A Flash Flood Case Study of 2017-08-11 Flash Flood in Madi (Riu Khola)Basin, Nepal

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The axis of monsoon trough at mean sea level runs close to the foot hills of Himalayas and further shifting north (Fig 3). At 0030Z some there is convective clouds over eastern Nepal (Fig 4).

Synoptic Condition

11th August 850 hpa, 1200Z isobar.

Himawari satellite IR image on 11th August 0030 UTC.

Fig Source: University of Wyoming.
WRF Model Prediction

Init Thu 10 AUG 23:45 NPT
Forecast Fri 11 AUG 23:45 NPT
Max: 117 mm
Past 3 days Gauge based Rainfall Observation

![Graph showing 3 Day Observed Rainfall across different stations]

- **Stations**: Dipayal, Dodelkha, Dhangadi, Birendranagar, Nepalgunj, Junla, Dang, Pokhara, Bhairahawa, Smita, Kathmandu, Okhaldhunga, Taplejung, Dhankuta, Birhnagar
- **Rainfall**:
  - 9th August
  - 10th August
  - 11th August
MWGHE and GHE rainfall Estimates of Last 24 hour Accumulated Rainfall
General Warning Dissiminated

Rajendra Sharma is with Binod Parajuli and नेपाल बाडी दुर्लभ
August 11, 2017 ⋆ 37
Probability of High Rainfall in eastern and central Nepal!!!!!
Region of Focus

- Madi (Riu Khola) Basin of Southern lower flat land in Central Nepal
- Chitiwan district is vulnerable to three major types of floods: floods on large river with snow components (Narayani River), flood on medium sized rain-fed river (Rapti, Lothar and Manahari) originating from the Mahabharat range and flash floods on rivers originating from the Chure hills, such as the Riu and its tributaries.

Observed Rainfall in the Madi Basin

<table>
<thead>
<tr>
<th>Date</th>
<th>Rainfall (mm/24hr)</th>
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<tbody>
<tr>
<td>8th Aug</td>
<td></td>
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<tr>
<td>9th Aug</td>
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<td>10th Aug</td>
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<td>11th Aug</td>
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</tbody>
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Legend:
- Riu
- Gobindabasti
Madi (Riu Watershed)

- In this area of concern, there is east-west extending steep slopes along the Nepal India boundary and mild slopes along the chure range having silty soil in the upstream but mostly clayey in the downstream areas.
Rainfall Activity in the region
Soil Moisture Condition

It's about 80% in the basin considered and over 50% in the other surrounding basins over that area.
Forecasted Rainfall
Observed Rainfall

Observed Rainfall in the Madi Basin

Observed Rainfall from 11th Aug 12 UTC to 12th Aug 12 UTC

Stations:
- Diployal
- Dadeldhura
- Dhangadi
- Birendranagar
- Nepalganj
- Jumla
- Duna
- Pokhara
- Brahnikawa
- Smara
- Katmandu
- Okhaldhunga
- Taplejung
- Dhanusa
- Biratnagar

Graphs showing rainfall in mm/24hr for different dates and locations.
Observed Water Level Rise at Riu Khola Gauging Site
Conclusion

- MWGHE and GHE well captured the rainfall event
- Considering the FFT and for this date the system missed this particular event
- We will do more Verification in this coming monsoon season
Thank You