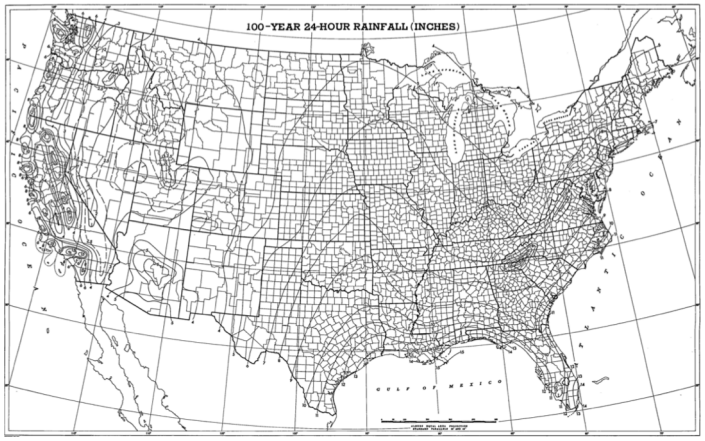
Precip.net: A precursor to NOAA Atlas 14 for the Northeast and a Living Extreme Precipitation Climatology

Art DeGaetano
Northeast Regional Climate Center
Department of Earth and Atmospheric Science, Cornell

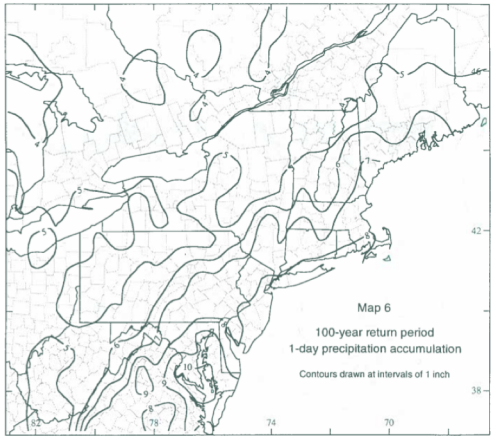
Cornell University

Northeast Regional Climate Center

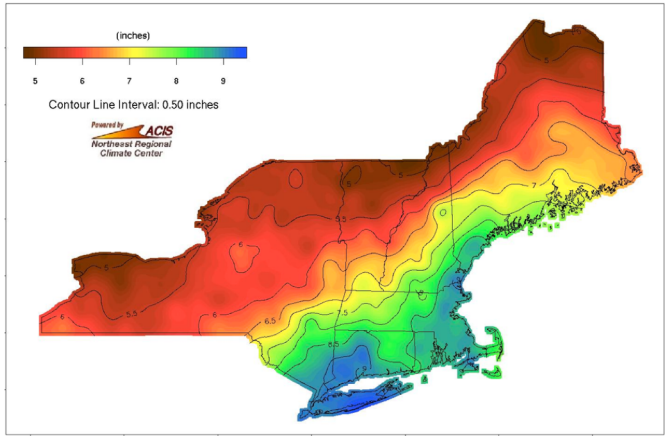
History of Extreme Precipitation



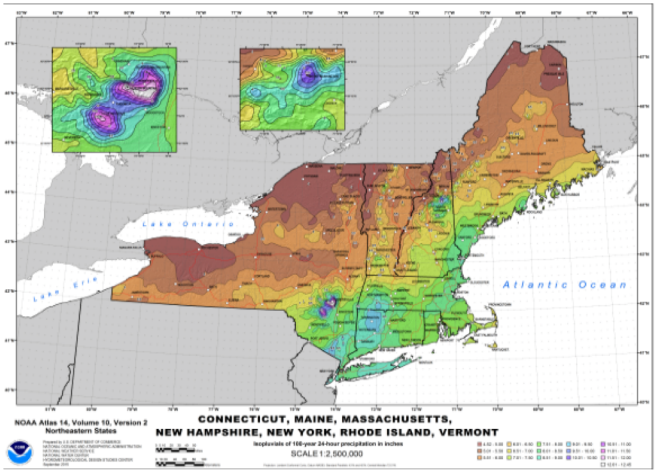
Technical Paper 40 (1961)



Wilks (1993)



NRCC (2010)



NOAA Atlas 14 (2015)

Project History 2009-2011

- USDA NRCS funded project for updated New York New England extreme precipitation atlas
- Match the products and output of NOAA Atlas 14 for NRCS compatibility.
- Add additional products to supplement NRCS hydrologic design.
- Produce automated real-time monitoring tools.

Data

- 2,070 Coop Stations
- 649 daily stations in eastern Canada.
- Start of record to end of 2008
- At least 20 year and<25% of data record missing
- Available NOAA hourly and sub-hourly datasets

NRCC QC Process

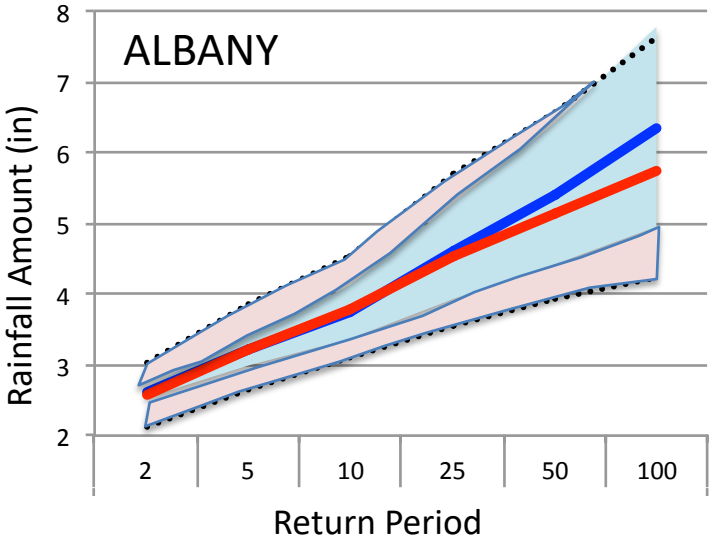
- Screened by Automated NOAA QC and than Validated by NRCC/NWS before entering database
- Further manual check of >5 inch PDS events that are not corroborated with nearby station reports of >3 inches.
- Correspondence between hourly PDS data and corresponding daily
  - Hours no greater than daily
- Manually screen PDS values > 2 standard deviations of the mean of all Northeast stations

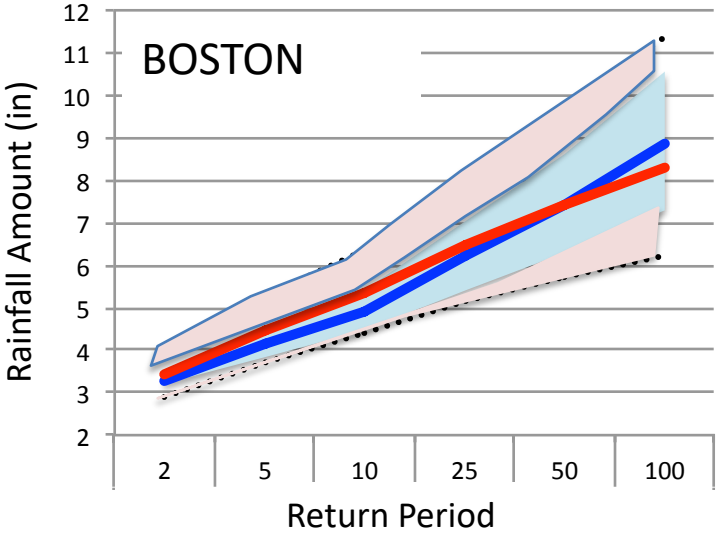
Screening of only PDS values makes annual updates manageable

Methodology Differences

- **DIFFERENCE 1** PDS versus AMS which is then converted to partial duration series results.
- **DIFFERENCE 2** Max Likelihood fit of Beta-P versus L-moments fit of the mainly GEV distribution.
- **DIFFERENCE 3** Post Analysis regionalization vs. regional L-moments. This also affects CI computation.
- **DIFFERENCE 4** No explicit elevation adjustment in mapped and gridded products vs PRISM-based interpolation.

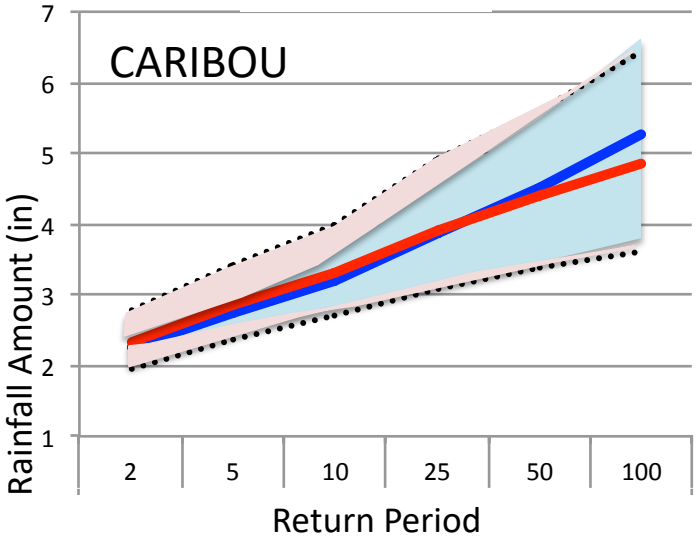
Select Precip.net Atlas-14 Comparisons

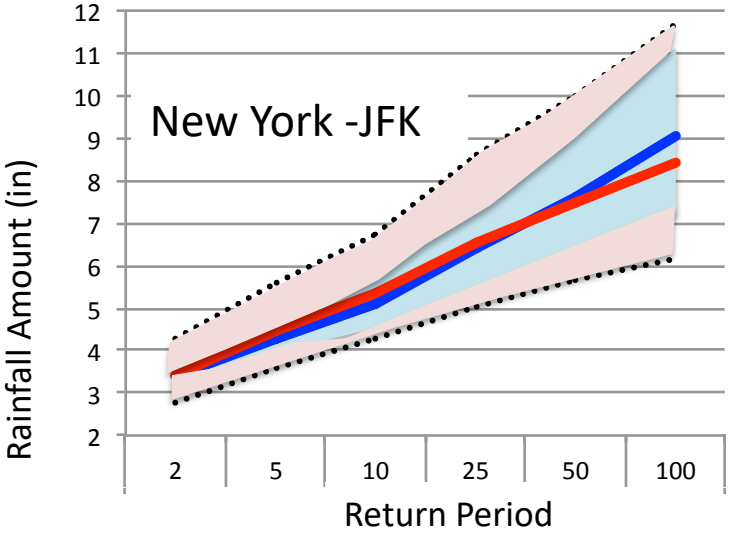




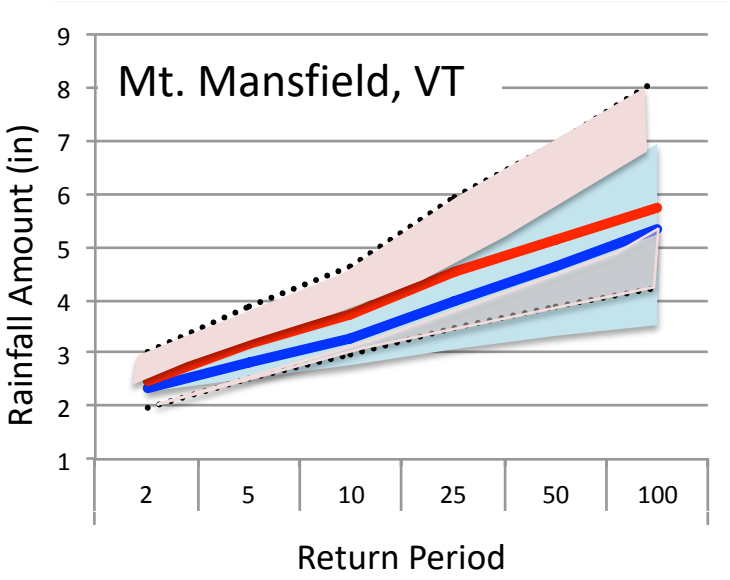
Atlas-14

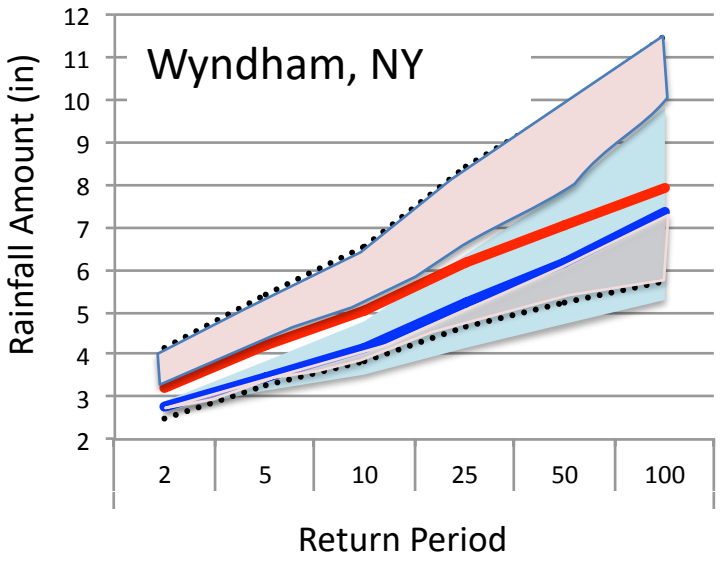
Precip.net





Select Precip.net Atlas-14 Comparisons

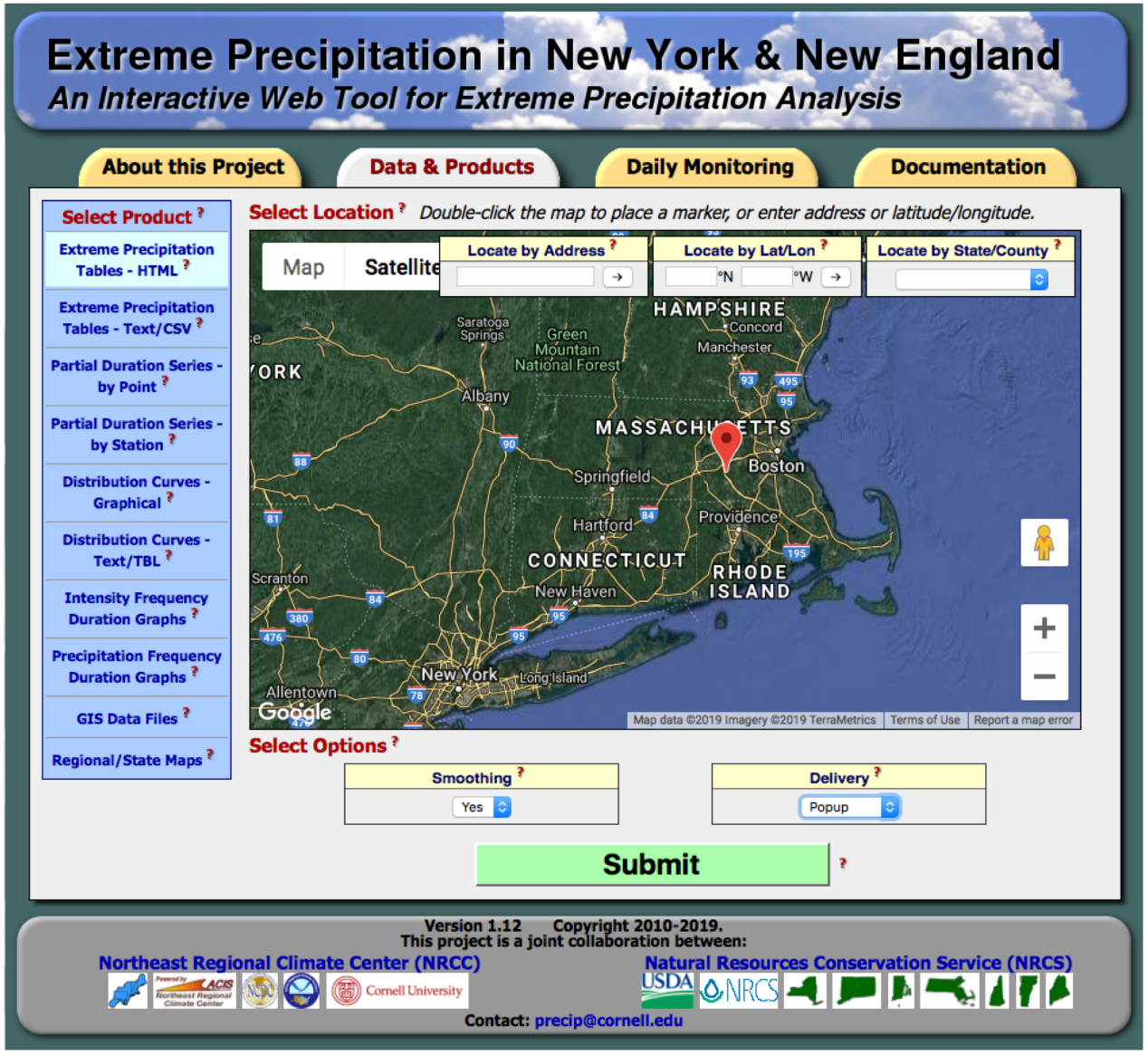




Atlas-14

Precip.net

Precip.net


Extreme Precipitation in New York & New England
An Interactive Web Tool for Extreme Precipitation Analysis
About this Project
Data & Products
Daily Monitoring
Documentation
Select Product
Extreme Precipitation Tables - HTML
Extreme Precipitation Tables - Text/CSV
Partial Duration Series - by Point
Partial Duration Series - by Station
Distribution Curves - Graphical
Distribution Curves - Text/TBL
Intensity Frequency Duration Graphs
Precipitation Frequency Duration Graphs
GIS Data Files
Regional/State Maps
Select Location
Double-click the map to place a marker, or enter address or latitude/longitude.
Map
Satellite
Locate by Address
Locate by Lat/Lon
°N
°W
Locate by State/County
HAMPSHIRE
Concord
Manchester
Saratoga Springs
Green Mountain National Forest
Albany
MASSACHUSETTS
Boston
Springfield
Hartford
Providence
CONNECTICUT
RHODE ISLAND
New Haven
Scranton
New York
Long Island
Allentown
Google
Map data ©2019 Imagery ©2019 TerraMetrics
Terms of Use
Report a map error
Select Options
Smoothing
Yes
Delivery
Popup
Submit
Version 1.12 Copyright 2010-2019.
This project is a joint collaboration between:
Northeast Regional Climate Center (NRCC)
Natural Resources Conservation Service (NRCS)
Cornell University
Contact: precip@cornell.edu

Precip.net

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.520 degrees West
Latitude	42.215 degrees North
Elevation	0 feet
Date/Time	Tue, 08 Oct 2019 09:05:49 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.71	0.89	1.13	**1yr**	0.77	1.07	1.31	1.65	2.10	2.68	2.92	**1yr**	2.37	2.81	3.25	3.91	4.56	**1yr**
2yr	0.35	0.54	0.67	0.89	1.11	1.40	**2yr**	0.96	1.29	1.63	2.04	2.56	3.23	3.51	**2yr**	2.85	3.38	3.88	4.62	5.25	**2yr**
5yr	0.42	0.65	0.81	1.09	1.39	1.77	**5yr**	1.20	1.61	2.06	2.59	3.24	4.06	4.48	**5yr**	3.59	4.31	4.93	5.83	6.52	**5yr**
10yr	0.47	0.74	0.93	1.27	1.65	2.11	**10yr**	1.42	1.90	2.46	3.10	3.88	4.83	5.38	**10yr**	4.27	5.17	5.90	6.95	7.68	**10yr**
25yr	0.56	0.89	1.13	1.55	2.06	2.66	**25yr**	1.78	2.36	3.11	3.92	4.91	6.08	6.86	**25yr**	5.38	6.60	7.50	8.77	9.55	**25yr**
50yr	0.63	1.01	1.29	1.81	2.44	3.19	**50yr**	2.11	2.79	3.74	4.71	5.87	7.24	8.26	**50yr**	6.41	7.94	8.99	10.47	11.26	**50yr**
100yr	0.72	1.17	1.51	2.13	2.90	3.80	**100yr**	2.50	3.30	4.47	5.64	7.01	8.64	9.94	**100yr**	7.64	9.55	10.78	12.50	13.29	**100yr**
200yr	0.82	1.34	1.74	2.49	3.44	4.54	**200yr**	2.97	3.90	5.35	6.75	8.39	10.30	11.97	**200yr**	9.11	11.51	12.93	14.93	15.69	**200yr**
500yr	0.99	1.64	2.13	3.09	4.32	5.75	**500yr**	3.73	4.87	6.78	8.57	10.63	13.00	15.31	**500yr**	11.51	14.72	16.46	18.88	19.54	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.43	0.57	0.70	0.94	**1yr**	0.61	0.92	1.07	1.42	1.85	2.34	2.70	**1yr**	2.07	2.60	2.96	3.59	4.11	**1yr**
2yr	0.34	0.53	0.65	0.88	1.08	1.27	**2yr**	0.93	1.24	1.45	1.91	2.44	3.13	3.40	**2yr**	2.77	3.27	3.76	4.46	5.08	**2yr**
5yr	0.38	0.59	0.73	1.00	1.28	1.52	**5yr**	1.10	1.48	1.72	2.25	2.86	3.73	4.12	**5yr**	3.30	3.96	4.54	5.36	6.03	**5yr**
10yr	0.42	0.65	0.80	1.12	1.45	1.73	**10yr**	1.25	1.69	1.95	2.55	3.22	4.26	4.75	**10yr**	3.77	4.57	5.24	6.15	6.85	**10yr**
25yr	0.49	0.74	0.92	1.31	1.72	2.05	**25yr**	1.49	2.00	2.31	3.02	3.78	5.11	5.71	**25yr**	4.52	5.49	6.33	7.38	8.10	**25yr**
50yr	0.53	0.81	1.01	1.46	1.96	2.33	**50yr**	1.69	2.28	2.62	3.42	4.26	5.84	6.57	**50yr**	5.17	6.32	7.32	8.47	9.22	**50yr**
100yr	0.59	0.90	1.12	1.62	2.22	2.65	**100yr**	1.92	2.59	2.97	3.87	4.81	6.69	7.53	**100yr**	5.92	7.24	8.46	9.75	10.50	**100yr**
200yr	0.65	0.98	1.25	1.80	2.52	3.02	**200yr**	2.17	2.95	3.37	4.41	5.44	7.67	8.62	**200yr**	6.78	8.29	9.78	11.21	11.97	**200yr**
500yr	0.75	1.11	1.43	2.07	2.95	3.59	**500yr**	2.55	3.51	3.98	5.24	6.41	9.21	10.28	**500yr**	8.15	9.89	11.86	13.49	14.26	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.32	0.49	0.60	0.81	1.00	1.19	**1yr**	0.86	1.17	1.37	1.76	2.29	2.92	3.14	**1yr**	2.59	3.02	3.51	4.20	4.88	**1yr**
2yr	0.37	0.56	0.69	0.94	1.16	1.36	**2yr**	1.00	1.33	1.56	2.04	2.60	3.35	3.65	**2yr**	2.97	3.51	4.04	4.80	5.44	**2yr**
5yr	0.45	0.70	0.87	1.19	1.51	1.78	**5yr**	1.31	1.74	2.04	2.62	3.31	4.39	4.86	**5yr**	3.89	4.67	5.37	6.34	7.03	**5yr**
10yr	0.54	0.83	1.03	1.44	1.86	2.19	**10yr**	1.60	2.14	2.50	3.18	3.96	5.39	6.06	**10yr**	4.77	5.83	6.66	7.82	8.57	**10yr**
25yr	0.69	1.05	1.30	1.86	2.45	2.88	**25yr**	2.11	2.82	3.27	4.08	5.06	7.07	8.13	**25yr**	6.26	7.82	8.87	10.36	11.13	**25yr**
50yr	0.82	1.25	1.56	2.24	3.02	3.55	**50yr**	2.61	3.47	4.02	4.94	6.06	8.69	10.15	**50yr**	7.69	9.76	11.02	12.80	13.59	**50yr**
100yr	1.00	1.50	1.88	2.72	3.73	4.37	**100yr**	3.22	4.27	4.94	5.98	7.29	10.68	12.71	**100yr**	9.45	12.23	13.70	15.82	16.57	**100yr**
200yr	1.20	1.81	2.29	3.31	4.62	5.39	**200yr**	3.99	5.27	6.09	7.24	8.75	13.13	15.94	**200yr**	11.62	15.33	17.02	19.56	20.18	**200yr**

Precip.net

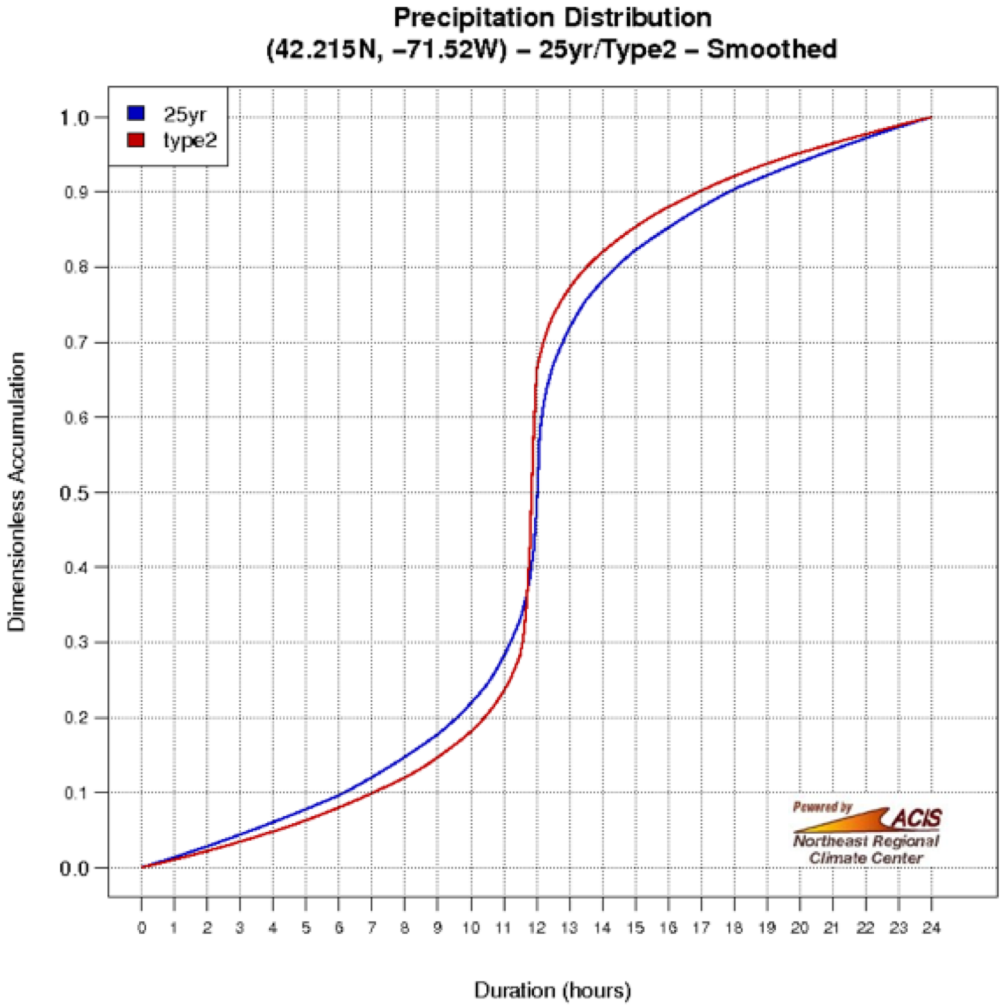
- Select Product
- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps

Select station to view Partial Duration Series

	Station ID	Station Name	Length of PDS
View PDS	#190049	ADAMS, MA	48 years
View PDS	#190120	AMHERST, MA	111 years
View PDS	#190190	ASHBURNHAM, MA	67 years
View PDS	#190213	ASHFIELD, MA	30 years
View PDS	#190218	ASHLAND, MA	72 years
View PDS	#190257	ATHOL, MA	29 years
View PDS	#190408	BARRE FALLS DAM, MA	49 years
View PDS	#190535	BEDFORD, MA	51 years
View PDS	#190551	BEECHWOOD, MA	54 years
View PDS	#190562	BELCHERTOWN, MA	66 years
View PDS	#190666	BIRCH HILL DAM, MA	60 years
View PDS	#190736	BLUE HILL, MA	103 years
View PDS	#190759	BORDEN BROOK RSVR, MA	25 years
View PDS	#190770	BOSTON LOGAN INTL AP, MA	72 years
View PDS	#190775	BOSTON CITY WSO, MA	63 years
View PDS	#190801	BOYLSTON, MA	77 years

Precip.net

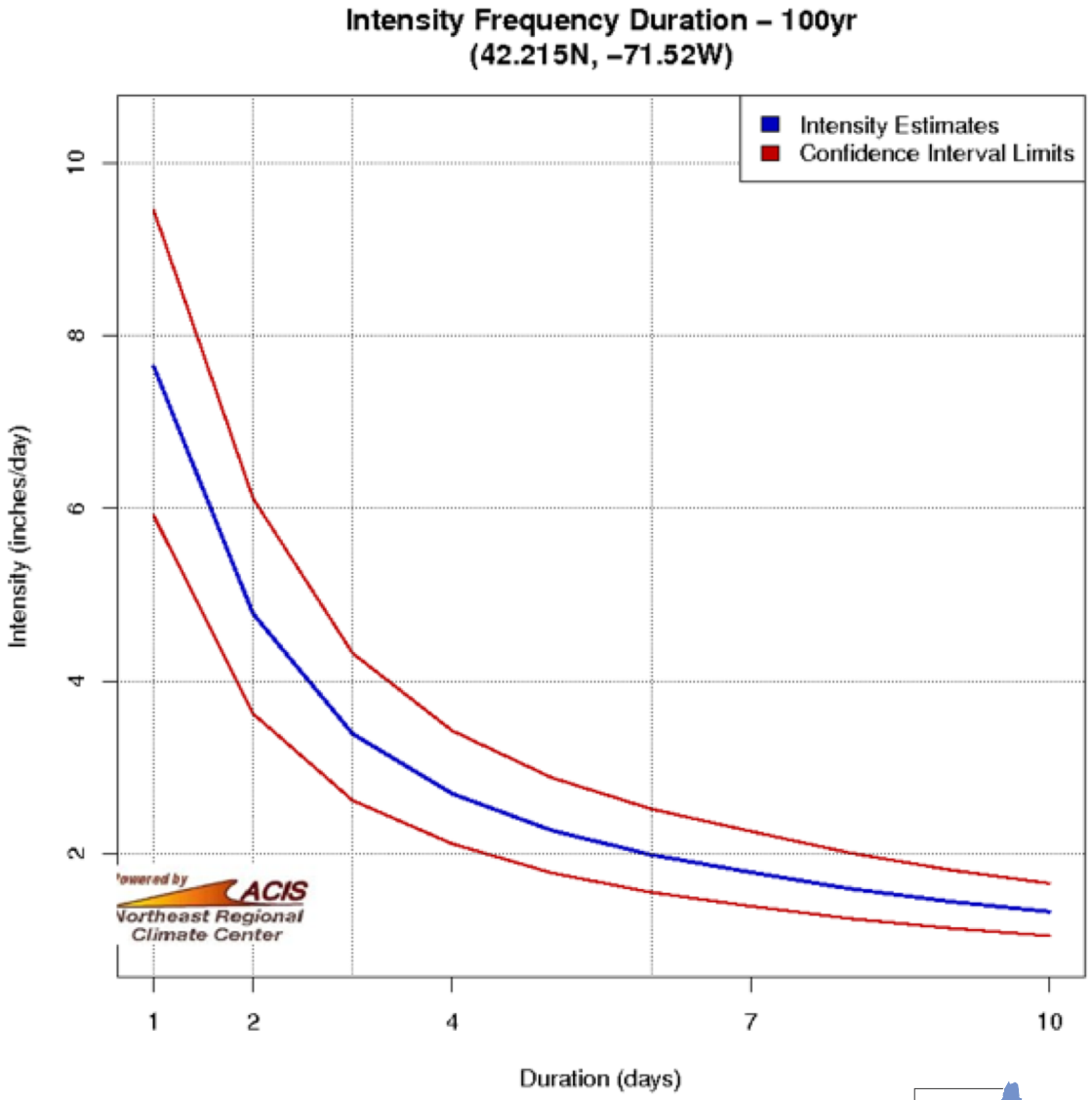
- Select Product
- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps



Time (hours)	25yr Accumulation (dimensionless)	Type II Curve (dimensionless)
0.0	0.0000	0.0000
0.1	0.0013	0.0010

Precip.net

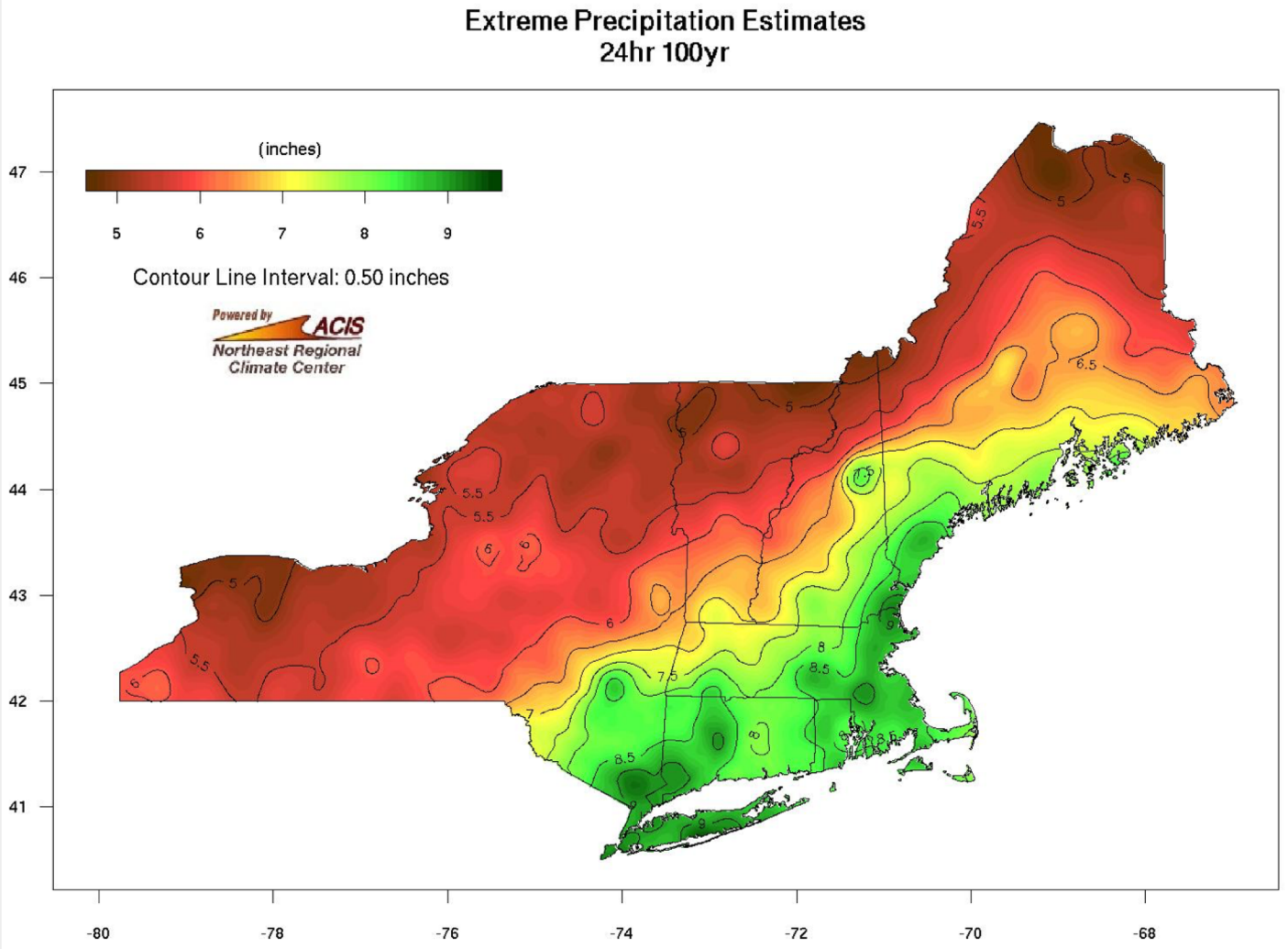
- Select Product
- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps



Precip.net

Select Product ?

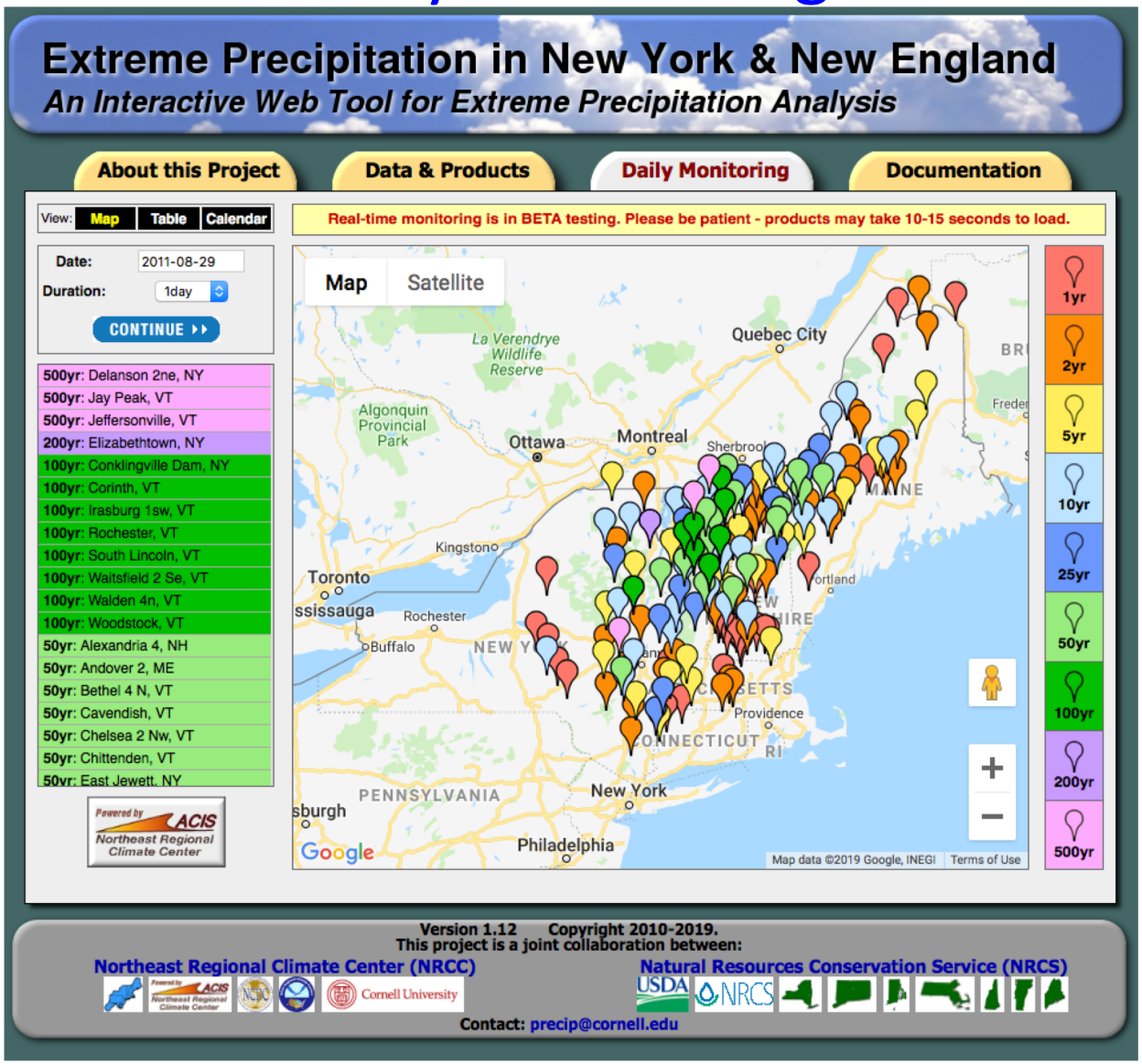
- Extreme Precipitation Tables - HTML ?
- Extreme Precipitation Tables - Text/CSV ?
- Partial Duration Series - by Point ?
- Partial Duration Series - by Station ?
- Distribution Curves - Graphical ?
- Distribution Curves - Text/TBL ?
- Intensity Frequency Duration Graphs ?
- Precipitation Frequency Duration Graphs ?
- GIS Data Files ?
- Regional/State Maps ?



Cornell University

Northeast Regional Climate Center

Daily Monitoring




THANK YOU!