntsholing/Chukha)

2. Flash Flood Case Study- (Samtse)

3. Verification of case study

Case study

SASIAFFG - South Asia Flash Flood Guidance System 2018-06-06 09:24:06 IST 2018-06-06 03:54:06 UTC FFG Product Date Selection **Base Layers** OGhr Product Date: 2018-05-25 00:00 UTC Open Street Mapa (mm/8hr) 00 oDit 220.00 SRTM 30m DEM 06 SRTM 30m DEM with Shaded Relief 12 188.00 SRTM 30m Contours 18 FFG-06hr 201 89.750 90 SRTM Contour Labels 100.00 Prev Timestep Next Timestep SASIAFFG Operational Product Prev 6hr Interval Next 6hr Interval 28.750 28.750 **SASIAFFG Basin Outlines** 80.00 Prev Day Next Day Open Street Maps - Water Only Reset to Current 28500 IP-REPORTED IN 30.00 Open Street Maps - Roads Only Country Selection Bhutan SASIAFFG Country Outlines 28.250 014933 16.00 Product Selection Table SASIAFFG Stations Basin: O FEG 06HR ¥ SA SIAFFG Basin ID Labels 0.01 Raster: 0 SASIAFFG Basin Value Labels SRTM Zoom to Country Map Dressing Layers v4.1 SASIAFFG Regional View (meters) Zoom to Basin ID ✓ LonLat Graticule 3500-Enter Basin ID View Header Label 6600 Lon, Lat Product Colorscale (In map) \$000 89.5138, 27.0892 SRTM Coloracale (in map) 1600 ASM08 BASIN INFO --ID: 2022801650 Mirik VALUE: 0.99 Ranga Siliguri Dalgo Selected Basin: Mangaldo 2022801650 -100 Go to Plots Ruhea Guwahati Download product bit (basin) Dudhnai Boko Download composite bd (basin •Umling hakurgaon i Open Time Animator For Current Map View

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 precipation-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



SASIAFFG - South Asia Flash Flood Guidance System

2018-06-06 00:53:42 UTC

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



Basin ID: 2022801650



Product Viewer | Product Comparison | FFG Plots

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Daily Rainfall for Phuntsholing and Samtse



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)

SASIAFFG - South Asia Flash Flood Guidance System

2018-06-06 05:35:59 UTC

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 Viewer | Product Comparison | FFG Plots

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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