Storm Precipitation Analysis System (SPAS)

The Storm Precipitation Analysis System (SPAS) is a state-of-the-art storm centered depth-area-duration (DAD) tool that produces a comprehensive temporal and spatial analysis of storms' precipitation for hydrologic, legal, probable maximum precipitation (PMP) and storm/flood assessment uses. Designed by Metstat, Inc and Applied Weather Associates, LLC, SPAS uses the latest advancements in Geographic Information Systems (GISs) to produce hourly or sub-hourly rainfall maps/grids, total storm precipitation map/grid, mass curves for any location, DAD results and more. Based on a similar approach used by the National Weather Service, SPAS output has achieved a level of consistency between newly analyzed storms and hundreds of historic storms previously analyzed. The multi-faceted SPAS process includes:

- **Identification and definition of storm,** area, duration, and time.
- **Development of storm precipitation database** using our comprehensive databases of hourly, daily, and supplemental weather observations. Plus observations from reliable outside sources.

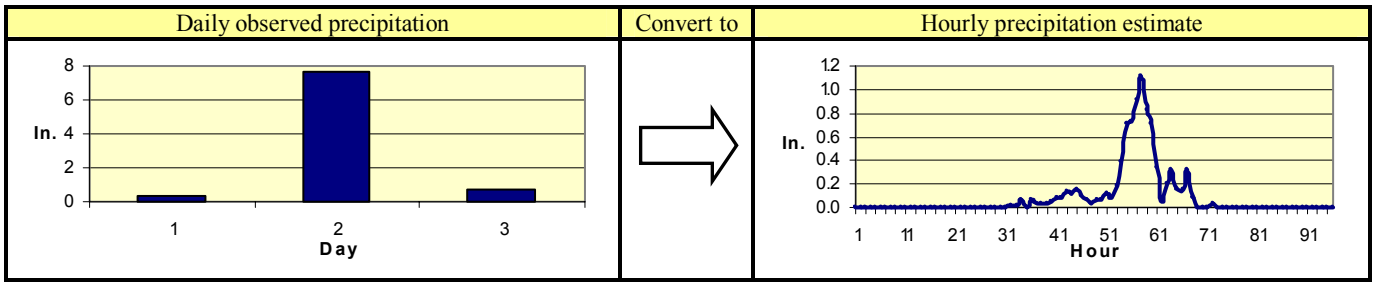

Figure 1. Illustration of how precipitation at a daily station is converted into an hourly distribution.

- **Conversion of all precipitation data into estimated hourly precipitation** using surrounding hourly recording sites or radar data to define the temporal distribution of precipitation at each daily station. See Figure 1.
- **The incorporation of the National Weather Service's network of Doppler radars (NEXRAD)** to obtain gauge-adjusted radar rainfall data, a dataset that maintains volume accuracy at gauge locations while retaining the spatial information from NEXRAD radar data.
- **Calculation of complete storm-centered depth-area-duration (DAD)** table/curve. See Figure 2.
- Creation of **high-resolution precipitation grids.**

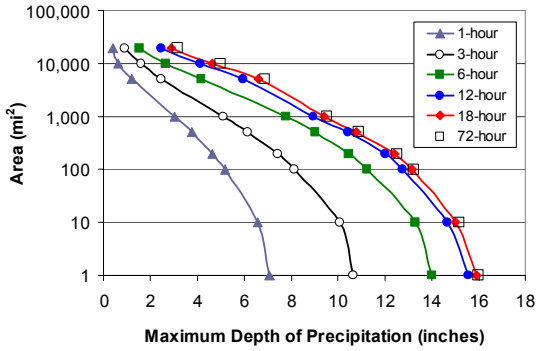

Figure 2. Depth-area-duration (DAD) curves.

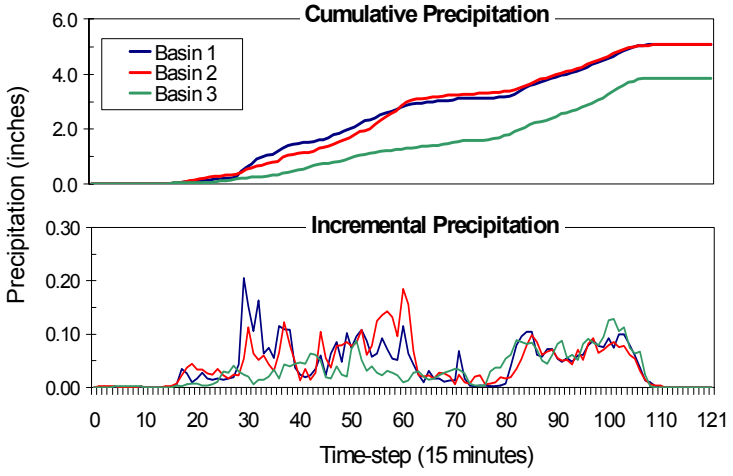

Figure 3. Gridded basin precipitation values from SPAS analysis

- **Creation of mass curves** to evaluate the temporal characteristics of the storm and quality control observed hourly precipitation data. See Figure 3.
- A variety of customizable output, including:
  - Total storm **isohyetal analysis** and hourly isohyetal analysis.
  - Comprehensive **station list**, including station density statistics and quality control reports.
  - Cumulative and incremental precipitation datasets
  - **Storm animation** series for cumulative and incremental precipitation.

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