

An unresolved and challenging problem in the hydrologic and meteorologic fields is the spatial, temporal, and seasonal characteristics of precipitation. Serving as a committed partner to our private and public clients, Metstat has a specialized niche to address these challenges using its expansive in-house database of archived climatological and meteorological data to provide high quality precipitation datasets and analysis for hydrological and meteorological interests.

- **Precipitation Frequency:** Precipitation frequency estimates (e.g. 100-year 24-hour) are used as basic design criteria for a variety of hydraulic structures such as dams, roadway drainages, bridges, and culverts. L-moments and frequency analysis utilize a dataset (annual maximum series or partial duration series) to estimate the characteristics of the underlying population by selecting and parameterizing a probability distribution (e.g. Gumbel, Log-Pearson, Generalized Extreme Value (GEV)). See Figure 1 and Table 1.

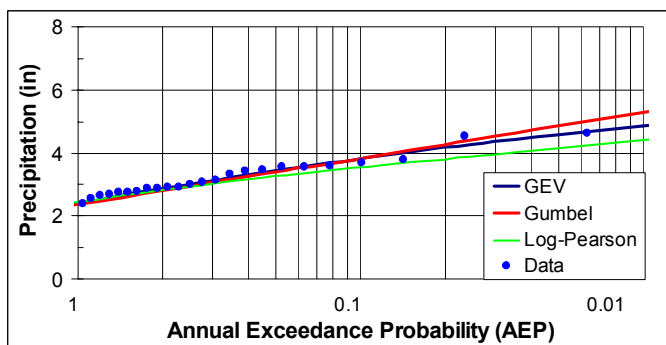


Figure 1. Plot of precipitation data and frequency distributions.

Precipitation Frequency Calculations
(period of record 1961-2000)

Return Period (years)	GEV (in)	Gumbel (in)	Log-Pearson (in)
1	1.21	1.40	1.52
2	2.66	2.60	2.64
5	3.37	3.32	3.19
10	3.79	3.80	3.52
25	4.26	4.40	3.89
50	4.57	4.85	4.15
100	4.86	5.29	4.40
200	5.12	5.74	4.63

Table 1. Table of precipitation frequency estimates.

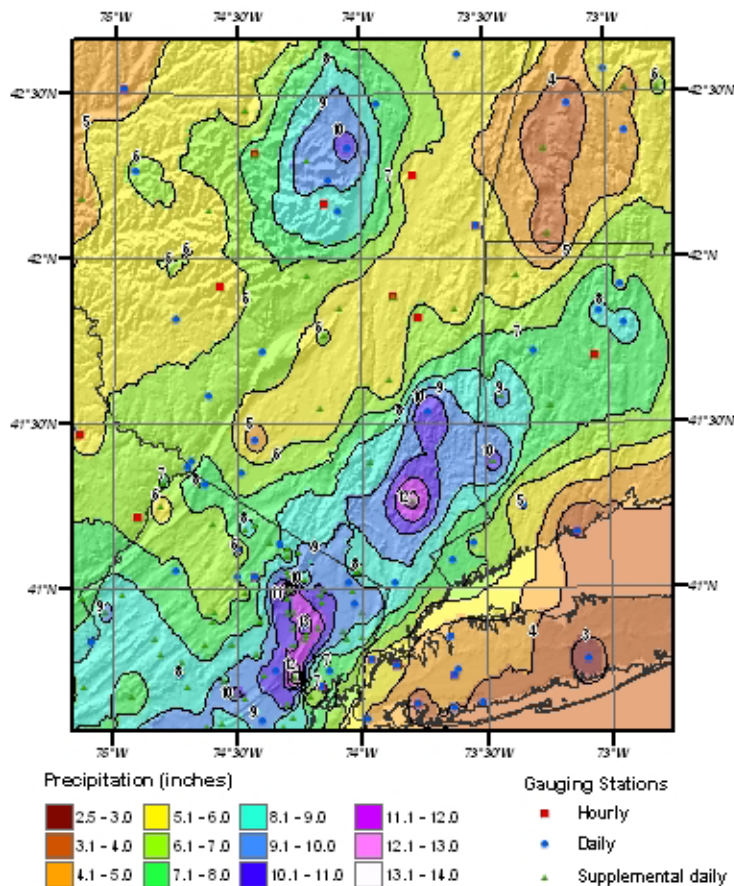


Figure 2. Total storm precipitation using spatial interpolation methods.

- **Spatial Interpolation:** Spatially distributed estimates of meteorological data are becoming increasingly important as inputs to spatially explicit meteorologic, hydrologic, regional, and global models. Metstat has developed a proven, government-accepted and cost-effective spatial interpolation technique that utilizes base maps (e.g. elevation, NEXRAD radar, mean monthly/annual precipitation) which increase the accuracy of the spatial interpolation at ungauged locations. See Figure 2.
- **Quality Control:** A large portion of precipitation frequency analysis and interpolation procedures are allocated to quality control (QC) methods. Potential errors associated with precipitation datasets are gauge undercatch, timing, data shifts, observer error, and metadata (latitude, longitude, elevation). All are essential for an accurate assessment of precipitation datasets. Metstat uses a QC process that examines the timing, magnitude, and interpolated values for the identification of erroneous data.
- **Quality Controlled Precipitation Datasets:**
 - Daily, Hourly, Sub-Hourly, and Supplemental
 - Hourly Upper Air Observations
 - Gauge-adjusted radar precipitation
 - Special Dataset Orders/Requests