



# NOAA Atlas 14 Precipitation-Frequency Estimates for Maryland

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Maryland Association of Floodplain and Stormwater Managers, October 2009, Linthicum, Maryland







- NOAA Atlas 14 Status
- NOAA Atlas 14 Products
- The Precip Frequency Estimates Have Changed
- Why?
- What About Climate Change?



#### **NOAA Atlas 14 Status**











www.nws.noaa.gov/ohd/hdsc

#### Linthicum, MD Example







# Why Are Estimates Different?



Much More Data

Longer period of record
Denser network

Better Statistical Techniques
Better Spatial Interpolation
We Don't Think It's Climate Change



## What about Climate Change?



- Impact on PF is small
  - compared with error in estimation
- Climate Models
  - change is small through 50 years (wrt uncertainty of estimates)
  - change is large in 100 years (wrt uncertainty of estimates)
  - large difference between models and between forcings
    - swamps uncertainty and trend
    - downscaling questionable

Climatologists Use Many Subjective Terms – heavy, very heavy, extreme – generally mean 1 -5 year ARI – generally only 24 hour duration

**Need Information in Engineering Terminology** 



TVVP 11/8/2004









### **Much More Data**



 Average Record Length over 60 Years
 over triple

**TP49** (2-10 day, 1964)

 360 daily stations for contiguous U.S.

NA14 Vol 2 - 2,846 daily stations Table 4.1.2. Information for daily, hourly datasets through 12/2000 and n-minute datasets through 12/1997.

|                                  | Daily     | Hourly    | N-minute  |
|----------------------------------|-----------|-----------|-----------|
| No. of stations                  | 2846      | 994       | 96        |
| Longest record length (data yrs) | 126       | 101       | 105       |
| (Station ID)                     | (30-5801) | (36-6889) | (31-9457) |
| Average record length (data yrs) | 63        | 40        | 67        |



Figure 4.1.3. Plot of percentage of total number of daily stations used in NOAA Atlas 14 Volume 2 versus data years.

# **Better Statistical Techniques**



- Regional Analysis Based on L-Moments
   Hosking & Wallis, 1997
- L-Moments; More Robust Estimation
  - choosing distribution function
  - distribution shape
  - less sensitive to outliers
  - Regional Approach
    - common distribution shape per region
    - but estimates are at site
    - pools information from many points
      - reduces uncertainty

Uncertainty Estimates – possible with today's computer power

## **Better Spatial Interpolation**



- Statistical Estimates Are At Points

   observation sites
- Account for High Resolution Spatial Variation
  - terrain, local climate
  - gridded interpolations
    - 30 arc seconds
- PRISM Technology
  - Oregon State University
     PRISM Group



- hybrid statistical-geographic climate mapping
   spatial grids of distribution means for each duration
- Cascade Residual Add-Back (CRAB) – grow spatial patterns across different frequencies • for each duration
  - produce grids for each frequency