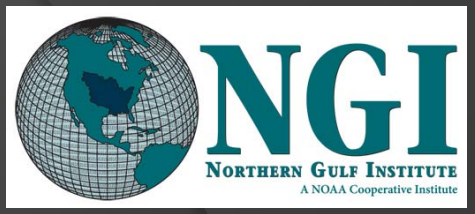


FLOODVIZ
VISUAL ANALYTICS FOR ASSESSMENT AND INTERPRETATION OF SIMULATED RIVER FLOODING

NGI Annual Meeting

May 2010

FloodViz Team

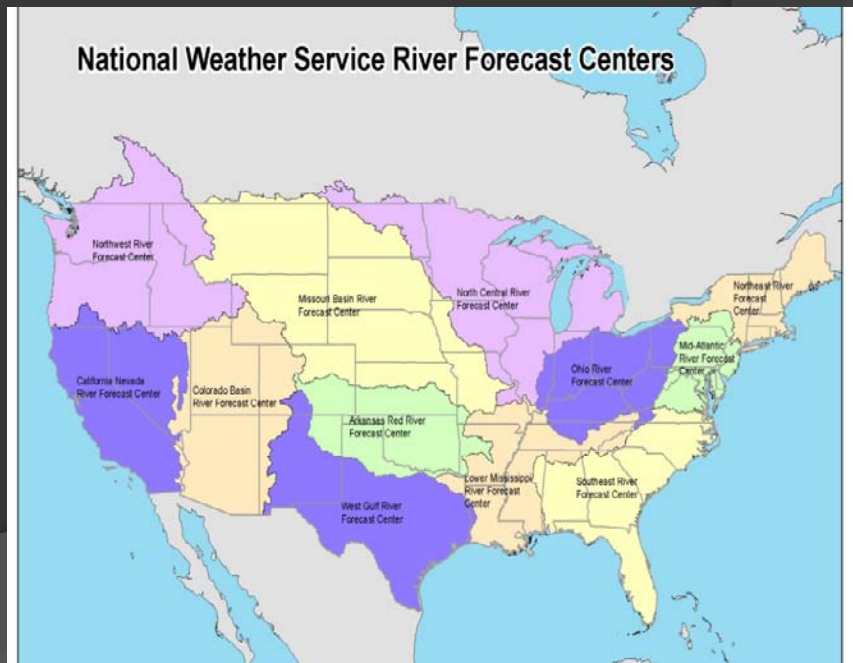
- Lower Mississippi River Forecast Center
  - David Reed
  - Jeff Graschel
  - David Welch
  - David Ramirez
- Mississippi State University
  - Philip Amburn
  - Jamie Dyer
  - Robert Moorhead
  - Song Zhang
  - Derek Irby
  - John van der Zwaag
  - Jibonananda Sanyal

Outline

- LMRFC Overview
- River Forecast
- Visualization Needs
- FloodViz
  - Concepts
  - Plans
  - Schedule
- Summary

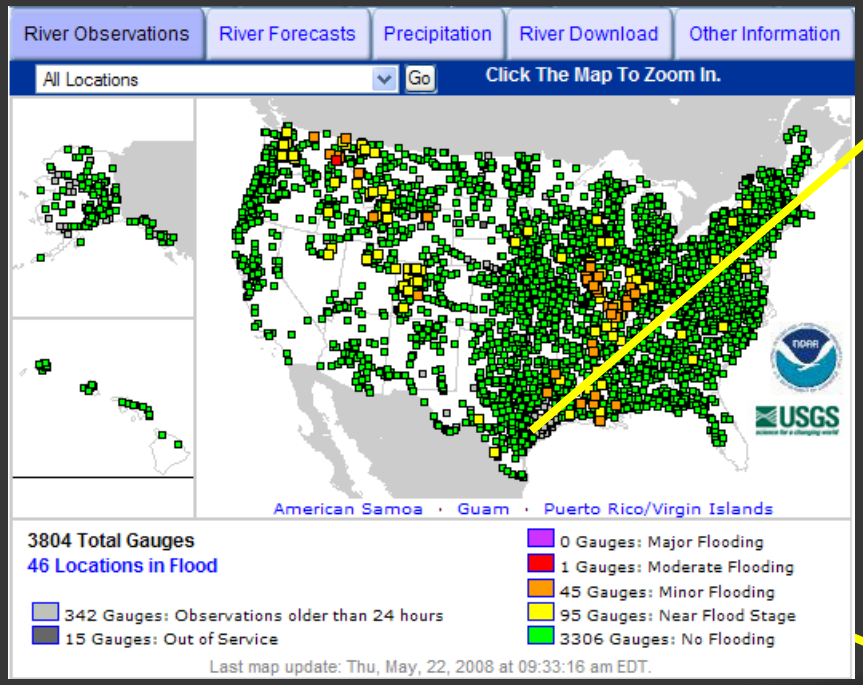
Lower Mississippi River Forecast Center

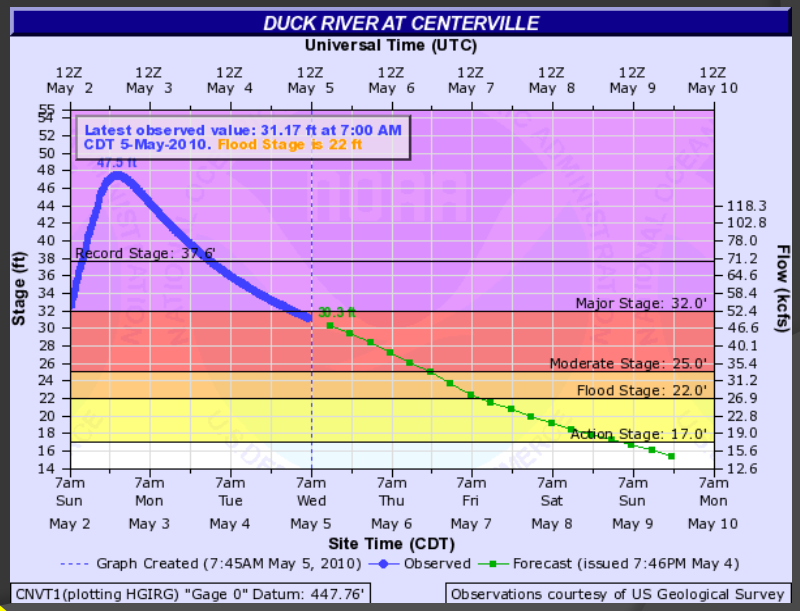
- One of 13 River Forecast Offices
  - Run hydrologic and hydraulic simulations of water runoff and stream routing to provide river forecast to the public.
- Daily Operations
  - Data collection and quality control
  - Precipitation and Hydrologic Forecasts
- Spectrum of Flood Hazards
  - Tropical systems
  - Snowmelt
  - Ice jams
  - Dam/Levee failures
  - Flash Floods



River Forecasts

- Model Simulations performed at each sub-basin (500+ sub-basins in Lower Mississippi RFC area)
- Deterministic forecasts issued at 220+ points

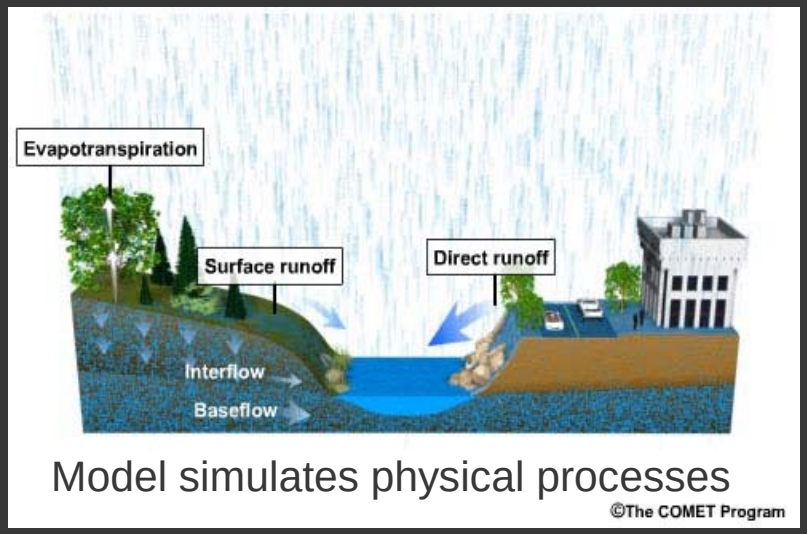




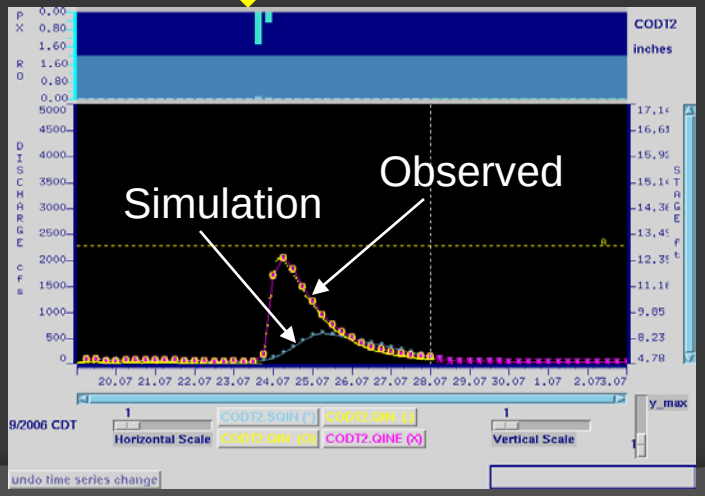
http://www.srh.noaa.gov/lmrfc/

River Forecasts

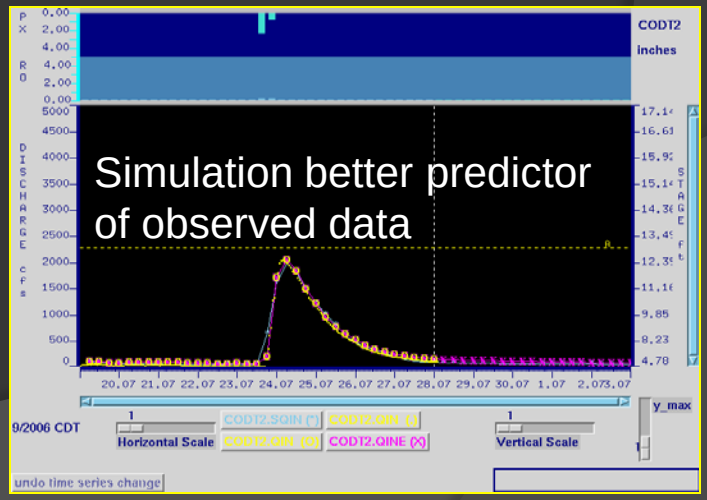
- Conceptual models used to simulate physical processes on soil column
- Extensive initial calibration of model parameters
- Forecasters use interactive program to adjust model parameters in real time
- Lack real-time visualization tools for flood mapping



Model simulates physical processes



Forecasters adjust model parameters in real time



Visualization Needs

- Common customer feedback – inundation mapping to allow users to visualize flooded areas
- Inundation maps being provided at select locations on a trial basis
- Similar need for RFC forecasters- currently no method to provide that information in real-time.

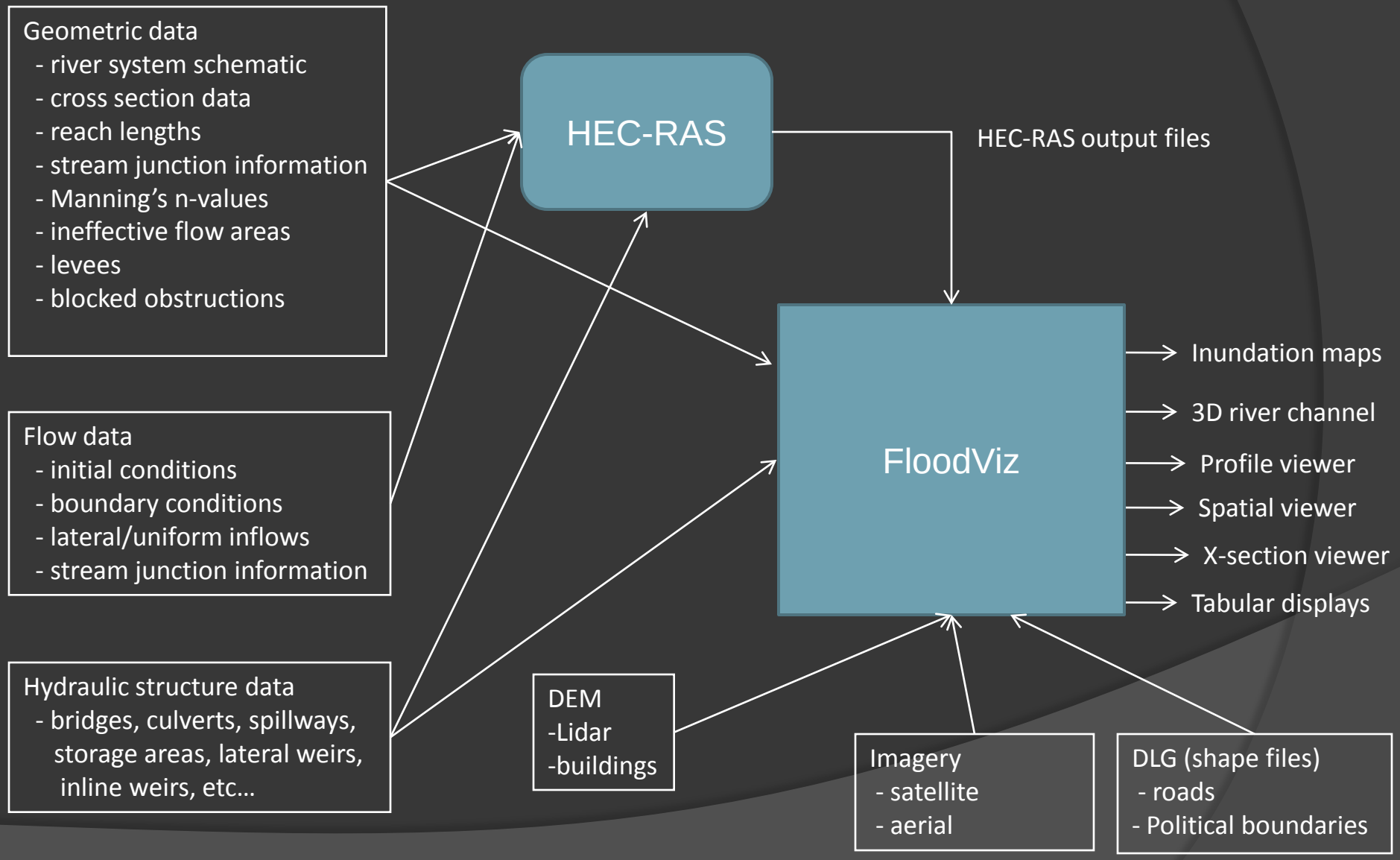
FloodViz – Concepts

- River flooding – a primary cause of weather-related damage to lives and property
- Numerical modeling is increasingly important; NOAA has selected HEC-RAS
  - Can more easily build geo-referenced hydraulic models
- FloodViz
  - Software visualization and analysis tool
    - Visualize the extent of flooding
    - Help forecasters relay information to emergency managers
  - Open source foundation
    - OpenGL
    - Qt

FloodViz - Plans

- Create inundation maps
- Analysis tools
- Compatible with NWS plans for AWIPS hardware and software
  - Linux-based environment
- Integrate with NWS Community Hydrologic Prediction System (CHPS)

FloodViz high-level block diagram



FloodViz – Schedule

- Three phases in software development in 2010
  - Phase I – infrastructure, completed in May
  - Phase II – initial GUI, file readers, initial 2D and 3D visualization
  - Phase III – initial version of FloodViz
- 2011
  - Beta version at LMRFC
  - Version 1.0 at end of year