Advances in Flood Hazard Forecasting
Using the International Community to Accelerate Innovation

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Deltares

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May 2008 in Myanmar...

Was Burma's cyclone predicted?

By Steve Jackson
BBC News

As the scale of the disaster in Burma becomes clear, questions are being asked over how much the authorities knew about the magnitude of the approaching storm.

US First Lady Laura Bush has accused the military government of failing to act to protect its people.

She says the Burmese authorities were well aware of the threat from Cyclone Nargis, but failed to issue a timely warning to those in the path of the storm.

India's meteorological agency, which monitors cyclones in the Indian Ocean, says it warned the Burmese authorities 48 hours before the storm struck.
May 2008 in Myanmar...

Cyclone Nargis making landfall in Burma on May 2, 2008
Properties at Risk...?!
Response ...
Forecasting, Warning & Response

Detection → Forecasting → Warning → Response

From data to information…

Key Questions…

- Could flood levels be predicted with more lead time?
- Could the predictions be more accurate?
- What is the risk of flooding under the prevailing and predicted hydraulic conditions?
System for operational forecasting (resilience!)
Flood, surge, water quality, structure stability…

Fully configurable by (super)users
Platform for operational research

Delft FEWS User Days 2009: 4-5 November ’09 in Delft

Software free of charge → central role for user community
### Sharing Tools…

> 50 models of different nature

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Supplier/Owner</th>
<th>Country</th>
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</table>

[public.deltares.nl/display/FEWSDOC/Models+linked+to+Delft-Fews](public.deltares.nl/display/FEWSDOC/Models+linked+to+Delft-Fews)
Open System...

Open to many data formats (XML, Grib, NetCDF etc.)
Process configuration - Workflows
Generic topics…

• Probabilistic forecasting
• Data model integration (→ data assimilation)
• Forecast verification
• *Training for dealing with extreme events (Serious Gaming)*
Sharing Science…

Generic topics…

- Probabilistic forecasting
- Data model integration (→ data assimilation)
- Forecast verification
- *Training for dealing with extreme events (Serious Gaming)*

Fields of work…

- Drought forecasting & reservoir management
- Coastal and estuary forecasting
- Inundation forecasting
- Tsunami’s
- Water quality forecasting
  (e.g. harmful algae bloom)
Data Poor Environments → Using Delft FEWS

Real-time use of hybrid approaches → fall-back options
Quantification of and dealing with uncertainties
Error correction & data assimilation

Combining different data sources…
• in-situ monitoring → accurate but limited areal extent
• models → good areal spread but limited accuracy
• remote sensing data → accurate & good areal spread but availability issues (place & time)
Waterlevels at Sea... using Satellite based Laser Altimetry

- Model calibration
- Surges & sea level anomalies
- Accuracy: order of centimeters (after re-analysis)
- Future? → use over remote sensing data for real-time (surge) forecasting
Delft FEWS User Community #1

- Environment Agency for England & Wales → National Flood Forecasting System (NFFS)
- Rijkswaterstaat & waterboards in The Netherlands
- Mekong River Commission

→ National & smaller regional applications
- Environment Agency for England & Wales → National Flood Forecasting System (NFFS)
- Rijkswaterstaat & waterboards in The Netherlands
- National Weather Service (NWS/NOAA) in United States → Community Hydrologic Prediction System (CHPS)
Thank you for your attention!