



CREST Applications at local, region and global scale

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April 2nd 2012



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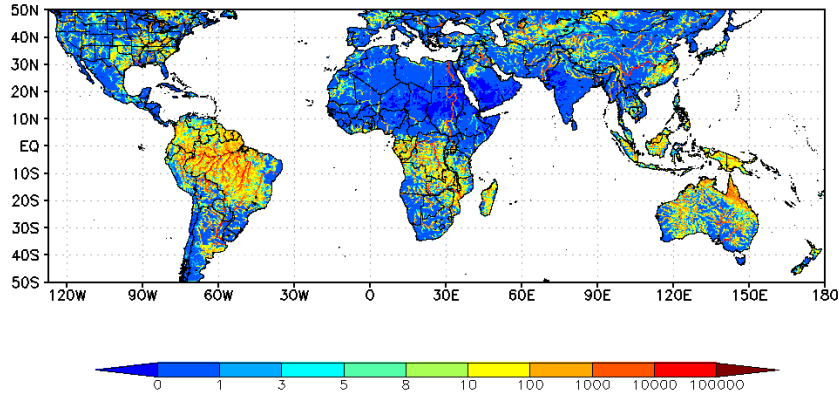
- Global Scale
- Regional Scale
- Watershed Scale



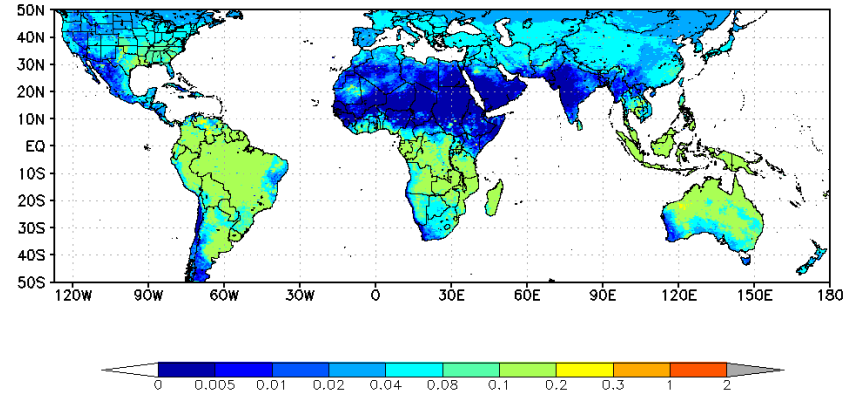
OU-NASA Joint Operational Global Hydrologic Prediction

[Real-time Hydrology: http://eos.ou.edu](http://eos.ou.edu)

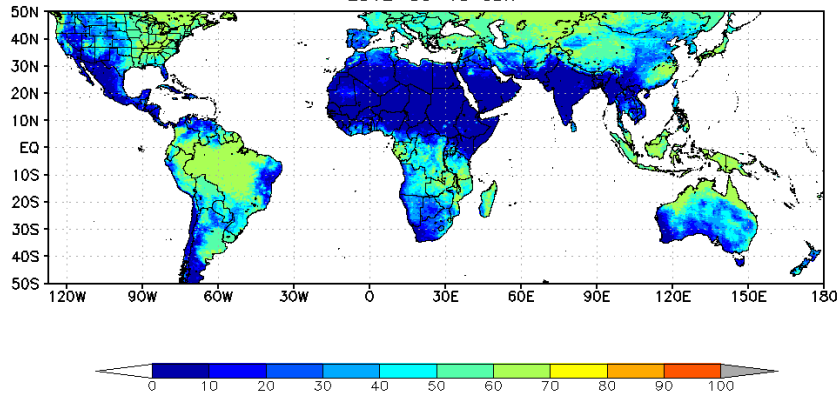
Latest 24h/3h Stream Flow (m³/s)
2012-03-19 09h



Latest 24h/3h Actual ET (mm/h)
2012-03-19 09h



Latest 24h/3h Soil Moisture (%)
2012-03-19 09h



Flood Potential

Flooding

Severe

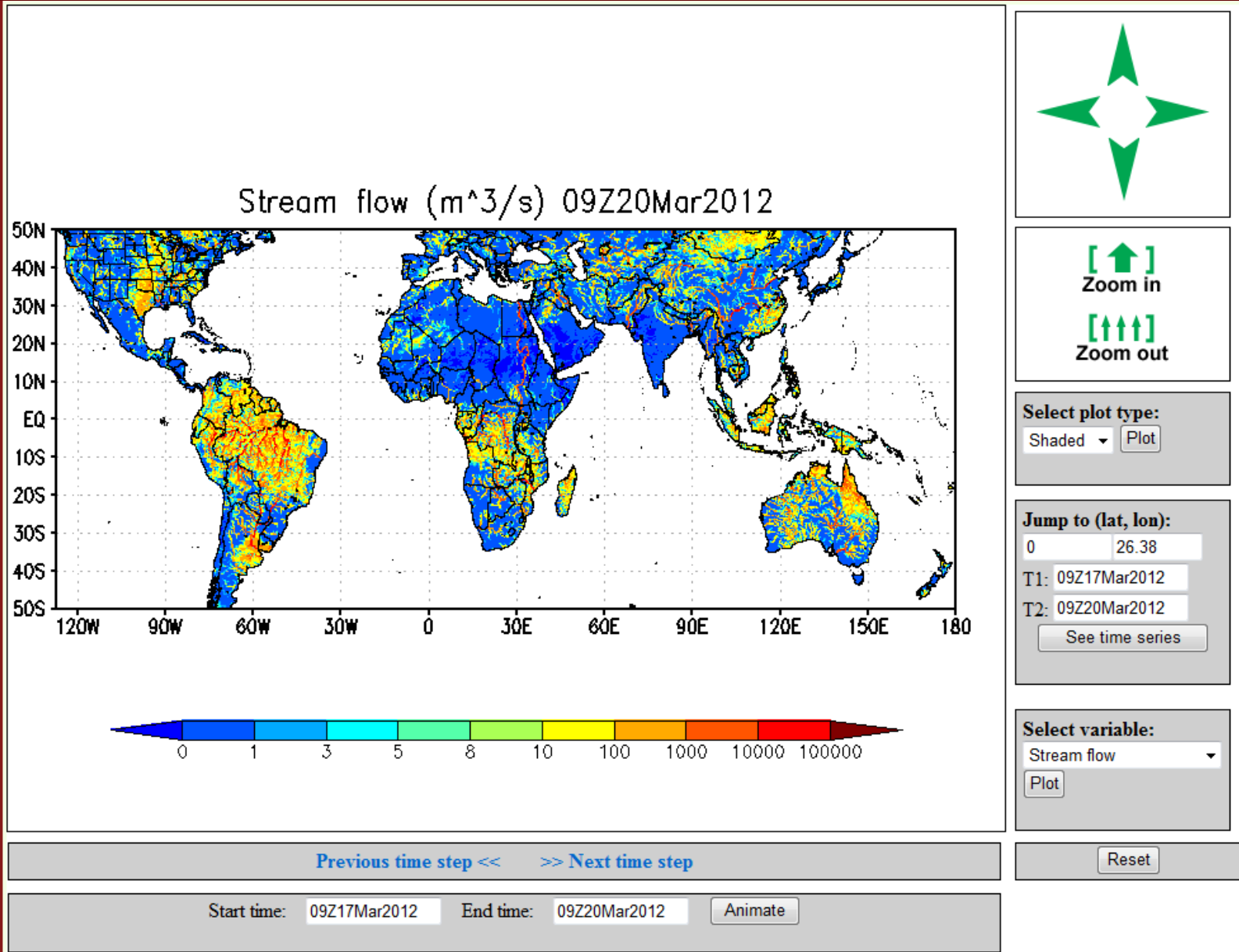
Hong et al. 2007 WRR; Wang and Hong et al. 2010 HSJ; Wu et al 2011 JHM



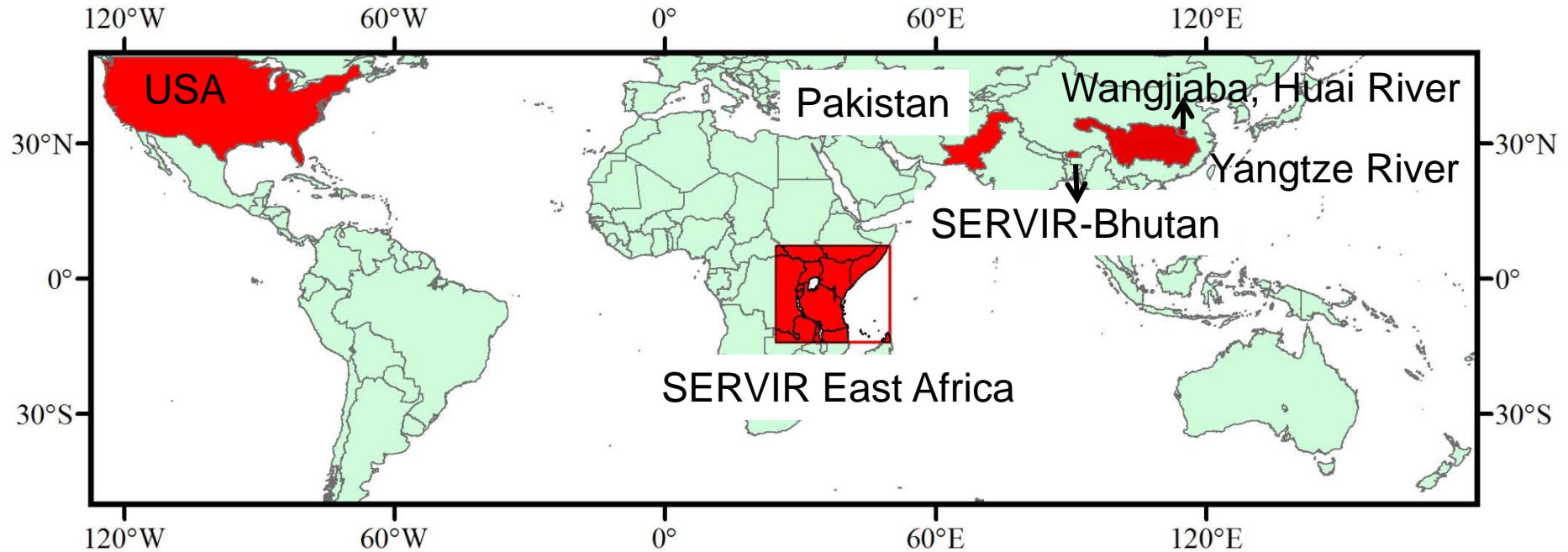
HyDrometeorology and RemOte Sensing Laboratory (hydro.ou.edu)



Operational Global Hydrologic Prediction System



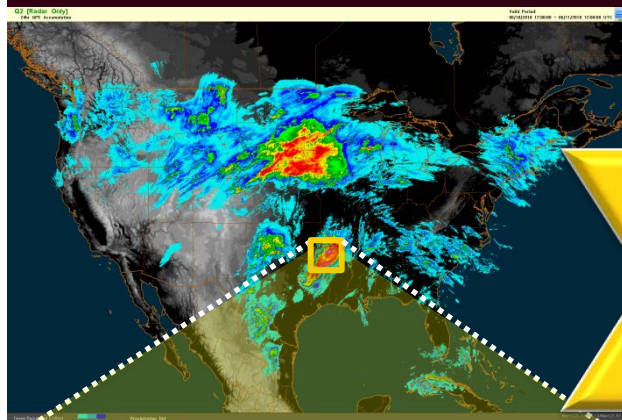
Regional and Watershed scale Application



National Mosaic and Multi-Sensor QPE (NMQ-) Flooded Locations And Simulated Hydrographs (FLASH)

- A CONUS-wide flash-flood forecasting demonstration system

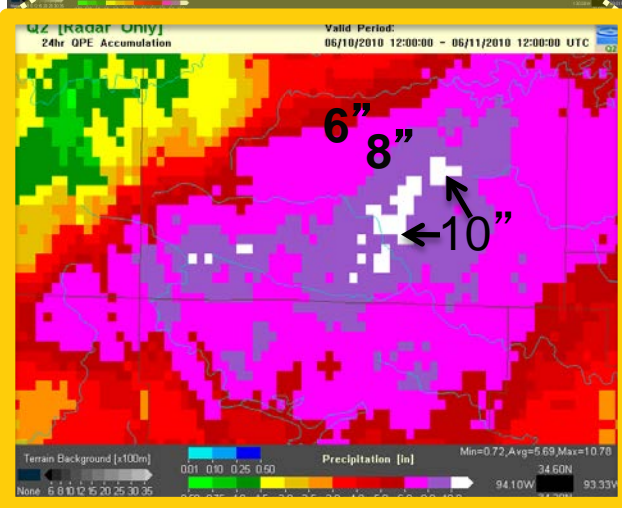
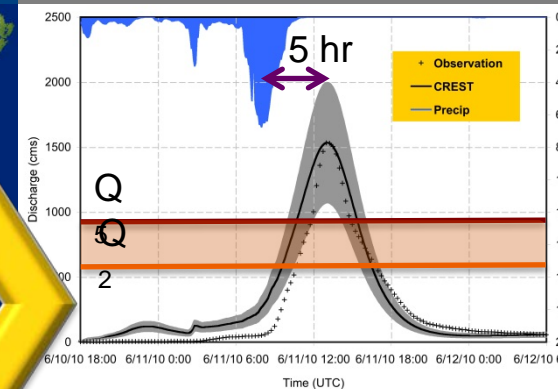
NMQ/Q2 Rainfall Observations
- 1km²/2.5 min
Stormscale Rainfall Forecasts



Stormscale Distributed Hydrologic Models



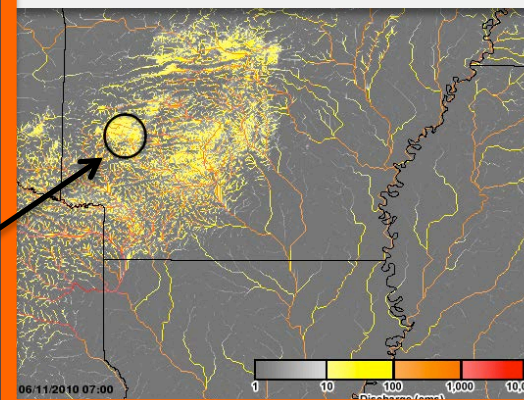
Probabilistic Forecast Return Periods and Estimated Impacts



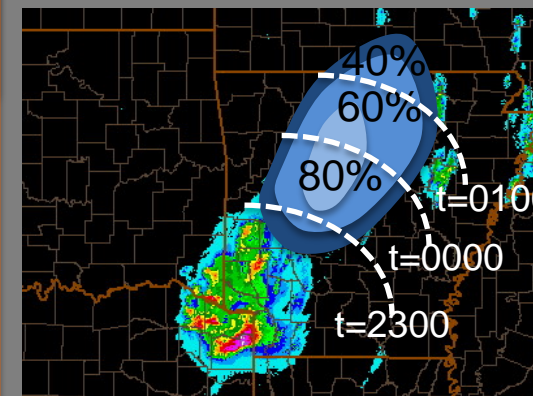
10-11 June 2010, Albert Pike Rec Area, Arkansas

20 fatalities

Simulated surface water flow



Hydrograph of Simulated and Observed Discharge



Probability of life-threatening flash flood

NATIONAL MOSAIC & MULTI-SENSOR QPE (NMQ)

Advancing the science and science-to-operations of QPE and very short-range QPF

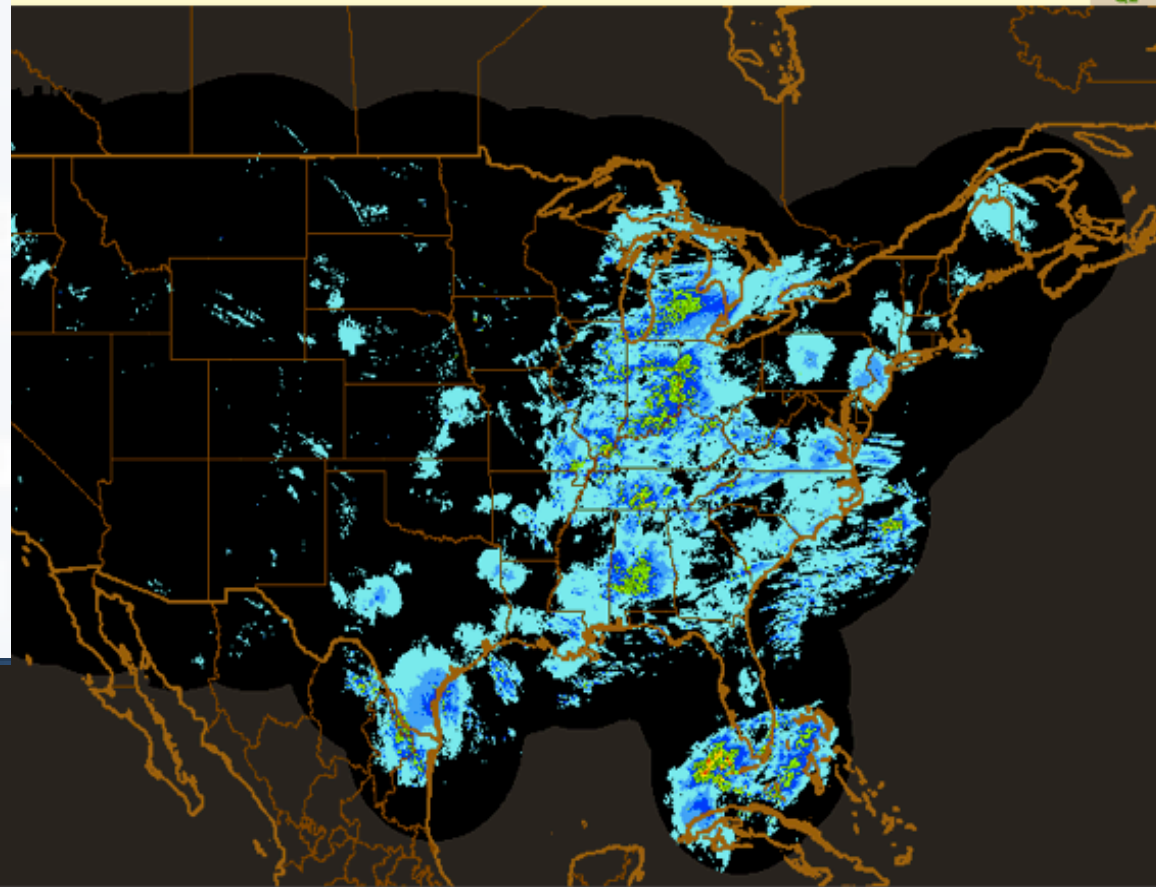
- Hydro Estimator [Sat]
- Stage II [Gauge Only]
- Stage II [Multisensor]
- Stage II [Radar Only]
- Stage II [Gauge Adj Rad]
- Stage IV
- Q2 [All Gauge]
- Q2 [QC'ed Gauge]
- ✓ Q2 [Radar Only]
- Q2 [Radar Only US+CA]
- Q2 [Gauge Adj Rad]
- Q2 [SHSR Pow Adj Rad]
- Q2 [SHSR VPR Corr Rad]
- Q2 [Mountain Mapper]
- Accumulated Precip Water
- Accumulated Precip Eff

Mosaic3D Levels	Mosaic3D Derived	VPR	NextGen
Model	Satellite	Diagnostics	Time Series

Page generated at: 10/14/2010 01:58

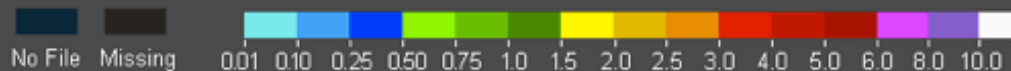
[Radar Only]
Accumulation

Valid Period:
10/13/2010 01:00:00 - 10/14/2010 01:00:00 UTC



Precipitation [in]

Min=0.00, Avg=0.03, Max=15.83

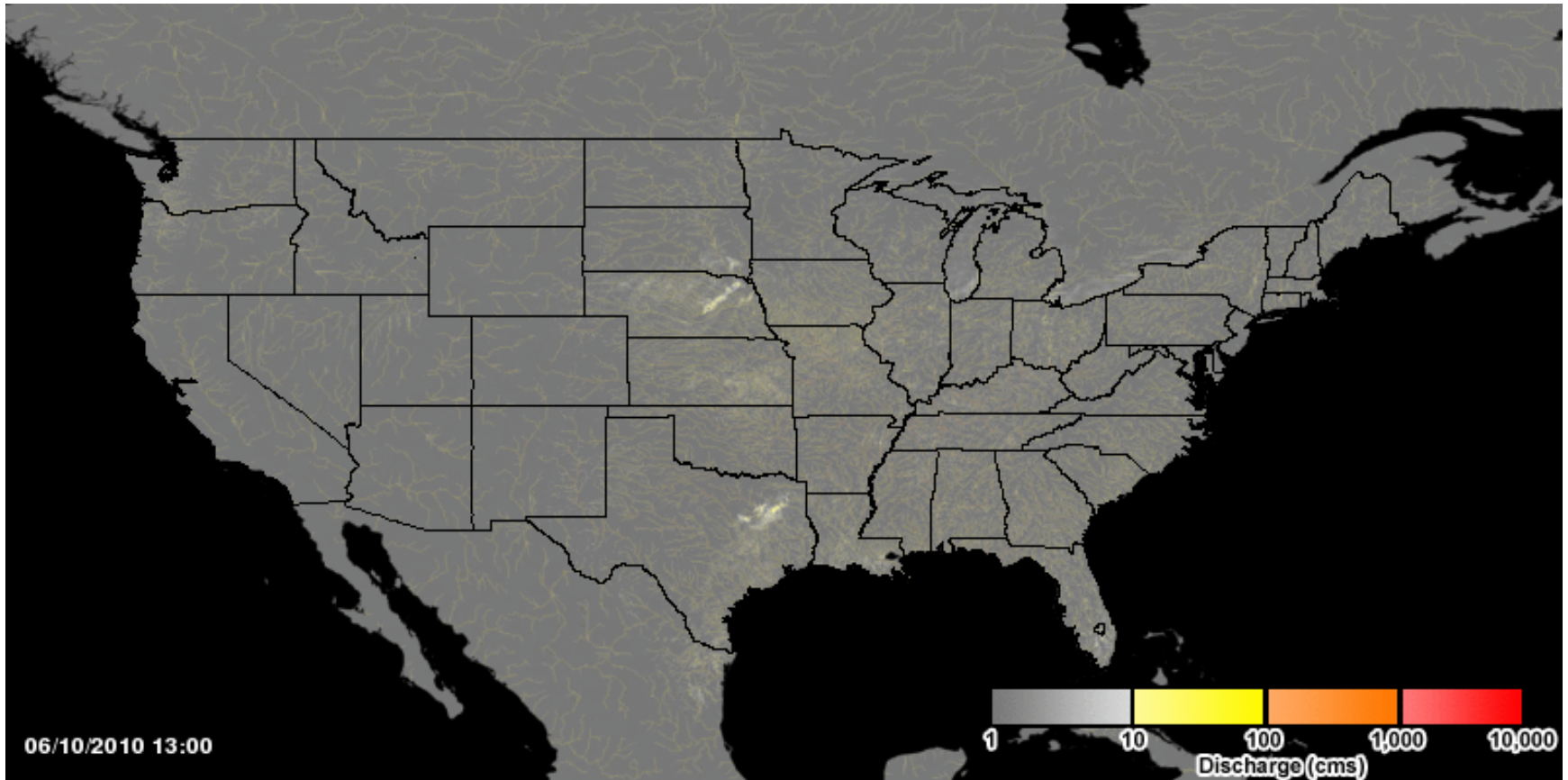


65.00N
130.00W
59.98W
20.00N

- Hor
- QF
- QPE Prod
- Product:
- Rate 1 hr
- Time Navi
- Month/Day
- Hour:Min:Sec
- ◀ 1 hr ▶
- Map Cover
- Map Over
- States
- Rivers
- CWA's
- RRCT
- Range Ring
- Gauge Rep
- Terrain Bac

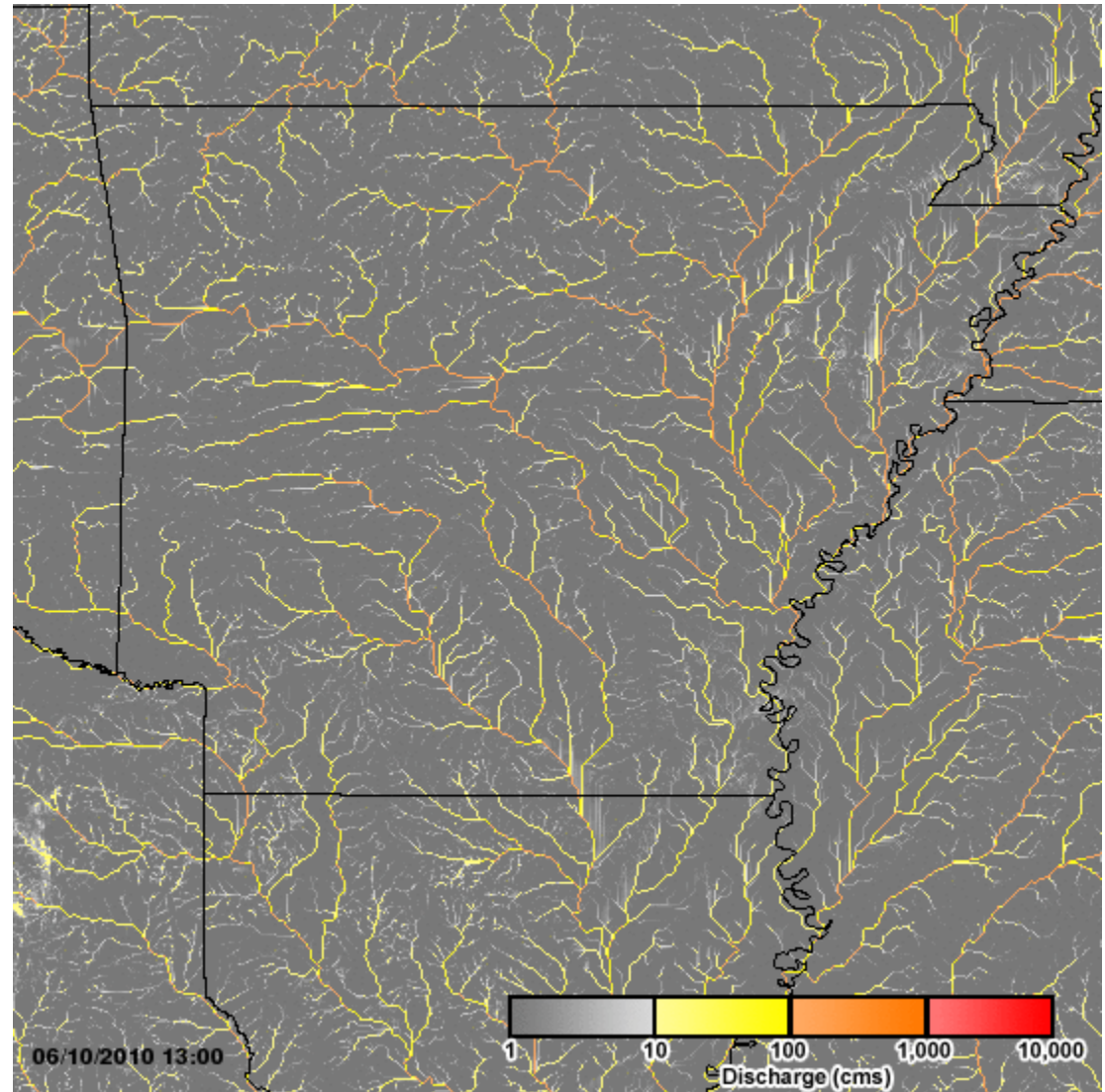
CONUS Flash Flood Demo System

- Project uses forcing from high-resolution Q2 and future dual-pol radar (Q3)
- Readily incorporates probabilistic rainfall forecasts (i.e., Warn on Forecast)
- Addresses service needs in NWS; flash flooding is #1 weather-related killer



Arkansas Flash Flood Simulation (1-km 2.5-minutes)

6/11 12:30am-4am Kills:
Little Missouri River
Crested from 3 ft to
23.5 ft within 3 hours



SERVIR East Africa: A Disaster and Water DSS

SERVIR Africa - Using geospatial data to serve Africa

Welcome to SERVIR Africa.net

- Disasters
- Ecosystems
- Weather
- Climate
- Water
- Agriculture
- Human Health
- Energy

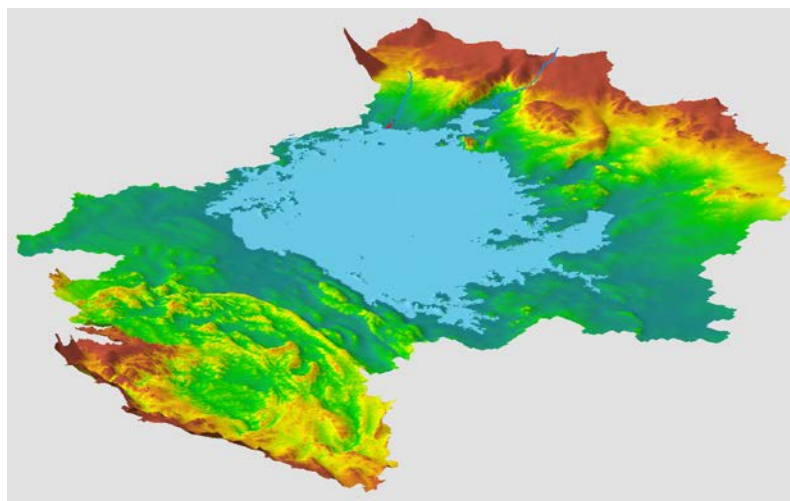
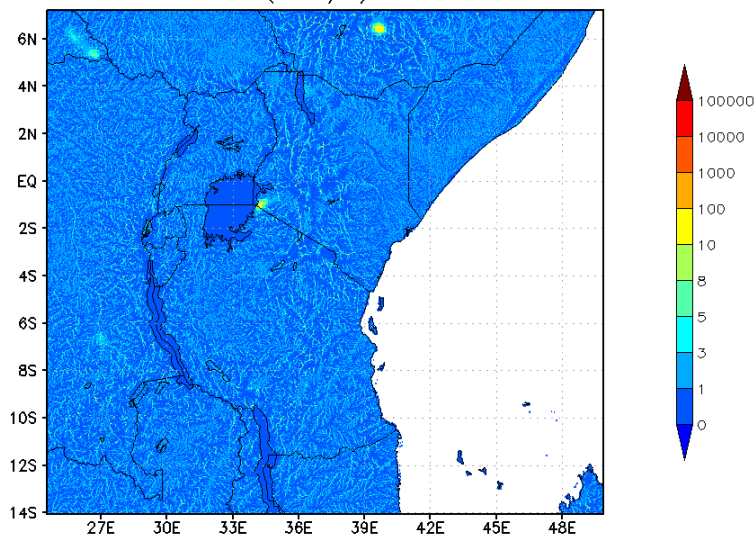
Funded by NASA Applied Science Program, USAID: to implement an operational water-hazard warning system, SERVIR-East Africa.

SERVIR-East Africa CREST/Flood Warning System

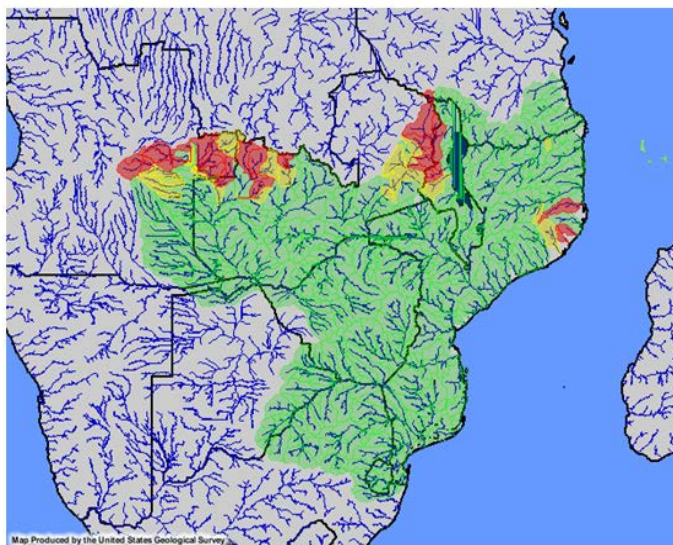
(funded by USAID/NASA and partnered with RCMRD in Kenya)

72-hour Forecast, later verified and updated by real-time Satellite Inundation Images

"Stream Flow (m³/s) 2011030621"



Visualization and Dissemination Systems: Google Earth and Web Portal

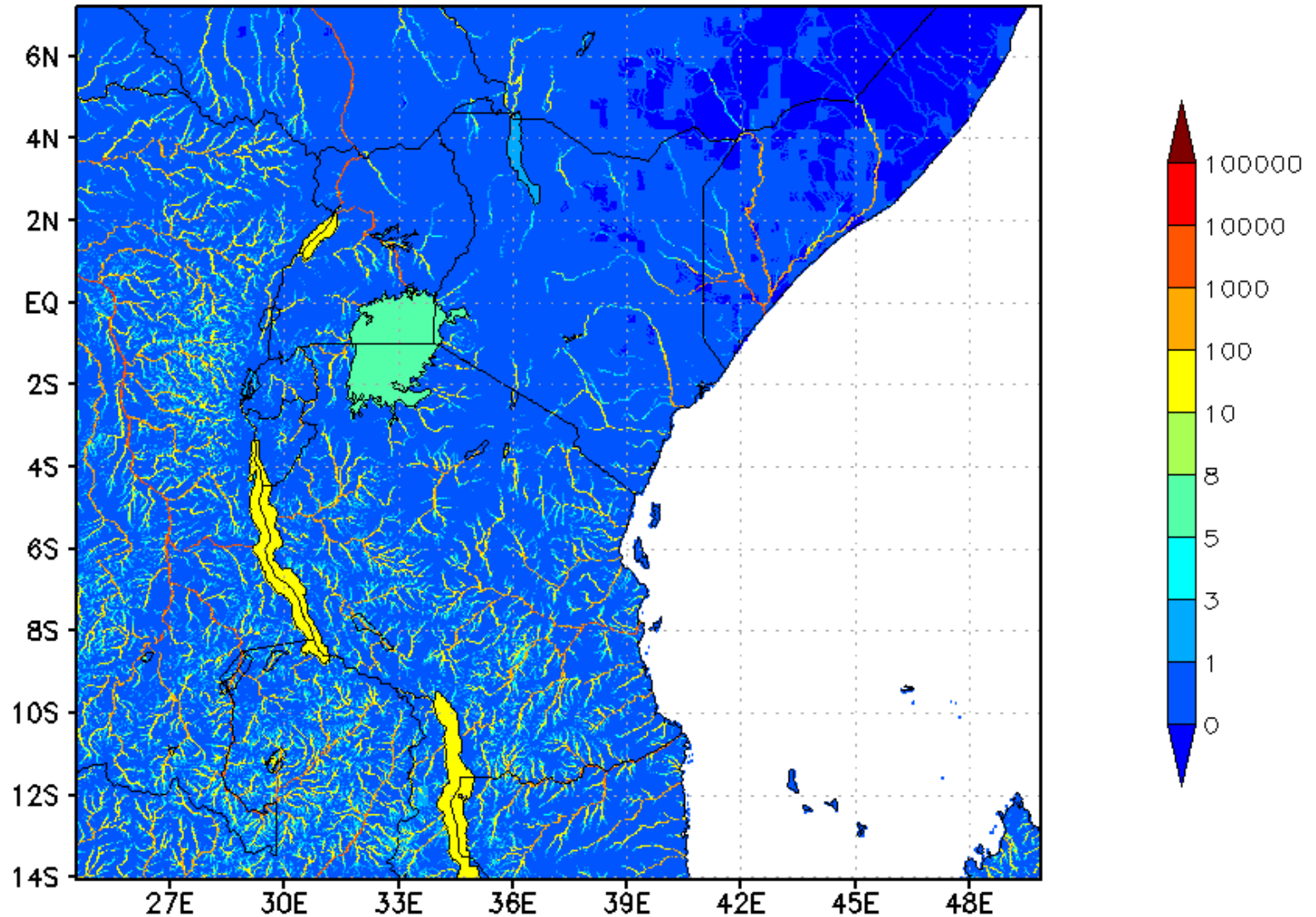


Green: Safe
Red: Warning
Yellow: Watch

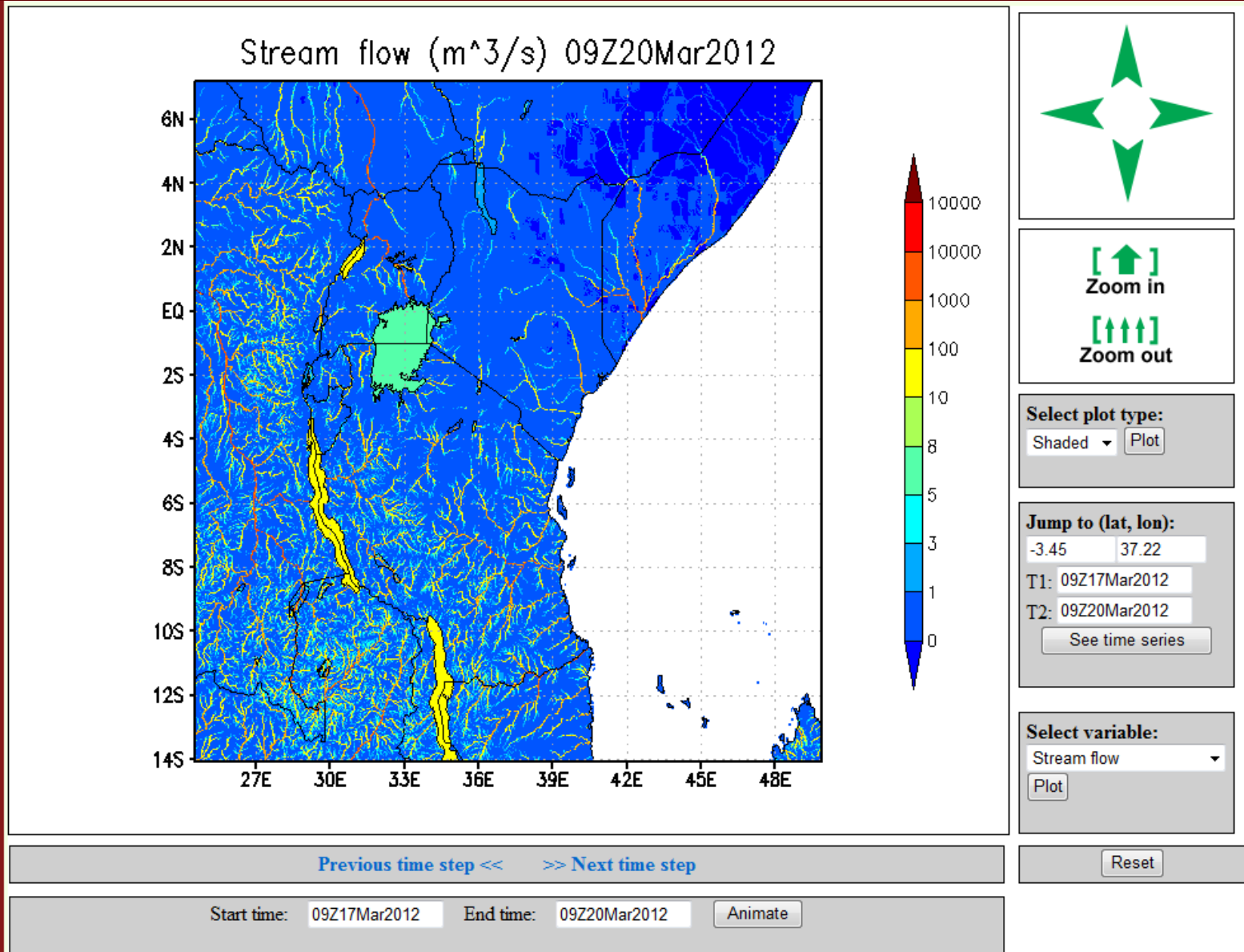


SERVIR-Africa: Realtime Hydrological Simulation and Flood Monitoring

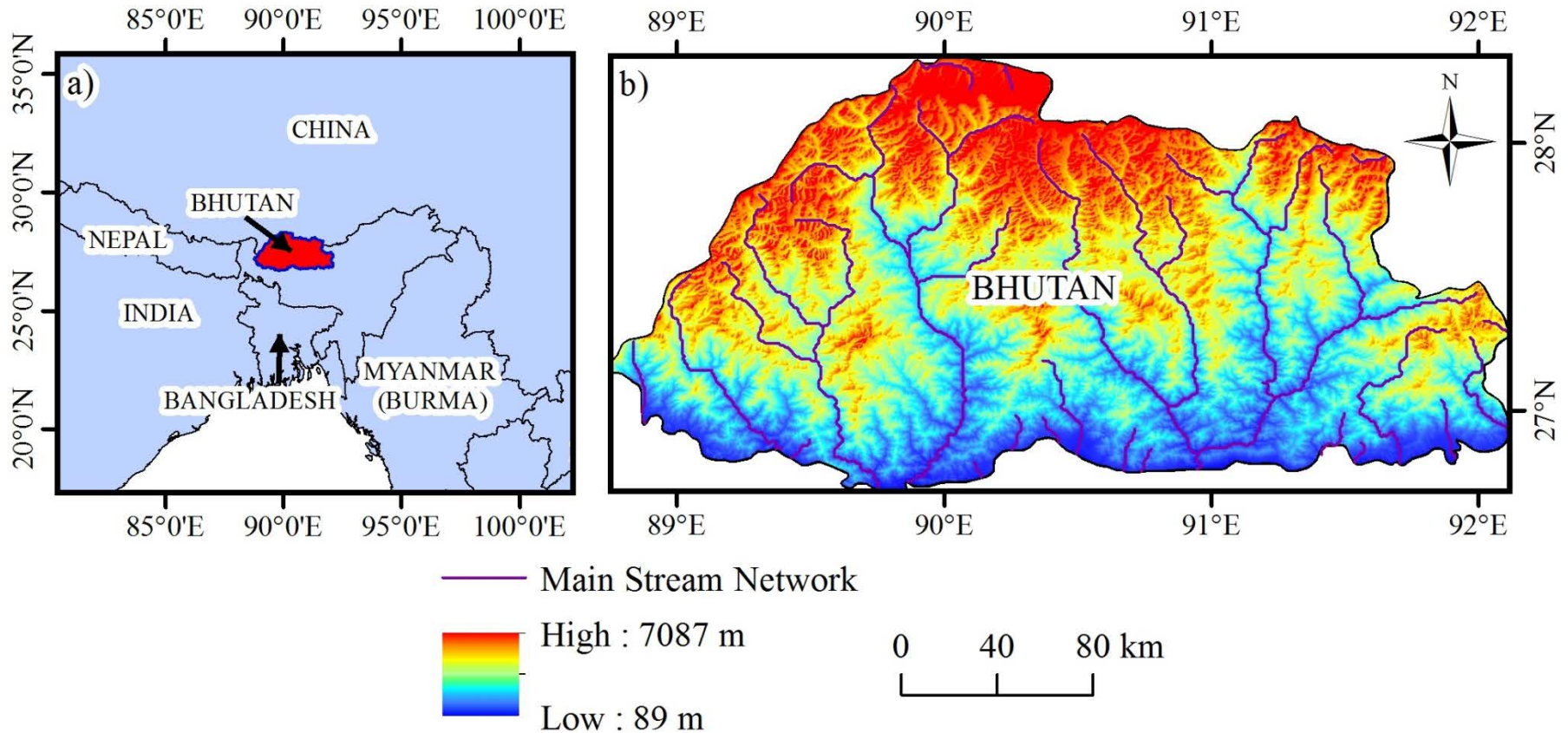
Latest 24h/3h Stream Flow (m^3/s) 2012-03-19 09h



SERVIR-Africa: Realtime Hydrological Simulation and Flood Monitoring

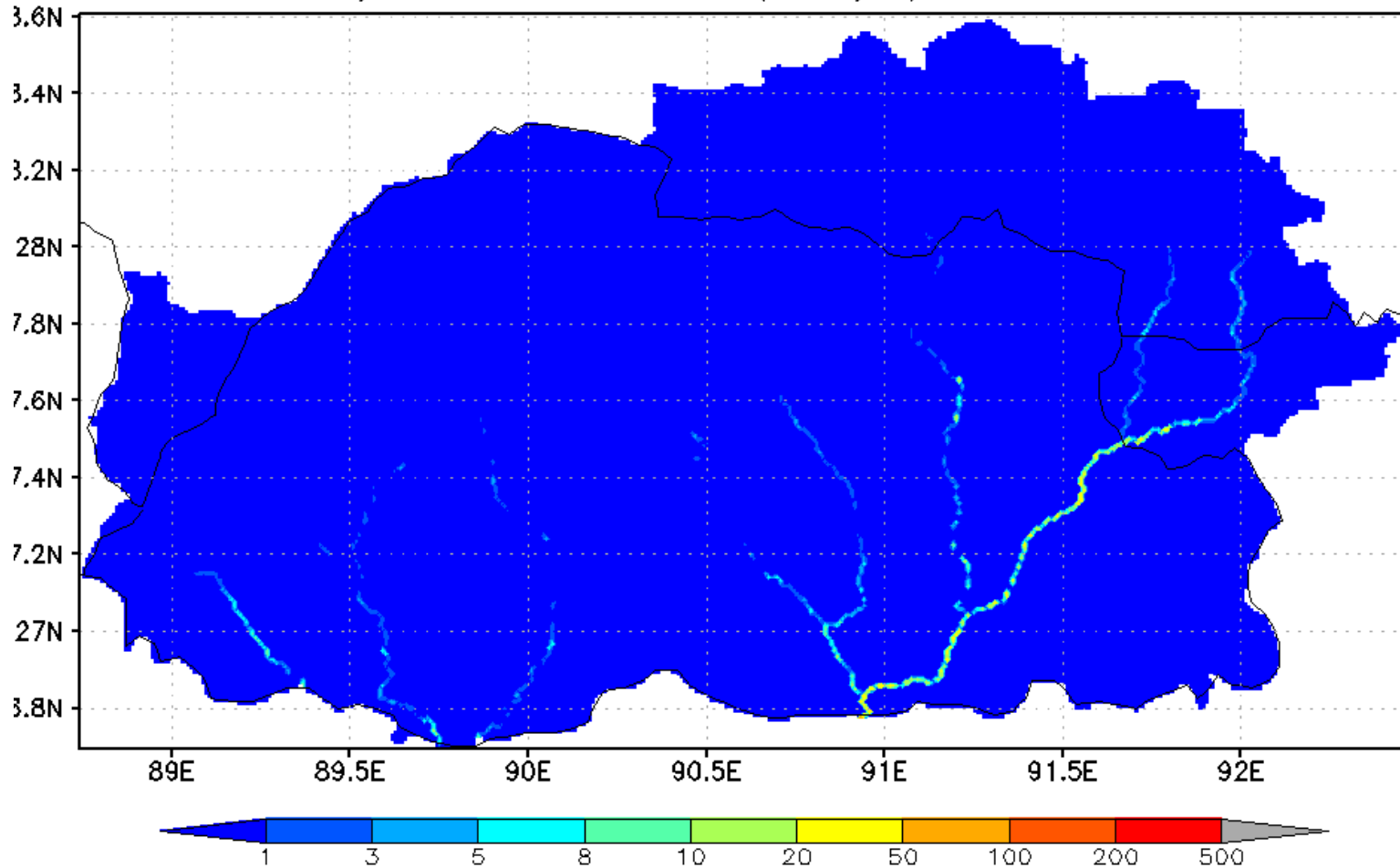


Location and DEM of Bhutan

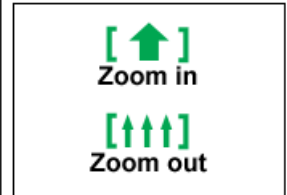
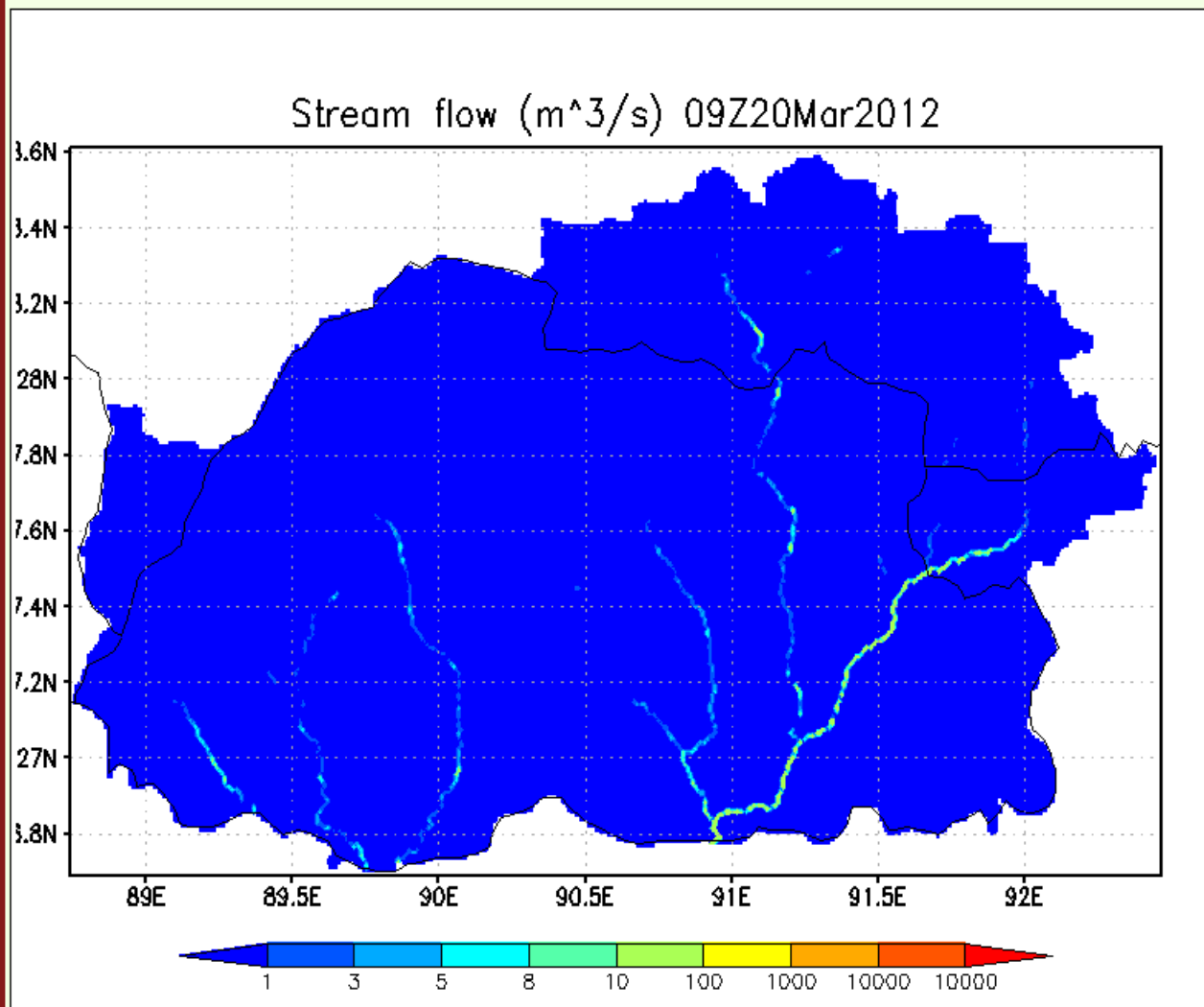


SERVIR-Bhutan

Latest 24h/3h Stream Flow (m^3/s) 2012-03-19 09h



SERVIR-Bhutan



Select plot type:

Shaded

Jump to (lat, lon):

27.65 90.6

T1: 09Z17Mar2012

T2: 09Z20Mar2012

Select variable:

Stream flow

[Previous time step <<](#) [>> Next time step](#)

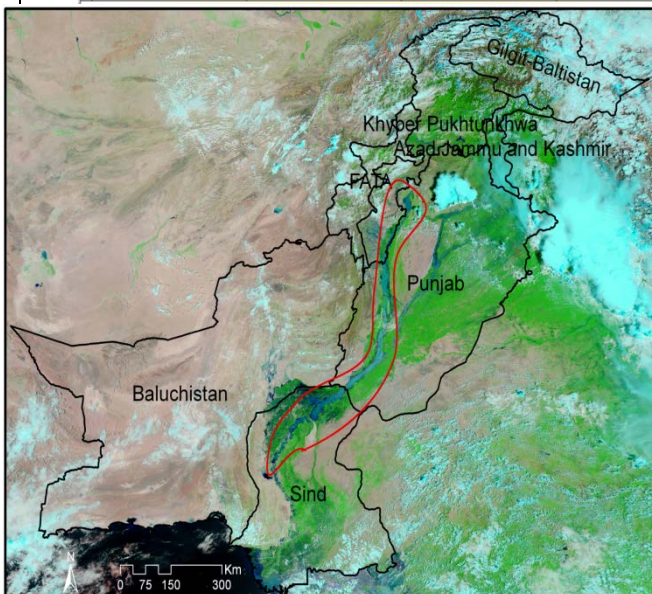
Start time: 09Z17Mar2012 End time: 09Z20Mar2012



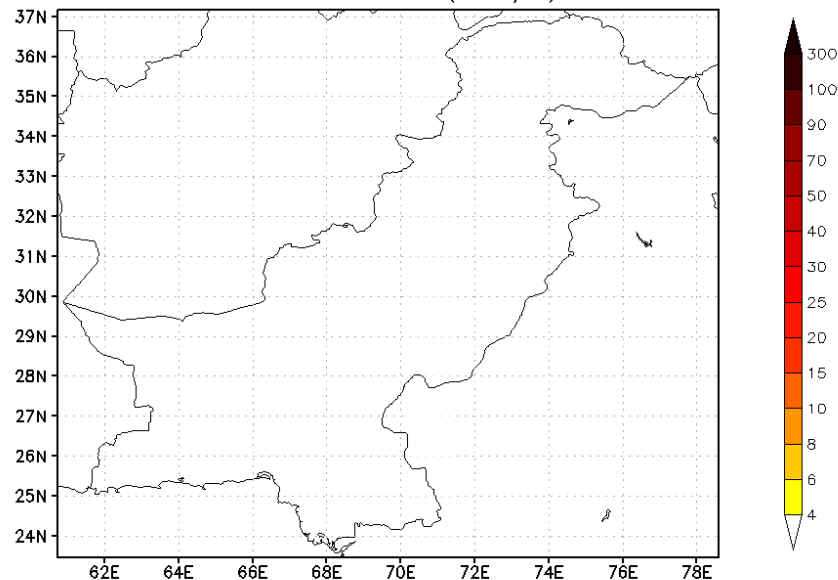
US-Pakistan Collaborative Project: 11/2010-10/2013

Capacity building in Hydrometeorological Disaster Risk Reduction through training and research in Pakistan

Flood disasters in Pakistan (1998-2008)

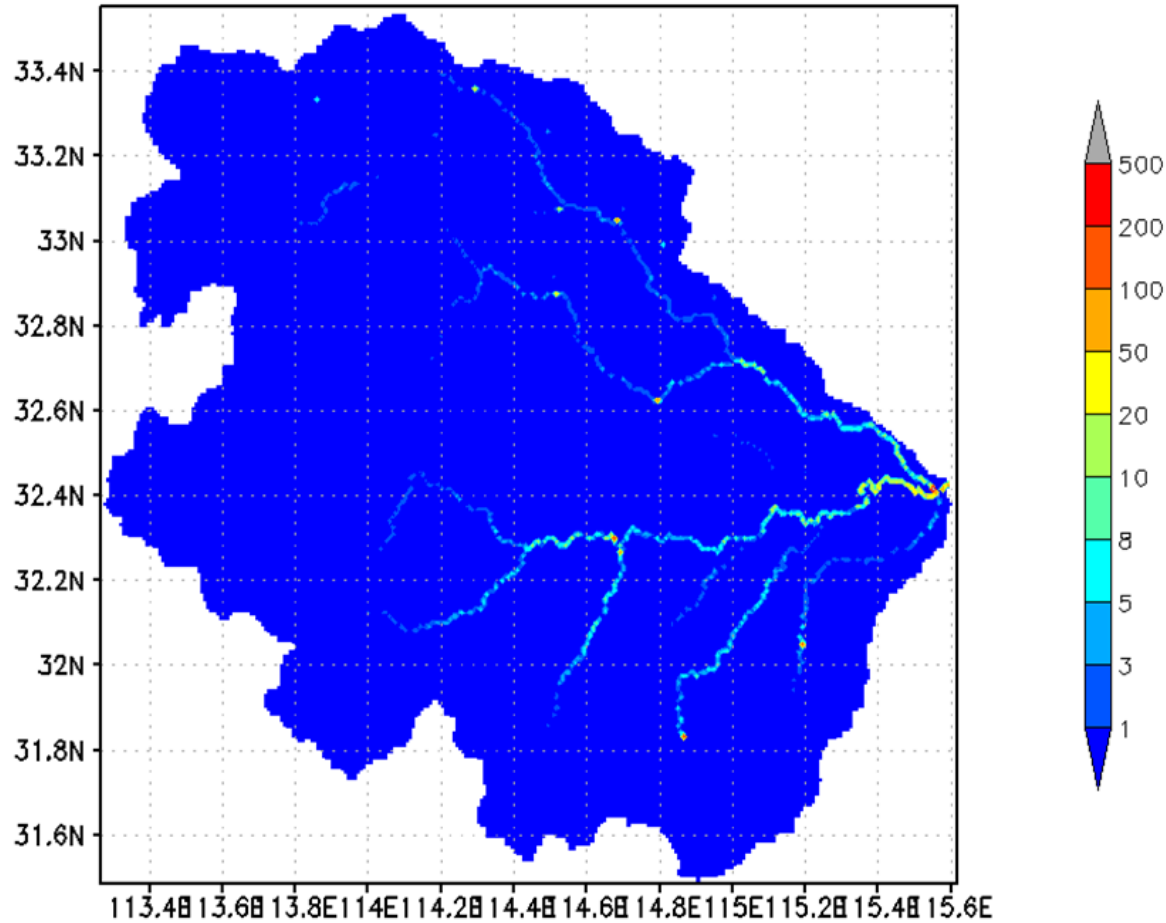


August 2010 Pakistan Stream Flow (m³/s) 2010-08-01 00h

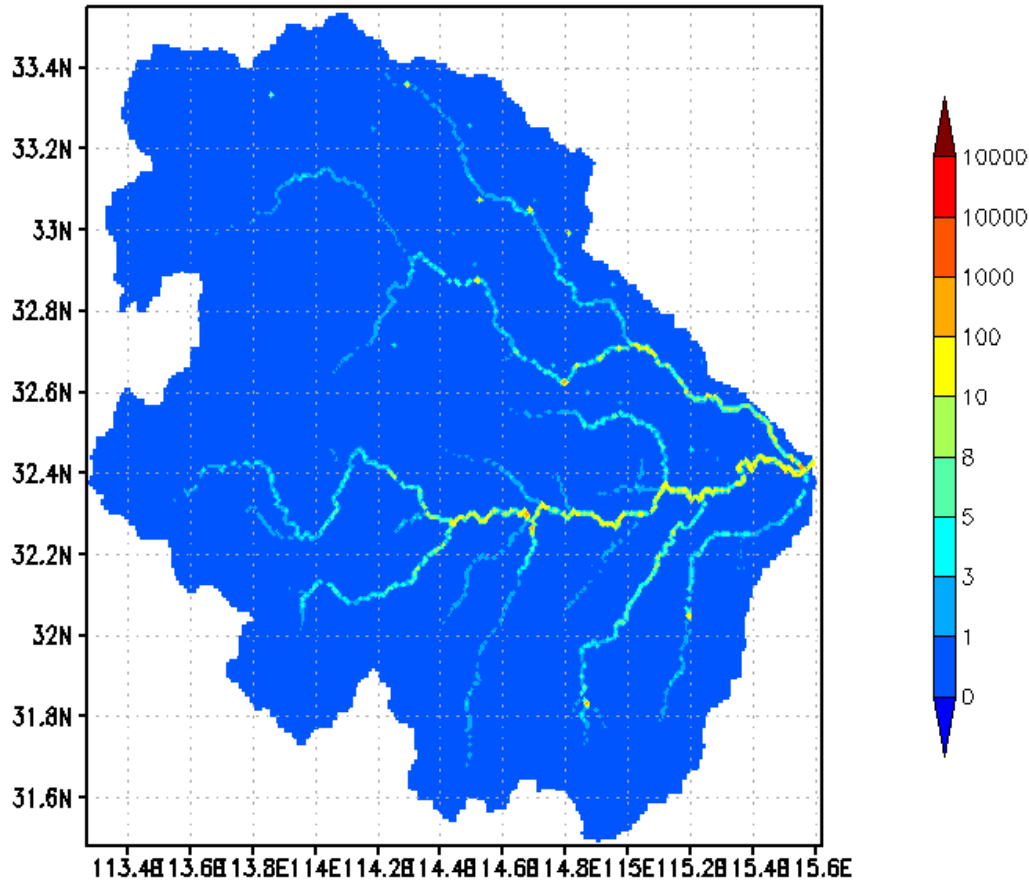


Wangjiaba Huaihe, China

Latest 24h/3h Stream Flow (m^3/s) 2012-03-14 06h



Stream flow (m³/s) 09Z20Mar2012



[↑]
Zoom in

[↑↑↑]
Zoom out

Select plot type:

Shaded

Jump to (lat, lon):

32.52 114.44

T1: 09Z17Mar2012

T2: 09Z20Mar2012

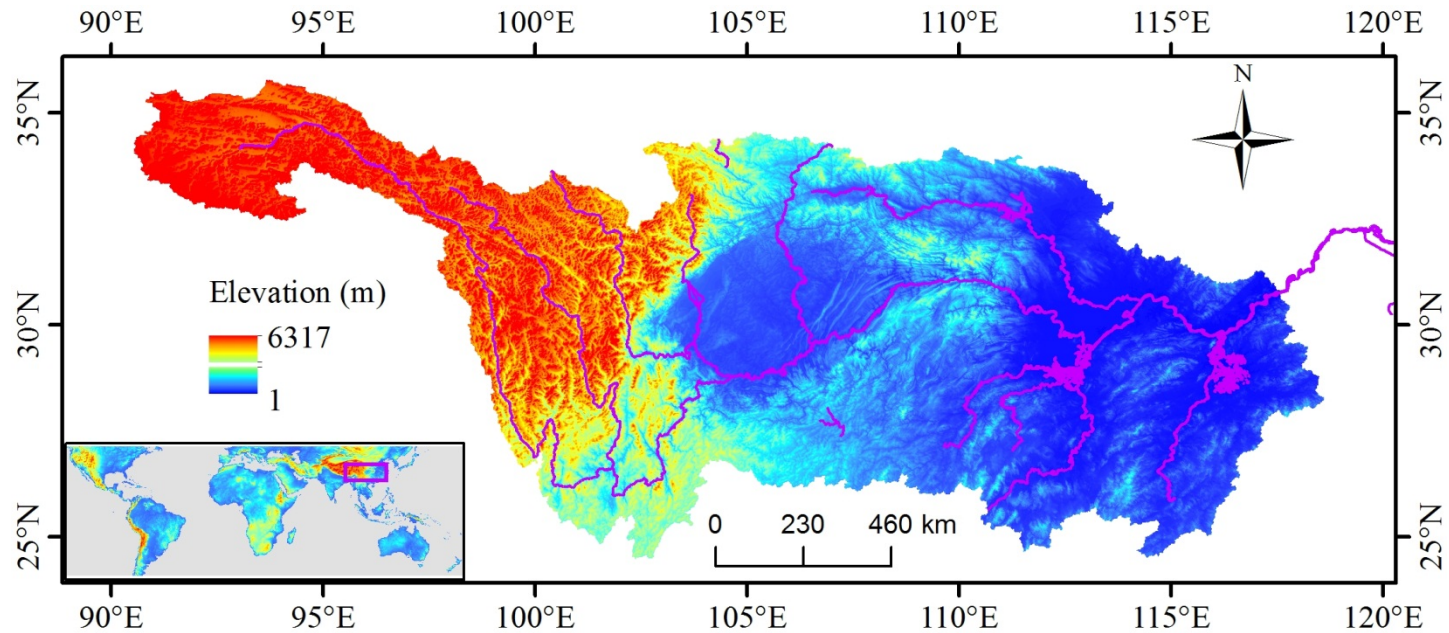
Select variable:

Stream flow

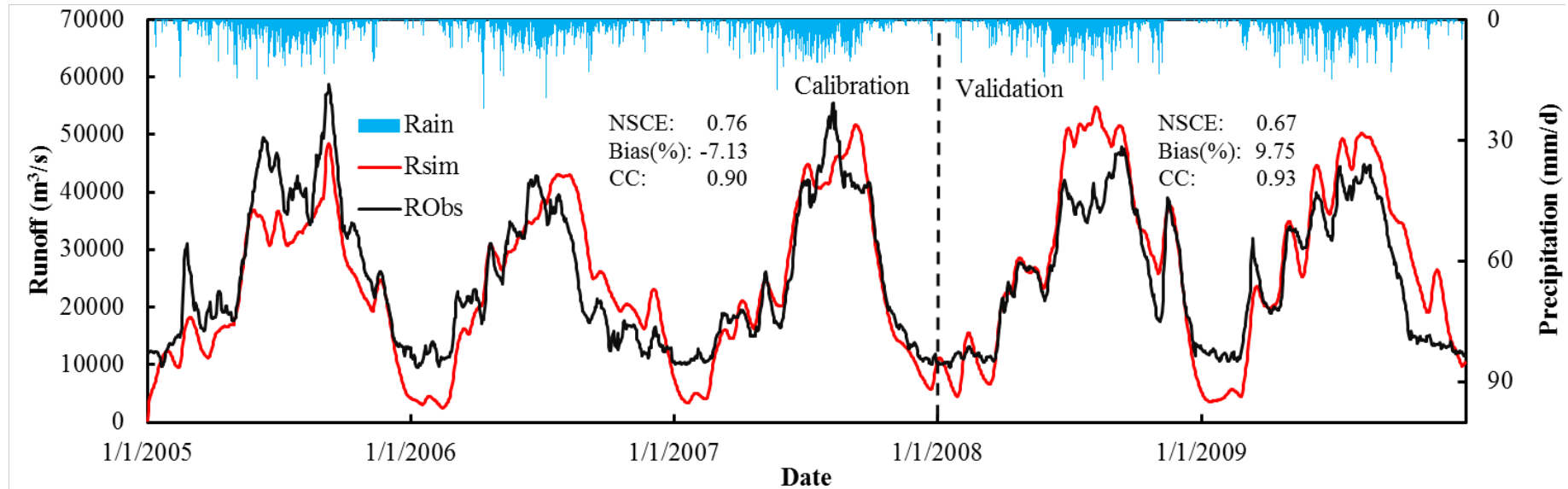
Start time: 09Z17Mar2012 End time: 09Z20Mar2012



Datong Station, Yangtze River, China



Comparison of simulated and observed discharge during the calibration and validation periods



Thank you for your attention!

Any questions and/ or comments?

