



Extreme Precipitation Analysis vs. Archived Storms in a Digital Age

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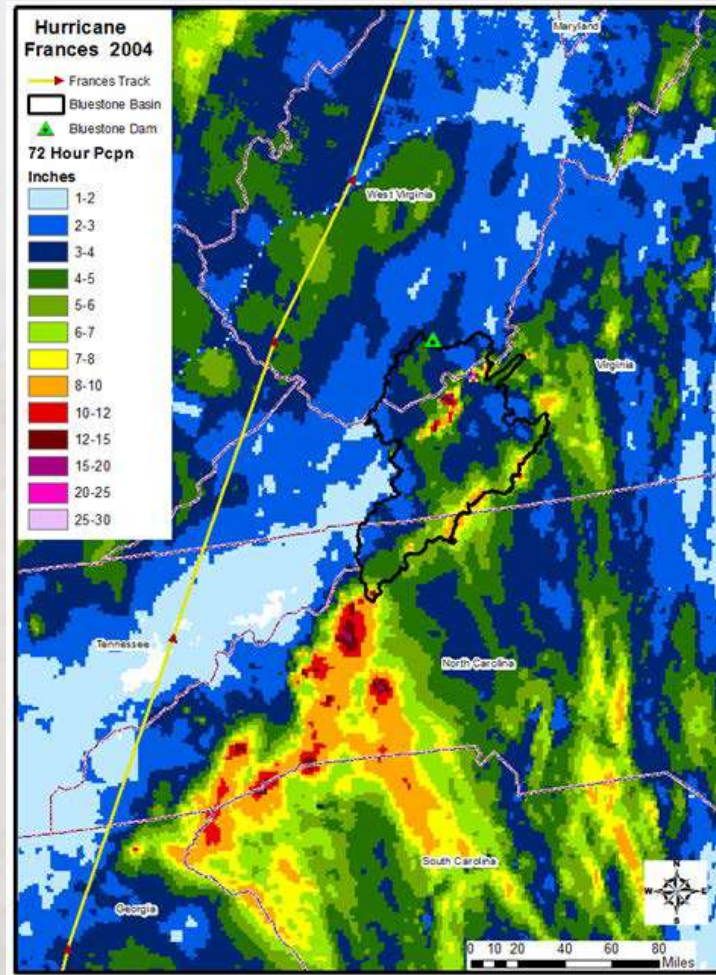
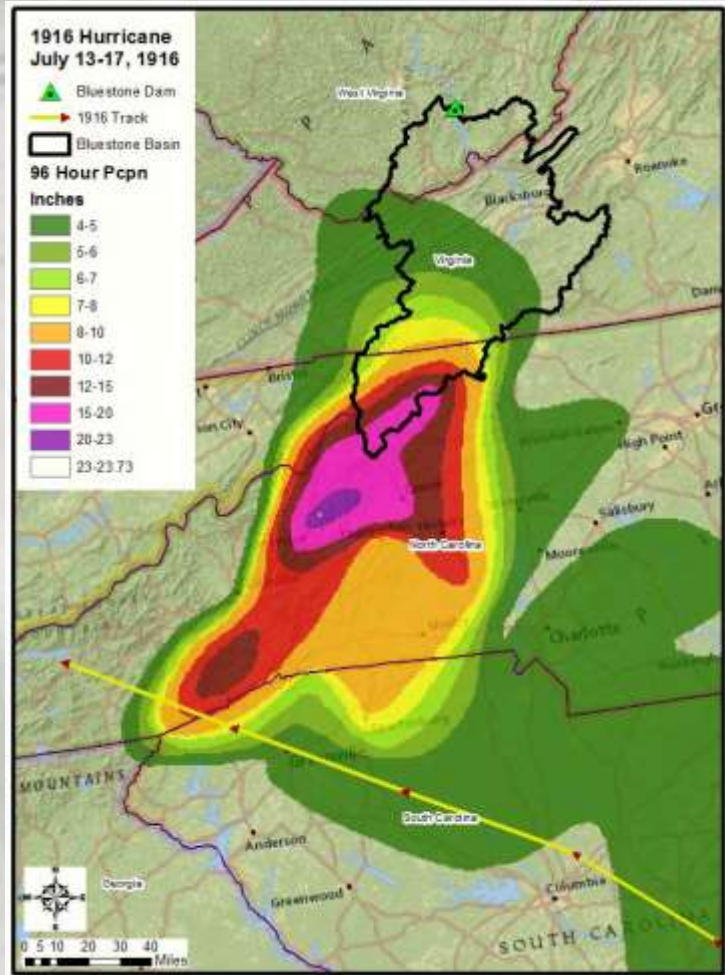
NOAA/National Weather Service

May 2, 2017

The Beginning of Extreme Storm Analysis

- Data from Large Storms Used in the Design of a Majority of Reservoirs throughout the United States
- Historical Data was mainly gathered from Rainfall Reports (Aviation, COOP), from Corps “Bucket Surveys” or other Agency Observations
- Simple Thiessen Polygon Isohyetal maps likely created larger than normal Depth/Area data than the actual rain event
- Terrain effects were often generalized or not depicted accurately in the isohyetal map.

An Example of the limits of Archived Data



Archive Transitioned into the HMRs

- National Weather Service started documenting a method to estimate probable maximum precipitation (PMP) in the 1970s called a Hydrometeorological Report (HMR)
- The NWS created a series of HMRs gradually expanding the study methods to include creating PMPs in the Western U.S. by the late 1990s
- Methodologies were based on original NWS staff experience, some loose storm physics mixed with some factors limited within the storm, such as precipitable water. The idea was to take large storms from the Atlas and “maximize” them for the most precipitation possible... but not too much
- Storms used in the HMRs were very limited in the western U.S.

Large Rain Events and Aging Infrastructure

- Many lakes that were created by simply taking an existing storm and moving it over a specific basin had drawbacks
- Aging lakes needed to be reassessed whether they could accommodate really large storms, the original storms they were designed for
- Biggest problem:
Lack of enough storm data!

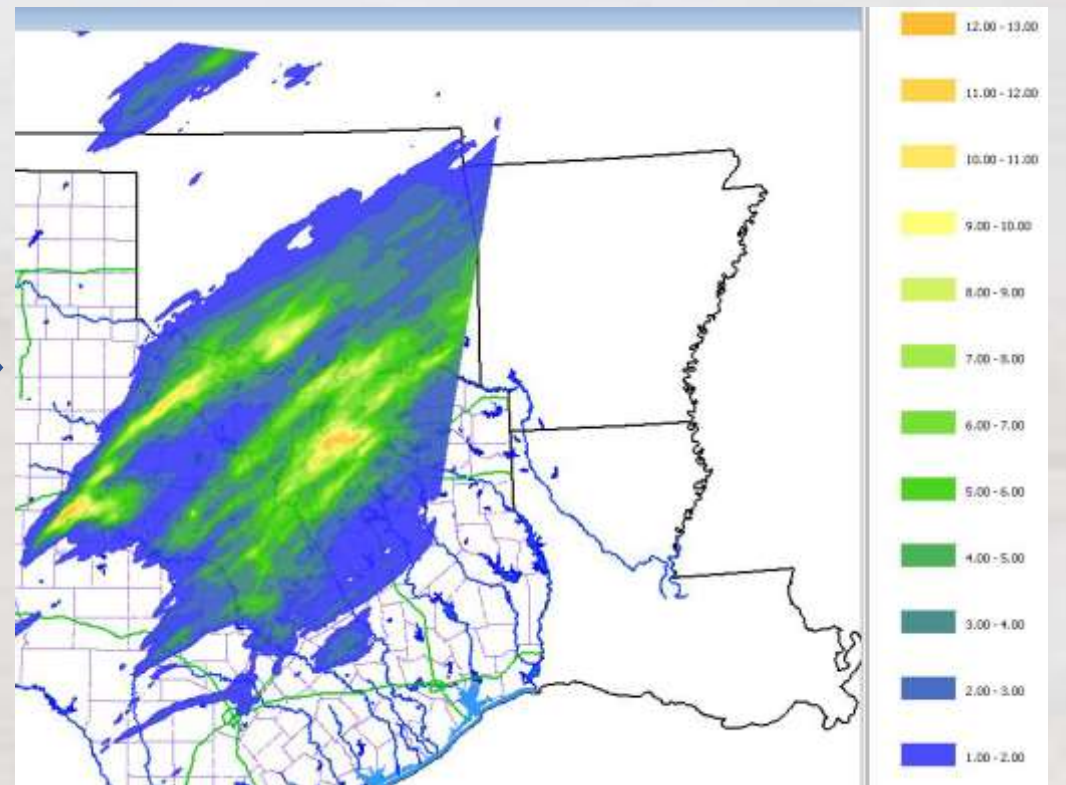
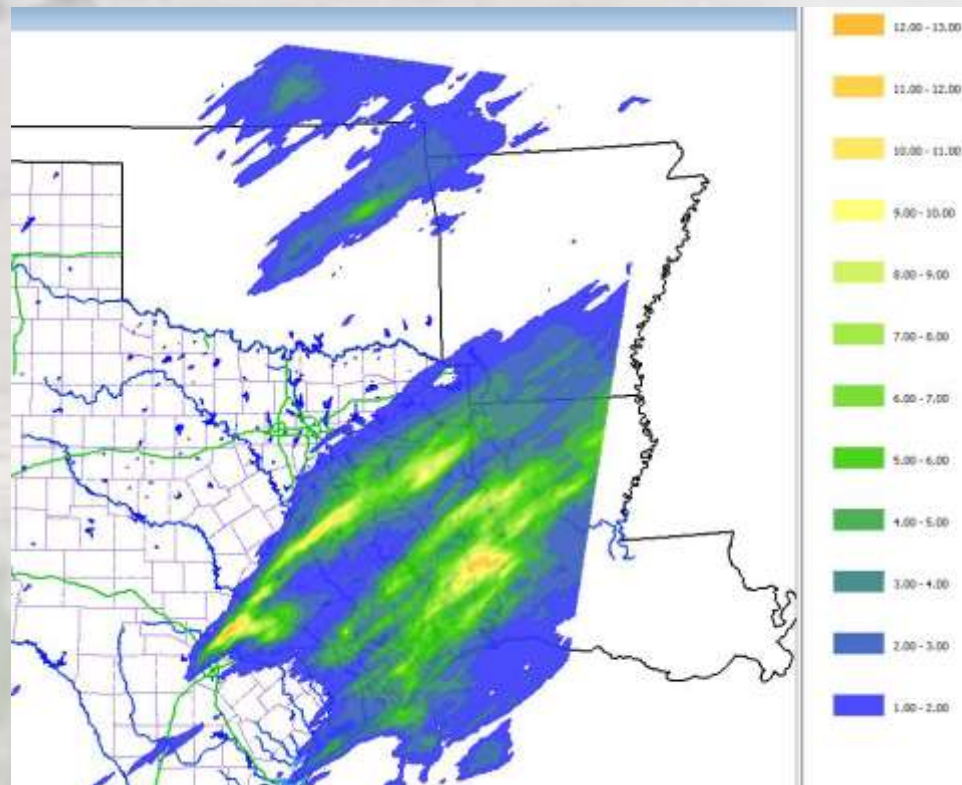
The Future is In the Data

- In 2009, the USACE started looking into a new collection of digital storm data
- The new data would be based on digital Multisensor Precipitation Estimate (MPE) data that had already been QC'd by the RFCs
- Thousands of storms were broken into ascii grids and processed to produce new depth/area/duration information on each storm.

The Future is the Data...and Method

- The Corps is creating a new database of storms that will eventually be accessible by other agencies or even the public*
- A new software tool called MetVue can ingest the gridded data and produce the Depth/Area/Duration data for large storms – on the fly
- Storms data can be transposed, rotated and trimmed
- Corps will be performing a reanalysis on the most significant historical storms.

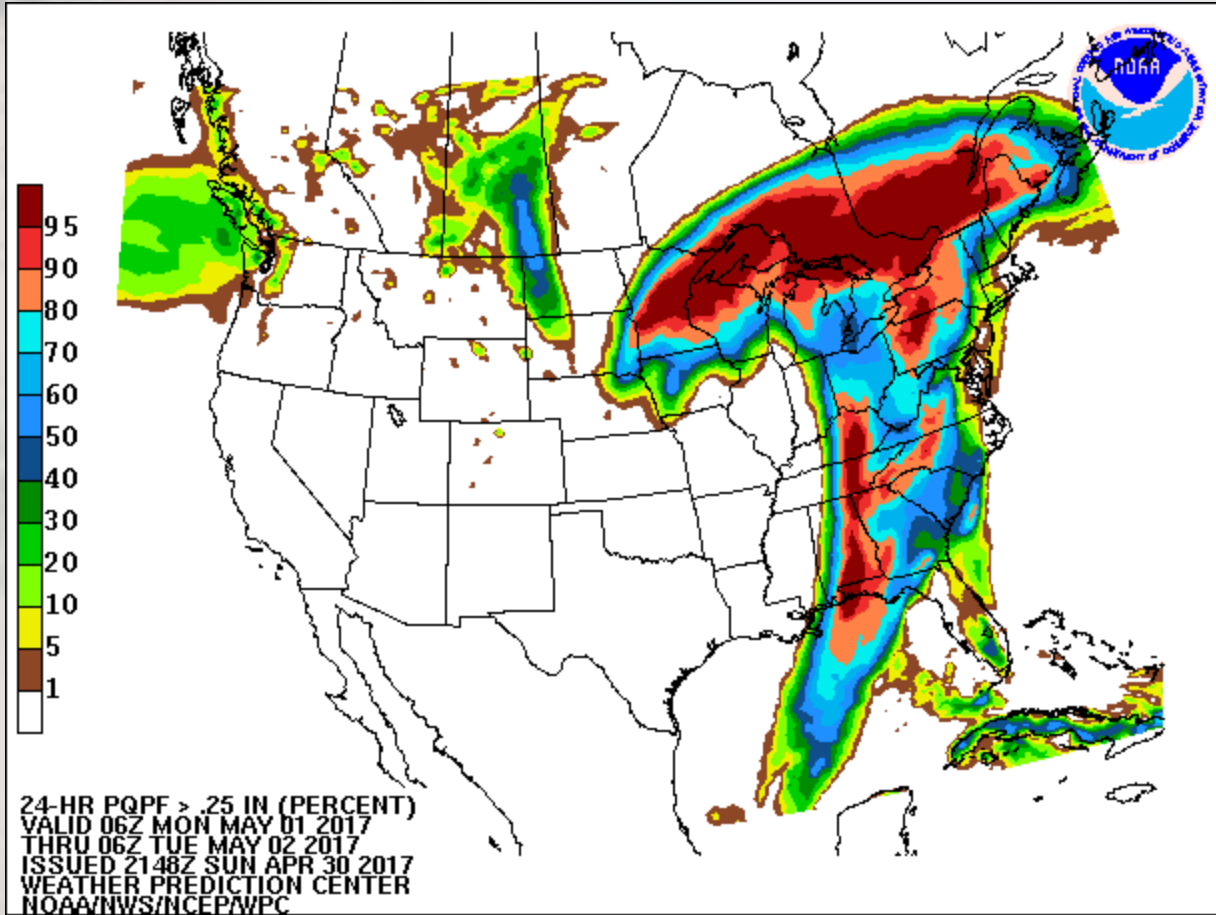
Screen Shots of Metvue



New Methods of Estimating Max Precip

- Existing methods to estimate PMP are very old and need to be updated urgently
- Or...
- Stop trying to attach a “number” to the area and instead create a probabilistic approach to estimating extreme rainfall
- New NWS software will be venturing into this realm...

Example of the new WPC Probabilistic QPF





Questions?