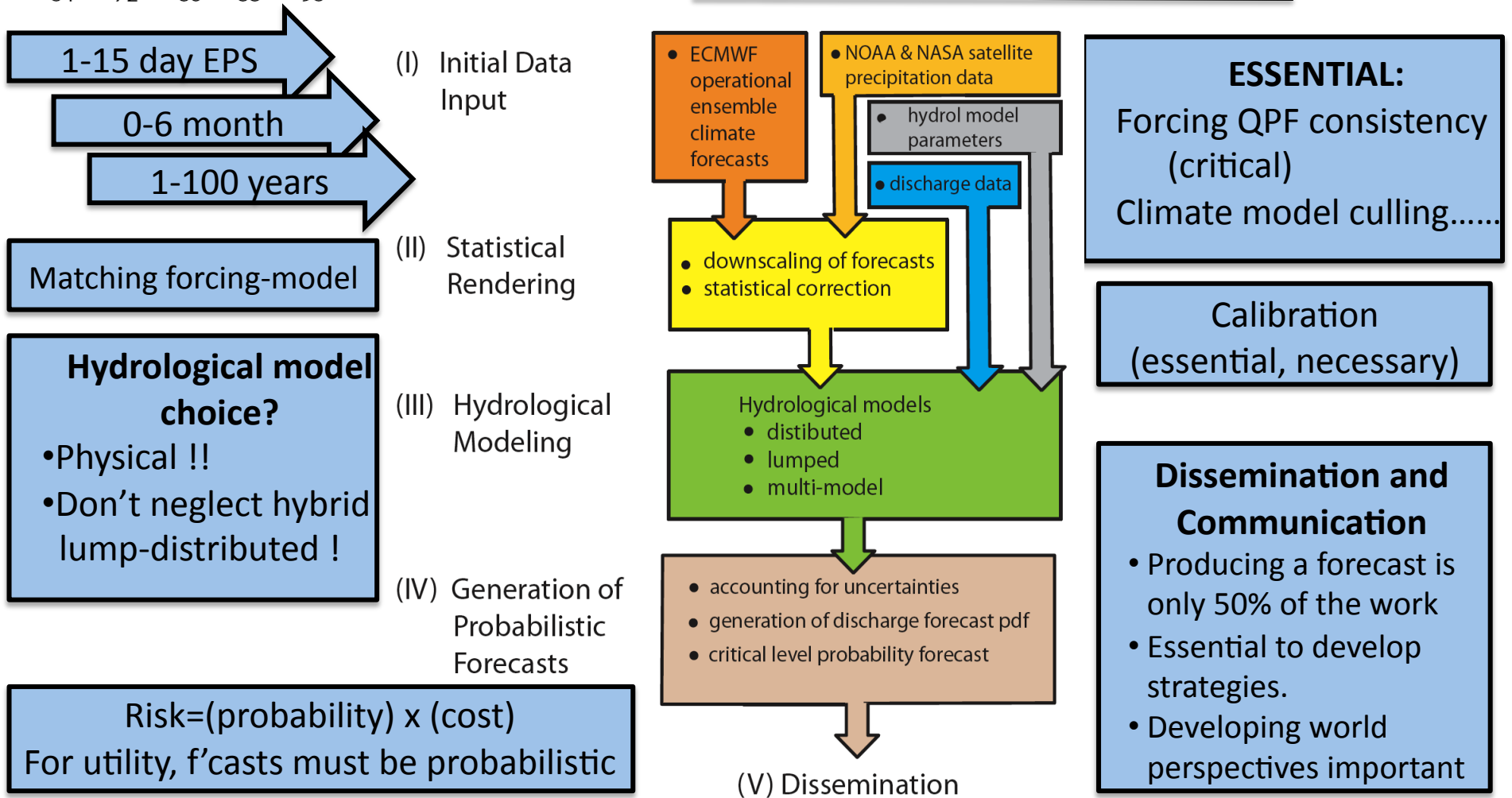
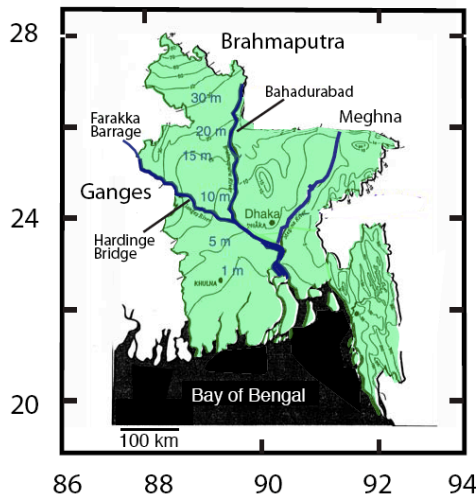


Recommendation to develop a unified large-scale hydrological system to consider multi-scale predictions, projections and analyses.



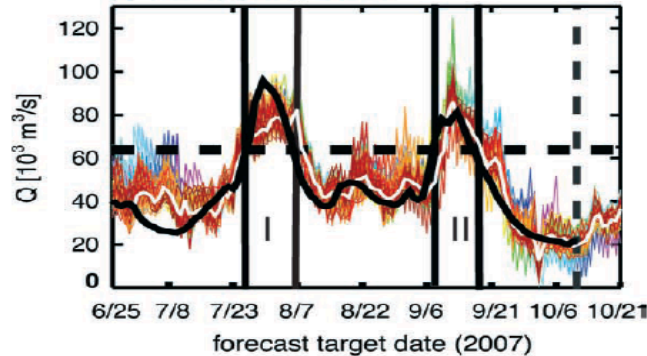
10-day quantitative probabilistic forecasts are operational:

Slide 2

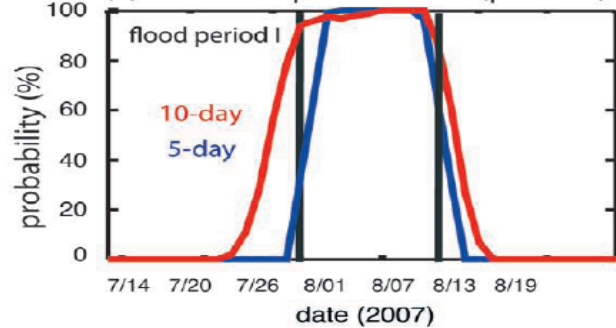


(a) Brahmaputra

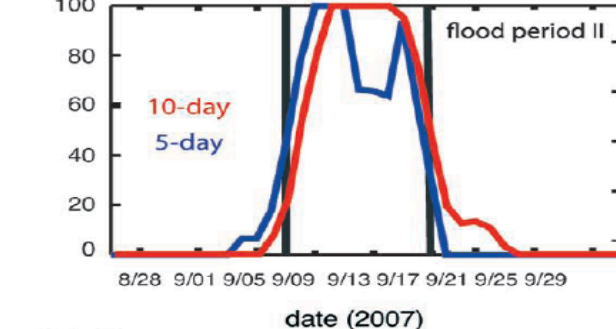
(i) 10-day forecast



(ii) Flood risk probabilities (period I)



(iii) Flood risk probabilities (period II)



Hopson and Webster (2010) Webster et al. (2011) Webster and Jian (2011)

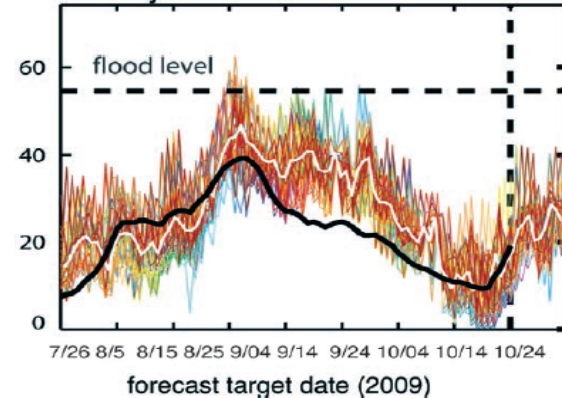
IFF:

- Well calibrated physical model
- Statistically rendered QPFs
- Technology exists now! Develop macro hydrological prediction system for US
- But, during low precipitation periods, much more difficult

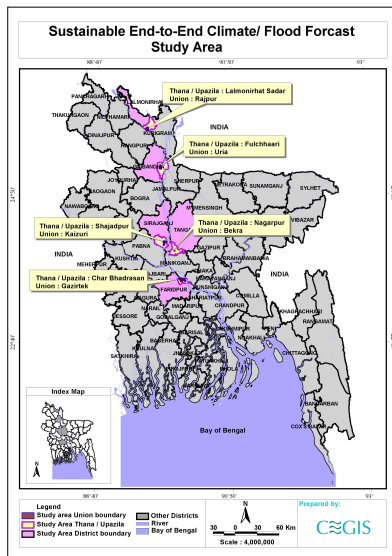
(b) Ganges

2009 India drought

10-day forecast

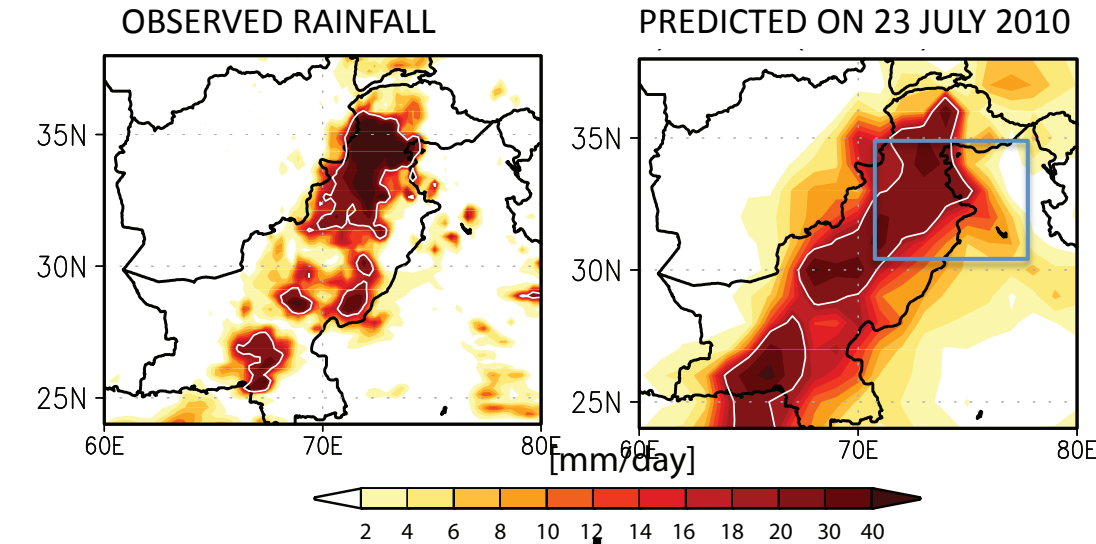


Critical issues! Aquifer, draw-down and etc: not insurmountable: PRIORITY

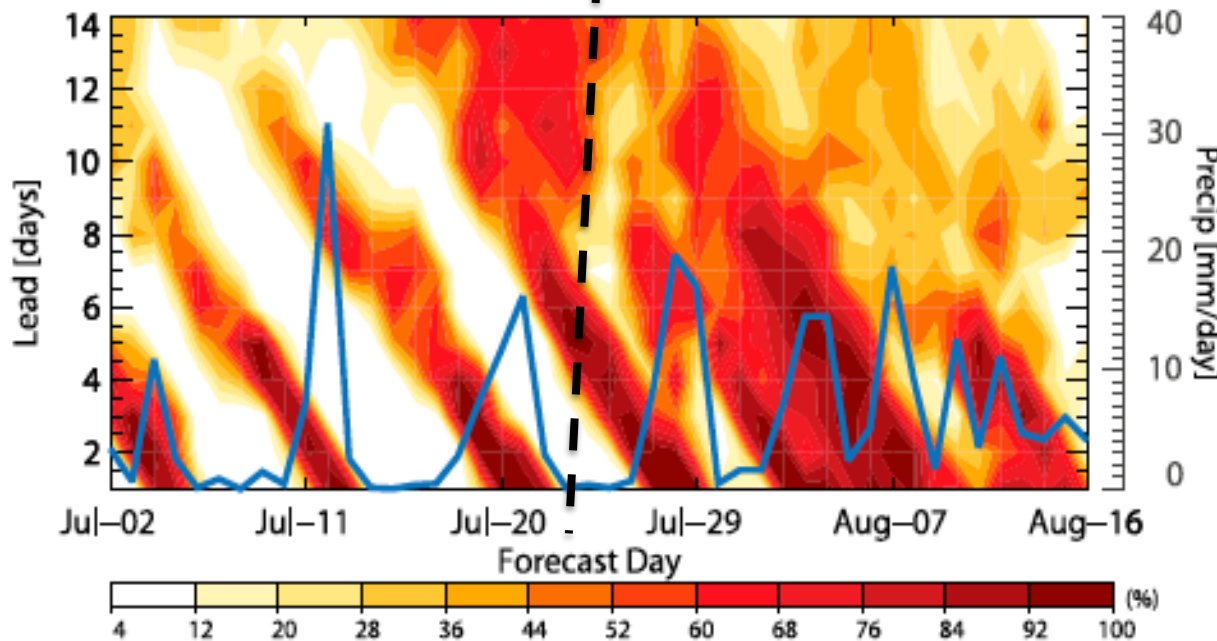


ECMWF (Rendered) QPFs for Pakistan July/August 2010

JULY 27-28



ECMWF EPS based forecasts of rainfall over northern Pakistan obtained both distribution, magnitude and timing of the 5 major monsoon pulses that caused the devastating floods.



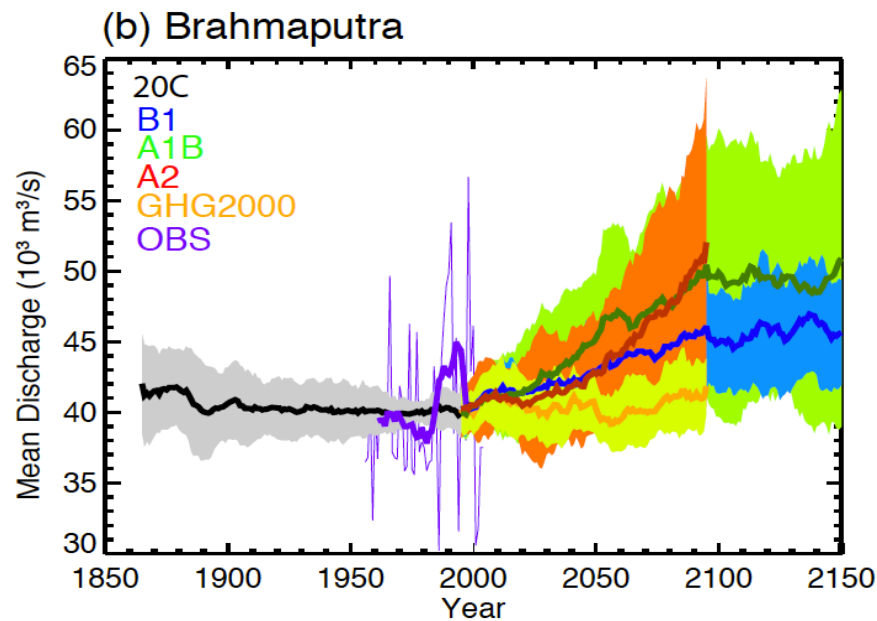
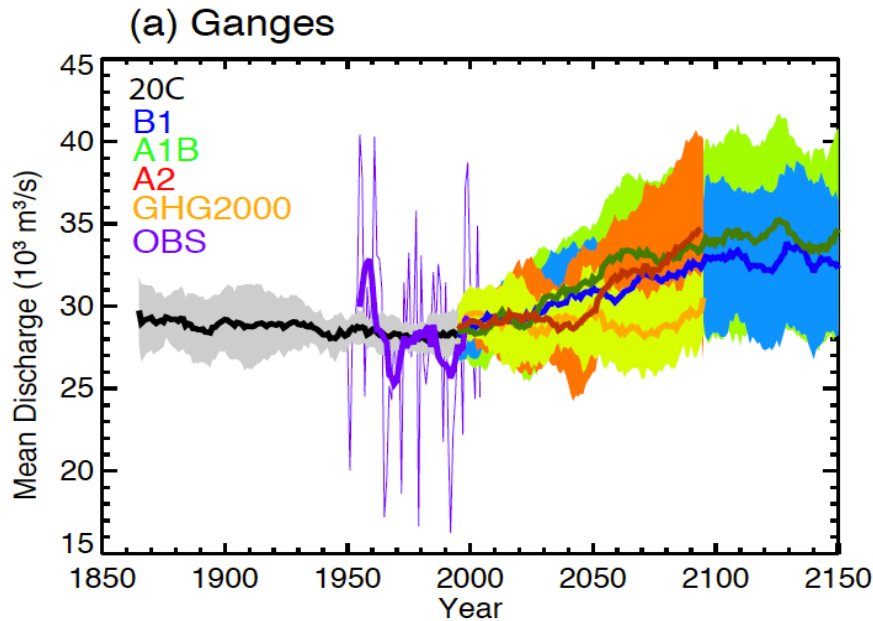
A coupled hydrological model forced by these precipitation forcing distributions would have provided high probabilities of flooding 7-10 days in advance

Webster, Toma, Kim (2011) GRL

This approach scales in space and time:

Slide 2 (Soroosh)

Flood frequency projections for the Brahmaputra & Ganges: 2000-2100



Information for policy makers regarding
log-term and high cost projects

Same model construct

AR-4 model input

Models culled re current climate

Calibrated re present discharge

