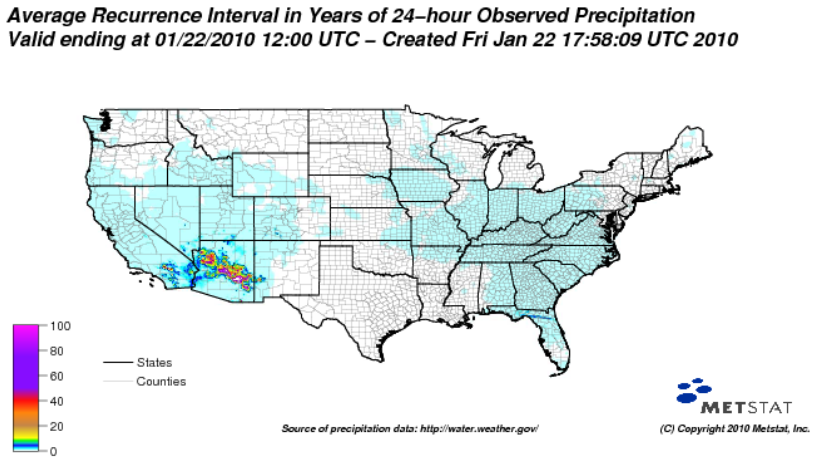
Average Recurrence Interval of Precipitation
fact sheet

As society and infrastructure become increasingly more vulnerable and impacted by extreme precipitation, the requirement for timely, accurate and informative precipitation information is paramount to protecting property, saving lives and efficiently managing water. Accurate precipitation data is becoming increasingly available, but translating it into meaningful information to support decisions is often difficult. To make precipitation data more meaningful, Metstat has developed an innovative technique for translating near real-time precipitation maps into a "return period" maps so users have timely, accurate and spatial details of recent precipitation. Knowing how much precipitation fell at a particular location during a certain amount of time is useful, but expressing the rarity of precipitation in terms of a "return period" provides an objective and useful perspective of the precipitation.



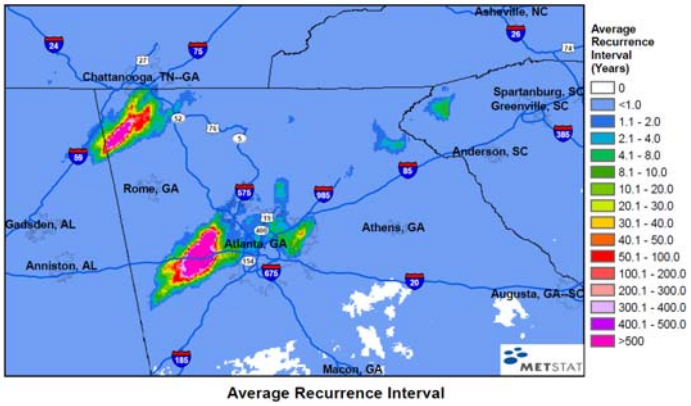
Sample version of ARI map posted at www.metstat.com

The use of the term "return period" has been criticized for leading to confusion in the minds of decision makers and the public because it is sometimes misinterpreted as implying that the associated magnitude is only exceeded at regular intervals, and that they are referring to the elapsed time to the next exceedance. Therefore, to clarify the meaning and to be consistent with NOAA's Hydrometeorological Design Studies Center (HDSC), the use of the term average recurrence interval (ARI) is used. The ARI is the average number of years between exceedances of a given precipitation depth for a given duration at a specific point location. For example, the ARI of 6 inches of rain in 24 hours in Washington, D.C. is 25 years. In other words, Washington, D.C. can expect 6+ inches of rain in 24 hours to occur, on average, every 25 years.

Until now, calculating the ARI of a given precipitation event has been inefficient, generalized for an area based on a single observation and/or lacking reliable underlying data. Our methodology address each of these by objectively computing ARI's using HDSC's official precipitation frequency atlas's (http://www.nws.noaa.gov/oh/hdsc/currentpf.htm) in conjunction with observed precipitation maps from the National Weather Service (NWS) and/or Weather Decision Technologies, Inc. (WDT) for every point (grid cell) across the United States. A free version the daily ARI map, based on NWS data, is shown above and also available at http://www.metstat.com.

An ARI map provides an objective determination of areas where observed precipitation exceed a certain threshold, for instance 100-year for disaster assistance or 1000-year for a potential dam failure. The map shows values in units of years, so for example, a 20 means that the observed 24-hour precipitation at that location occurs on average every 20 years. An ARI map shows how typical or atypical the observed precipitation was for a specific duration.

24-hour Accumulated Rainfall

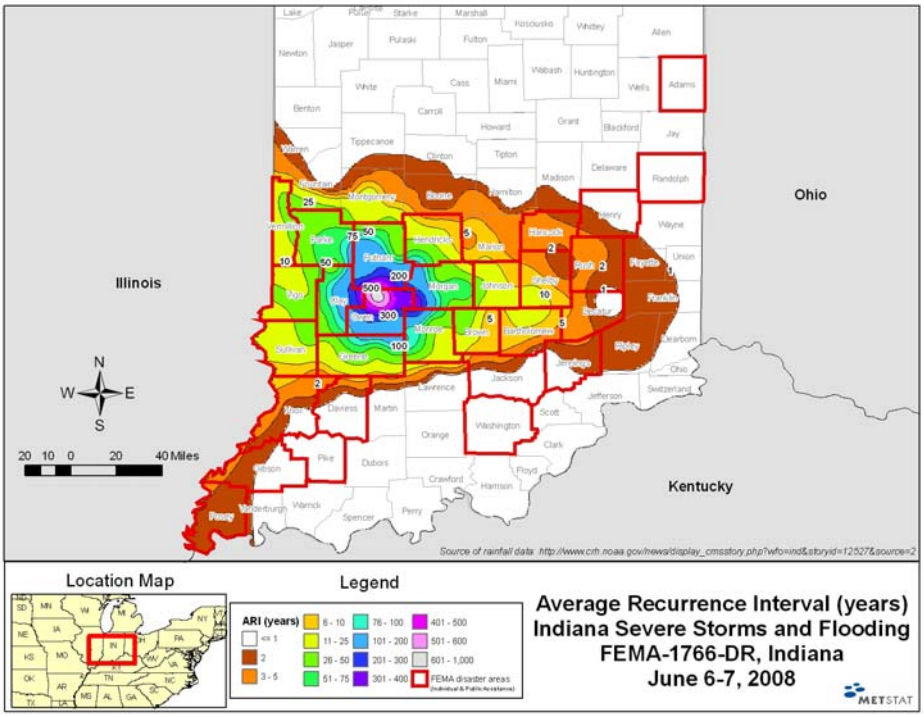


Average Recurrence Interval

Severe Flooding – Southeast U.S. rainfall and average recurrence interval for 24-hour period ending at 21-Set-2009 07:00 AM EDT.

Currently, Metstat is producing a free, coarse (4km x 4km) resolution 24-hour ARI map of the continental United States based on gauge-adjusted radar precipitation data from the NWS. Based on more timely, accurate and higher resolution (1km x 1km) gauge-adjusted radar precipitation from WDT, customized ARI products and services (e.g. text message alerts) are also available. Efforts are underway to expand to Puerto Rico and Hawaii as well as adding additional durations and variables (e.g. snow). Plans are in place to also provide forecast ARI products, thereby giving clients an idea of how significant (in terms of ARI) a precipitation event is expected to be. Near-real time ARI maps are a powerful and unique tool that could benefit a wide variety of users, including:

- Dam owners - for triggering emergency action plans (EAPs)
- Dam operators
- Media - now weathercasters can say "A 100-year rainfall event occurred in Chicago yesterday")
- FEMA - for deploying emergency personnel and services
- Storm water managers
- County/city flood control districts
- Insurance companies - verification of unusual rainfall that resulted in a claim
- Sewer districts
- Irrigation districts
- Emergency managers - receive email/text alerts of extreme precipitation
- Department of Transportation - notify bridge inspectors of areas were ensuing flooding could compromise bridges
- Private weather forecast companies - notify clients of extreme rainfall
- Weather enthusiasts
- Flood warning systems



Sample application map depicting disaster areas and ARI of 2-day rainfall.

About Metstat, Inc.

For nearly 20 years, Metstat has been providing high quality storm analysis and spatially distributed precipitation products for optimized hydrologic design. Metstat has played a key role at NOAA's NWS Hydrometeorological Design Studies Center and the development of precipitation frequency (e.g. 100-year 24-hour precipitation) estimates for 10 years. Metstat, Inc is the nation's leader in extreme precipitation analysis and is well suited to provide real-time precipitation monitoring through our innovative ARI mapping and our Storm Precipitation Analysis System (SPAS), which provides a compressive array of data for use in hydrologic model validation/calibration, hydrologic design optimization, storm water analyses, litigation, inundation mapping, probable maximum precipitation (PMP) studies and precipitation monitoring.

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