Are extreme rain events becoming more frequent?

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Josiah Mault and Marketa McGuire Elsner

(Climate Impacts Group, University of Washington)

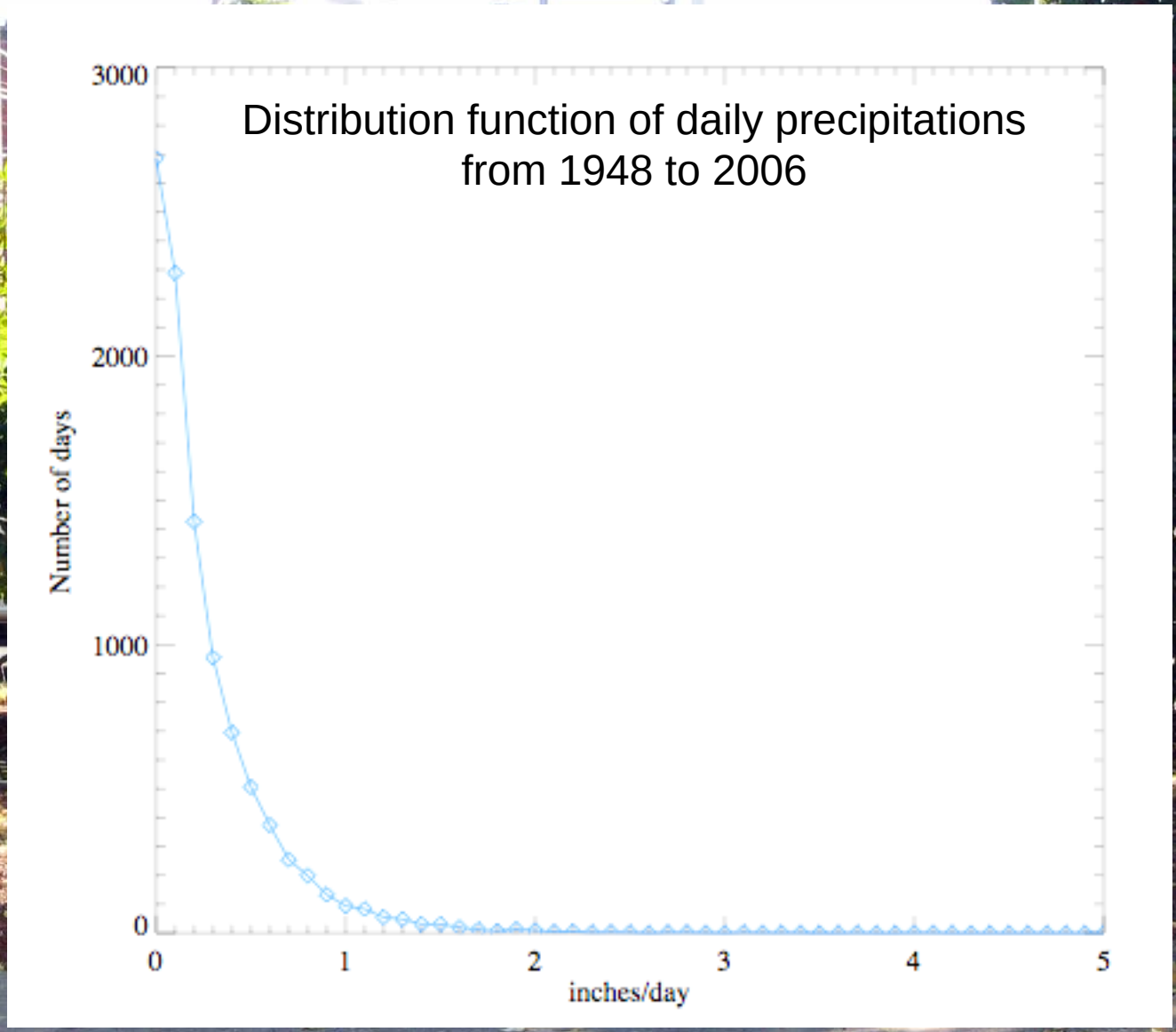
2008 Pacific Northwest Weather Workshop

Source : THE OREGONIAN/Bruce Ely


The Chehalis River flooding
Source : THE OREGONIAN/Bruce Ely

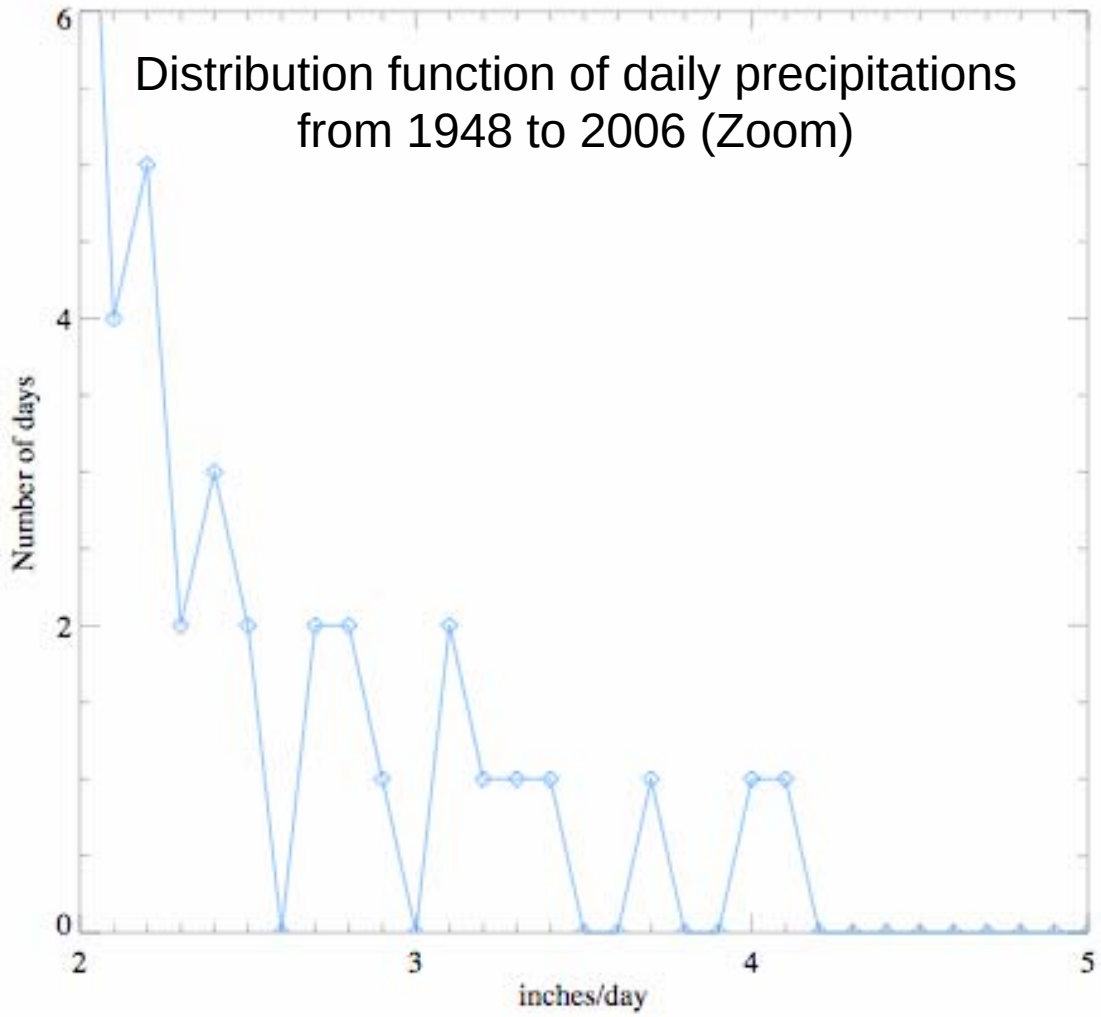
The Centralia station

The Centralia station

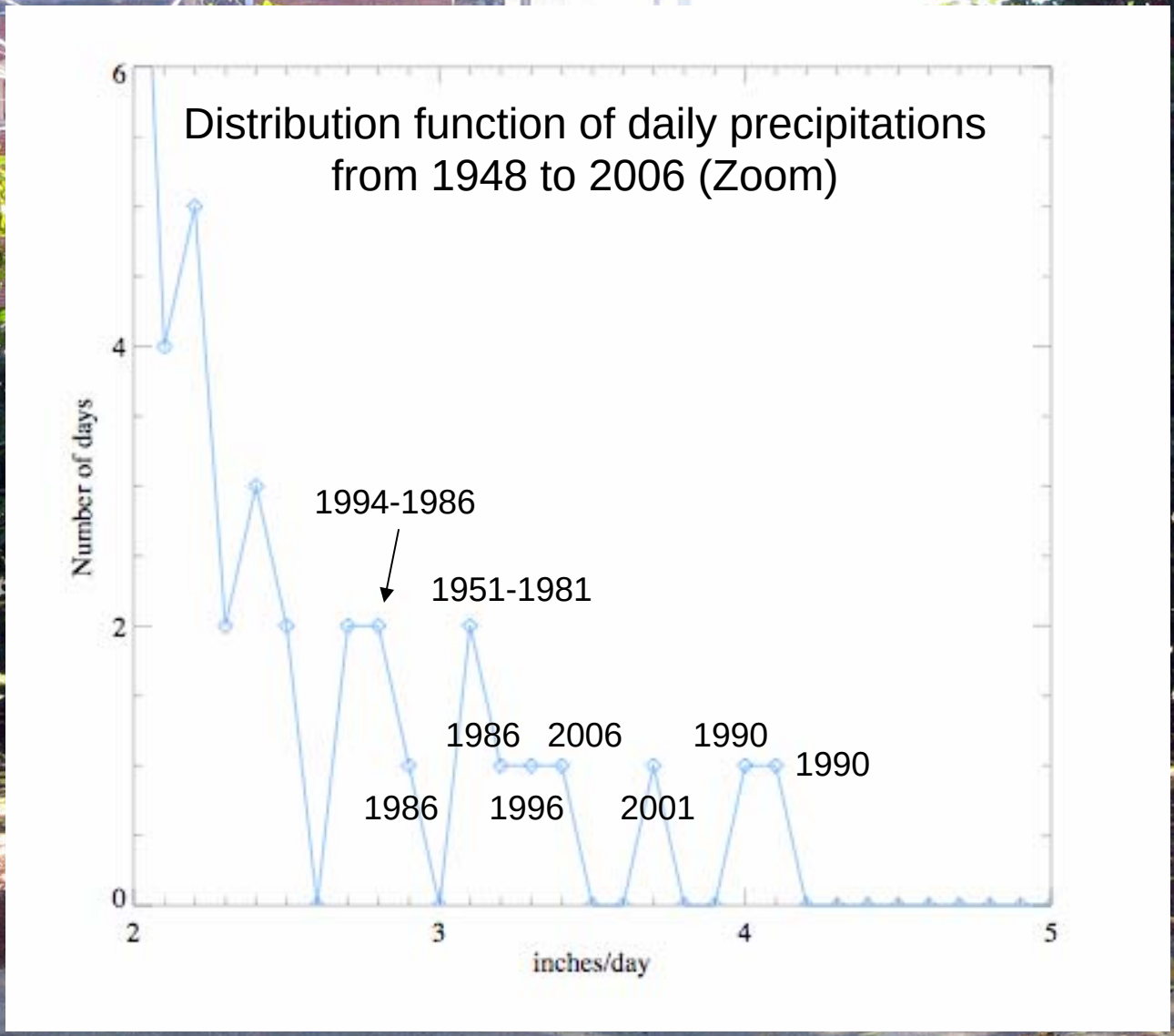


The Centralia station

Distribution function of daily precipitations from 1948 to 2006 (Zoom)



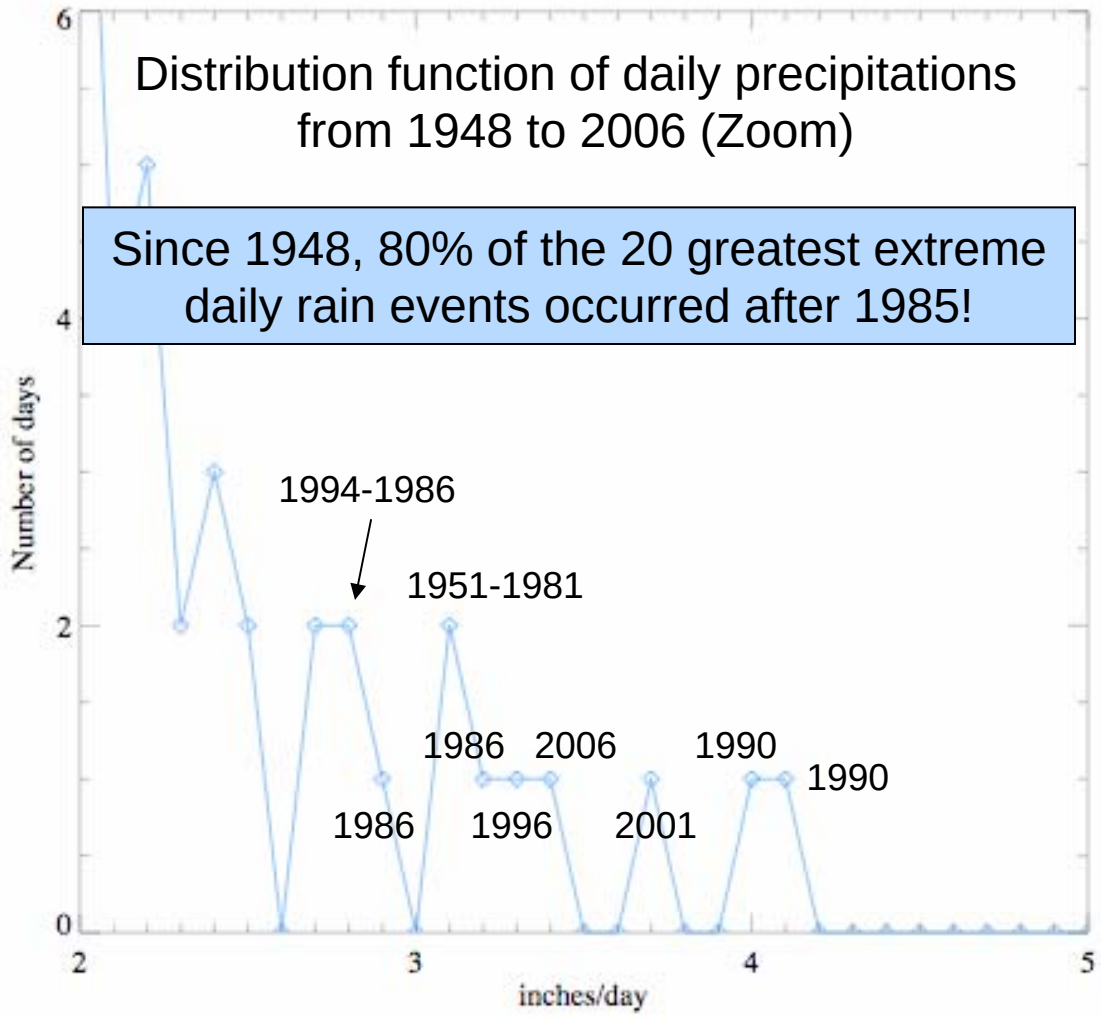
The Centralia station



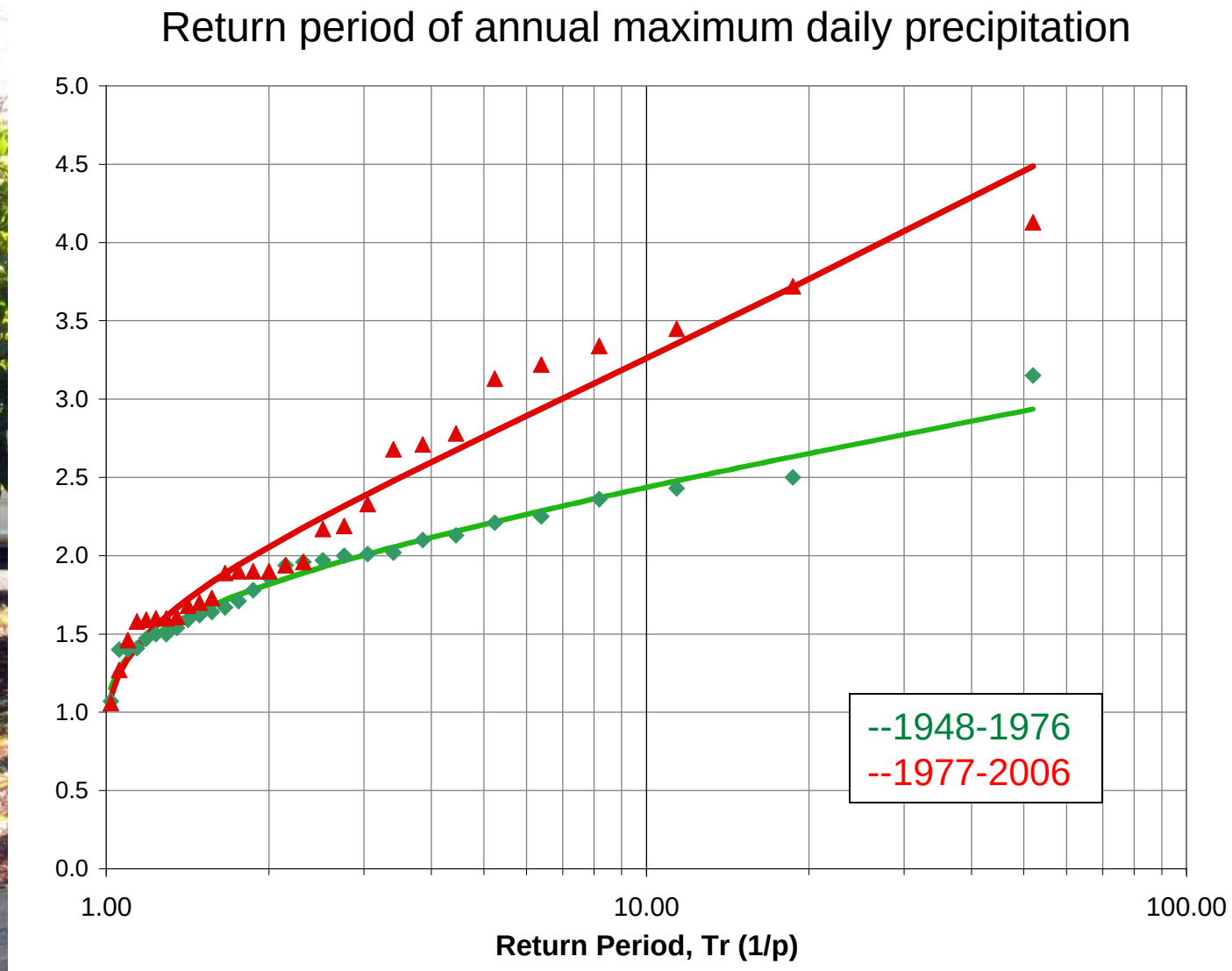
The Centralia station

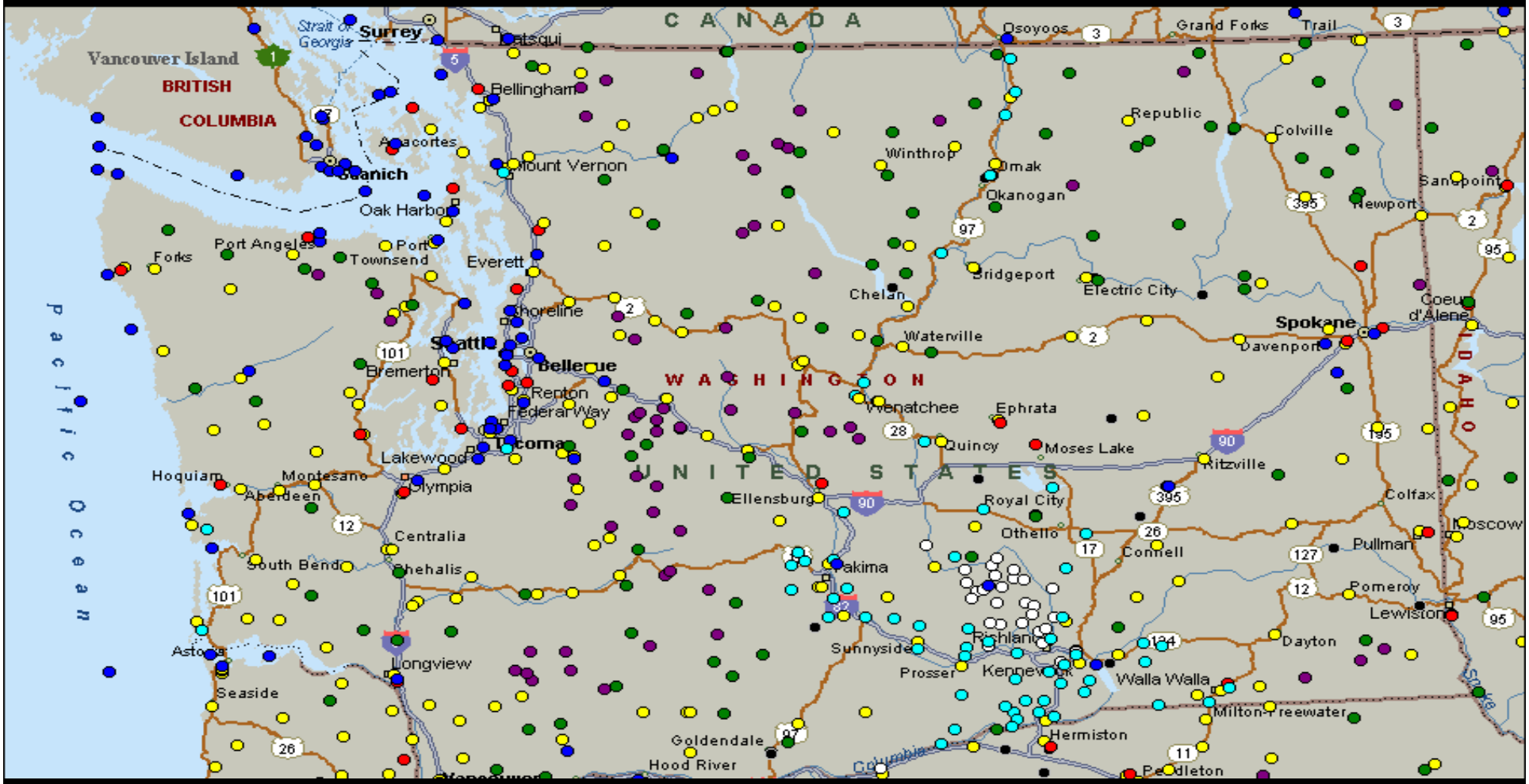
Distribution function of daily precipitations from 1948 to 2006 (Zoom)

Since 1948, 80% of the 20 greatest extreme daily rain events occurred after 1985!

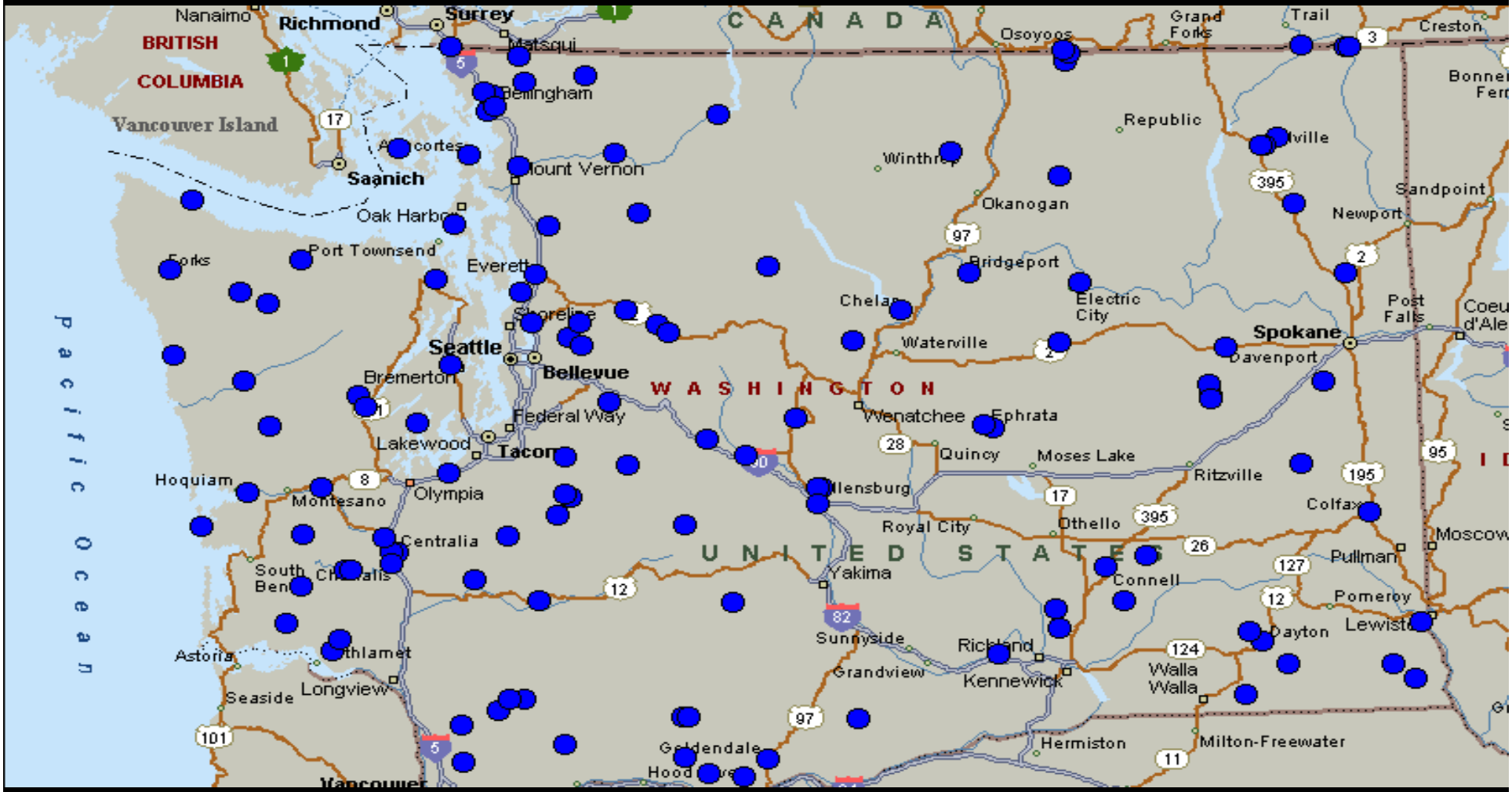


The Centralia station

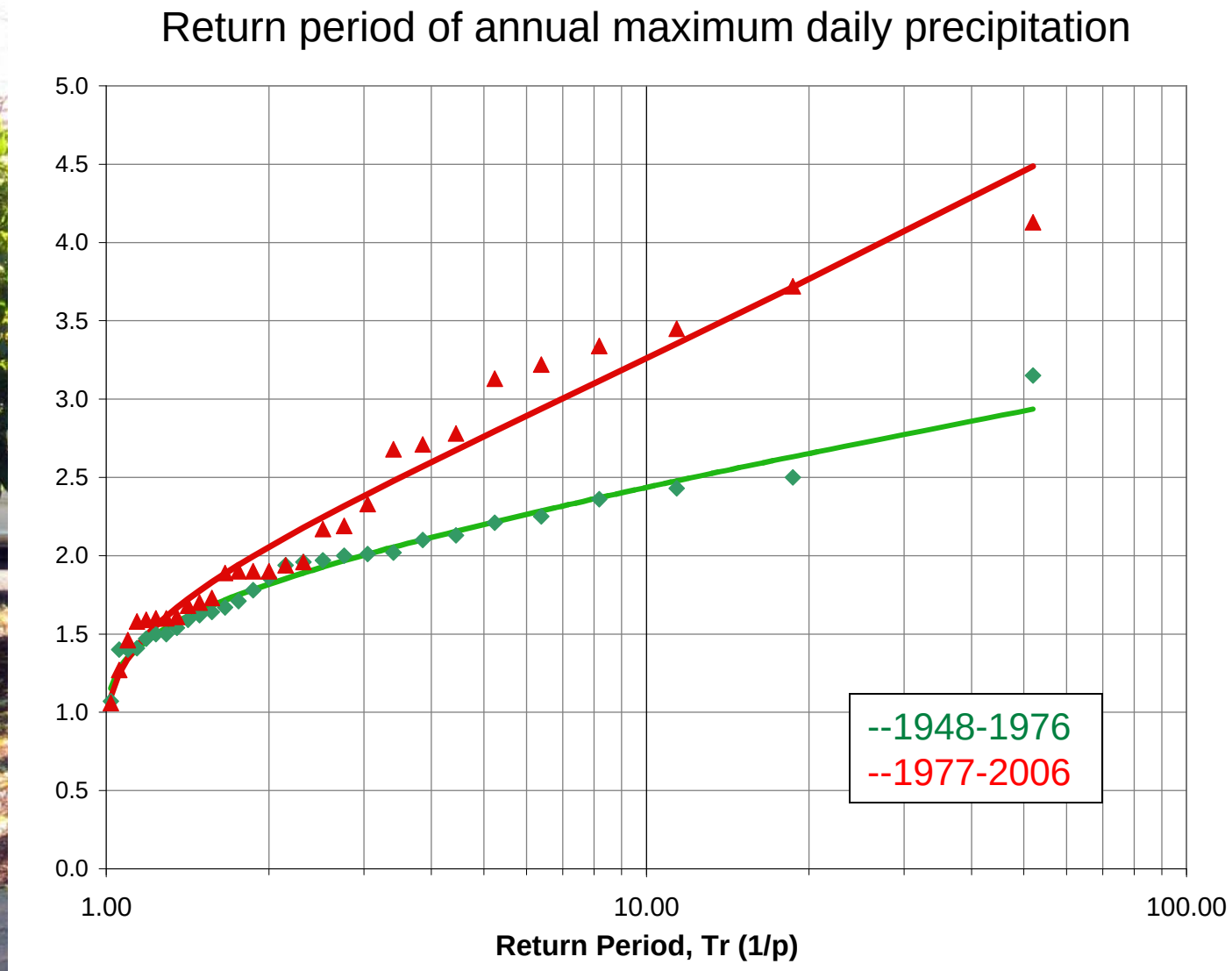



C A N A D A
Strait of Georgia
Surrey
Vancouver Island
BRITISH
COLUMBIA
Bellingham
Anacortes
Mount Vernon
Oak Harbor
Port Angeles
Port Townsend
Everett
Forks
Shoreline
Seattle
Bellevue
Bremerton
Renton
Federal Way
Tacoma
Lakewood
Olympia
Hoquiam
Aberdeen
Montesano
Centralia
South Bend
Chehalis
Longview
Astoria
Seaside
Pacific Ocean
W A S H I N G T O N
U N I T E D S T A T E S
Osoyoos
Grand Forks
Trail
Republic
Colville
Winthrop
Omak
Okanogan
Sandpoint
Newport
Bridgeport
Chelan
Electric City
Coeur d'Alene
Spokane
Waterville
Davenport
Wenatchee
Ephrata
Quincy
Moses Lake
Ritzville
Ellensburg
Royal City
Othello
Colfax
Pullman
Moscow
Connell
Yakima
Pomeroy
Lewiston
Sunnyside
Richland
Dayton
Prosser
Kennewick
Walla Walla
Milton-Freewater
Hermiston
Goldendale
Hood River
Pendleton
Columbia
Snake
O H I O

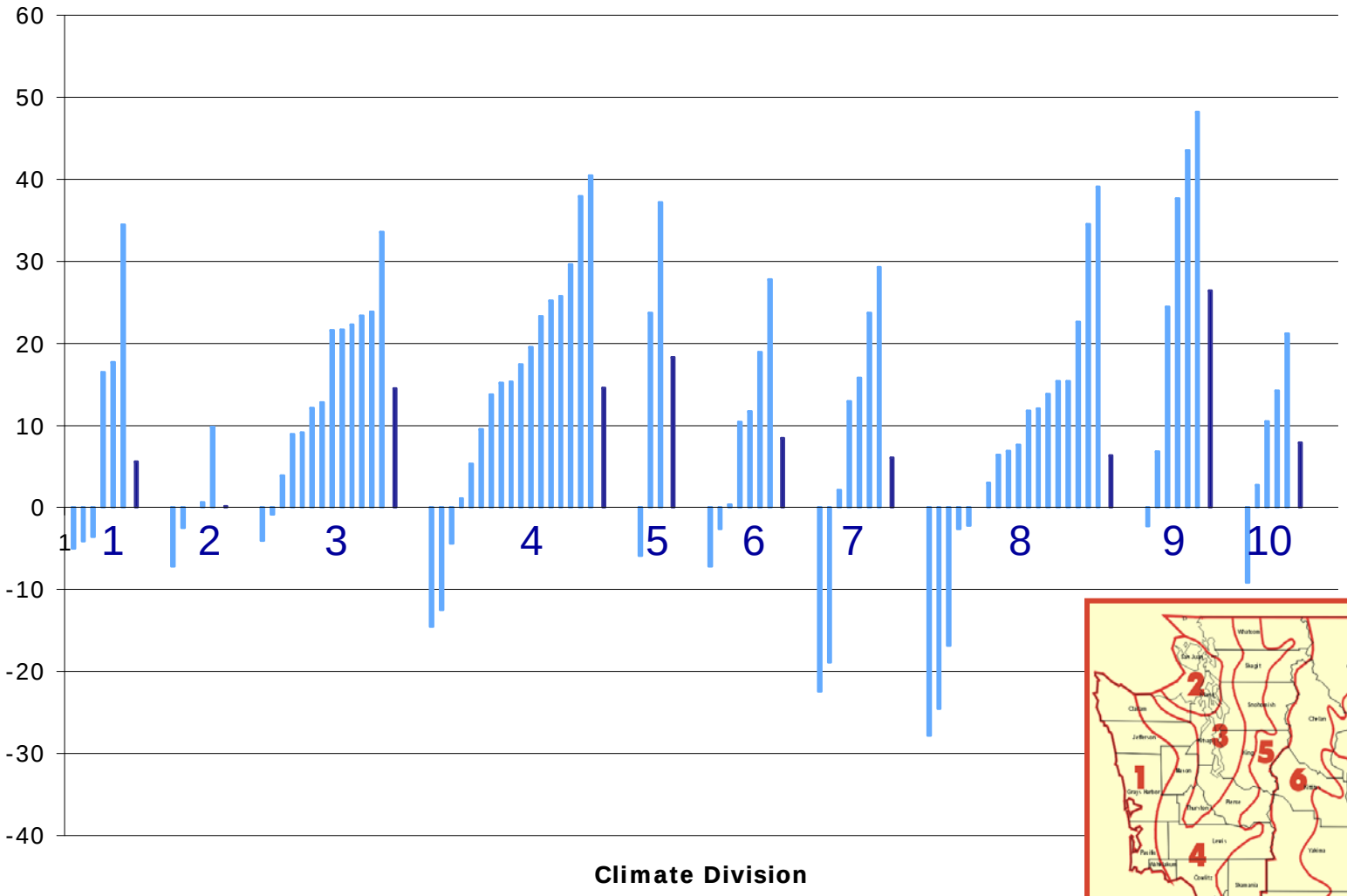
The Cooperative Observer Program network

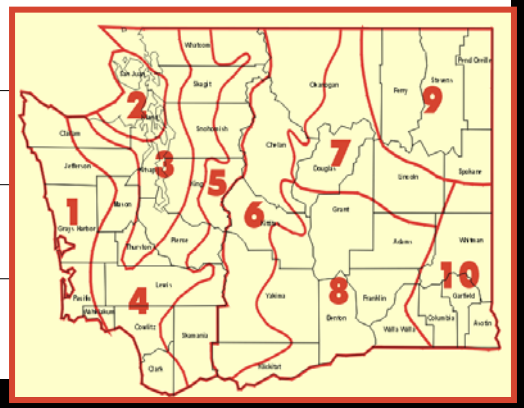


The Centralia station

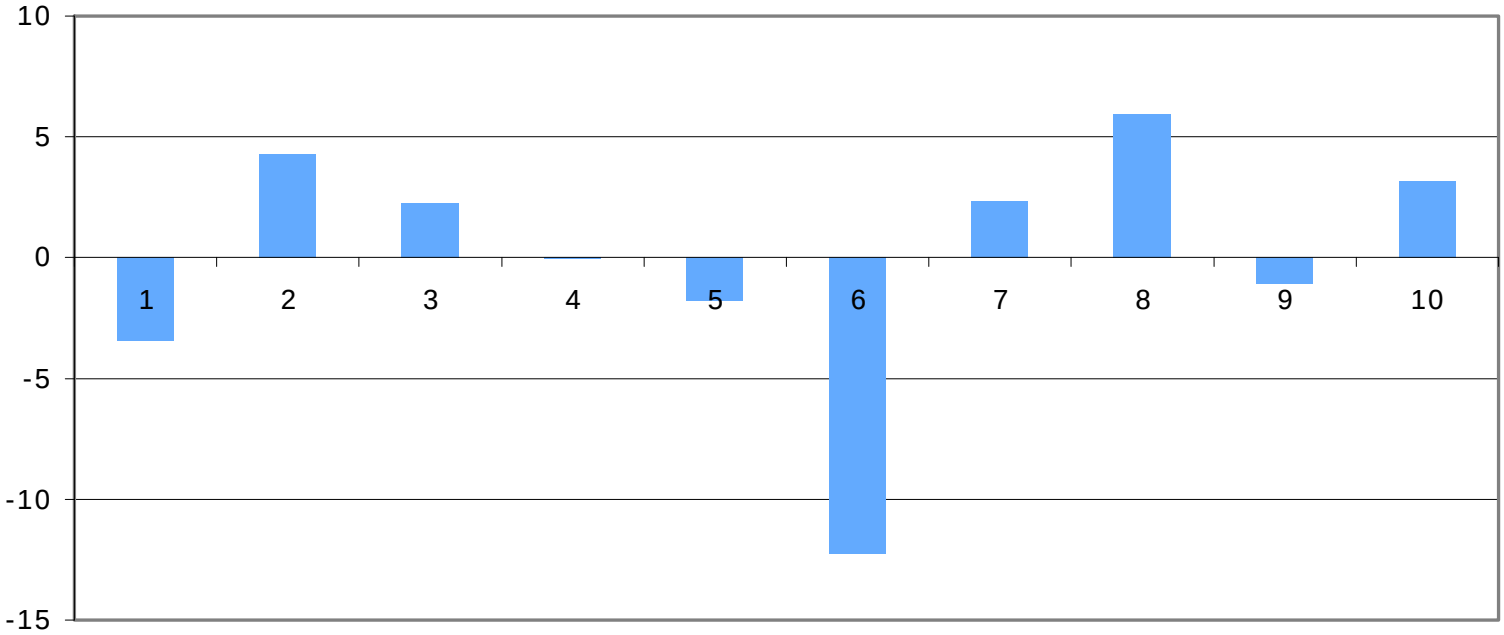


Percentages of change in the annual maximum daily precipitation with a 10 years return period for each station

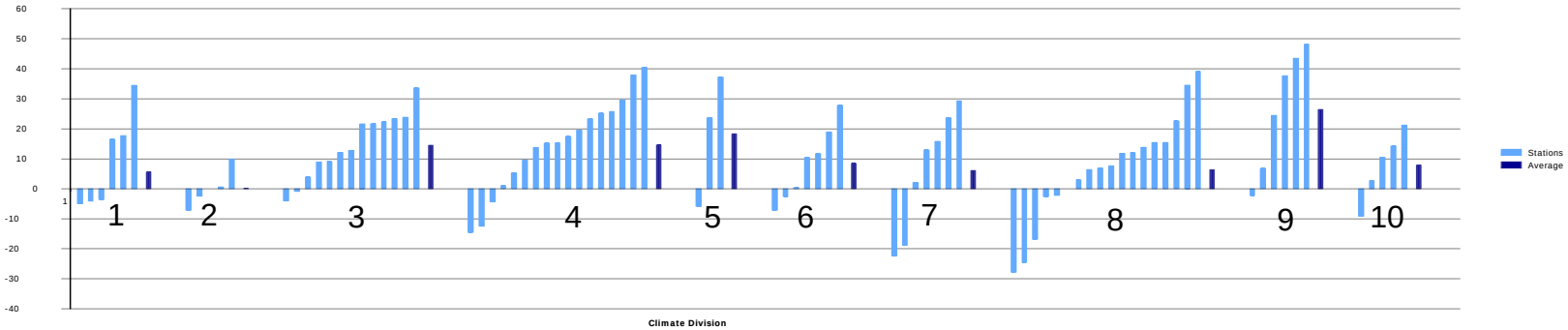


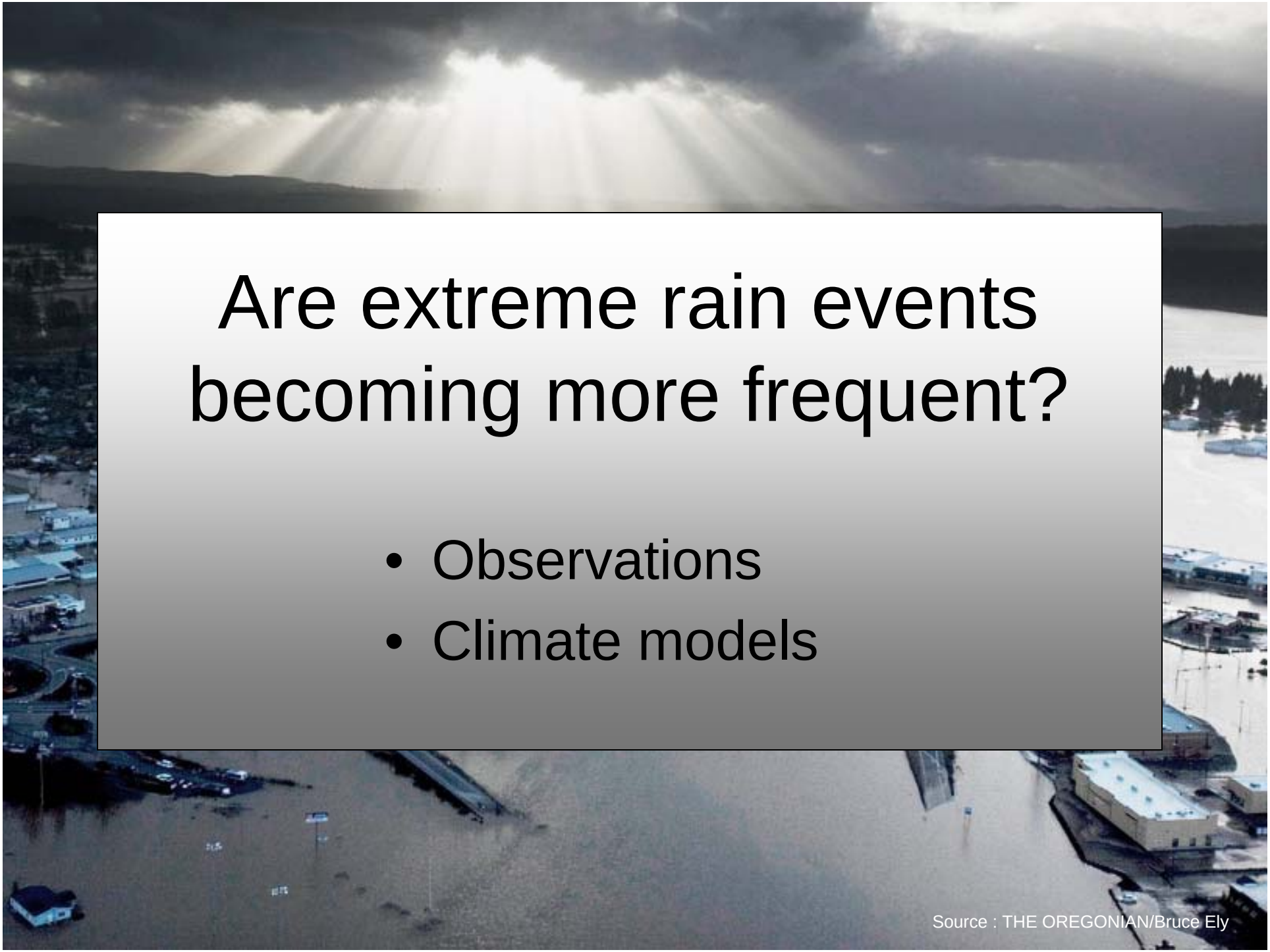


Percentage of change in the mean annual precipitation



Climate division





Are extreme rain events becoming more frequent?

- Observations
- Climate models

Source : THE OREGONIAN/Bruce Ely

What for the future in the PNW?

(2046-2065 versus 1981-2000)

	SRES A1B	SRES B1
IPSL		
ECHAM5		
CCSM3		

Percentages of change in the annual maximum daily precipitation with a 10 years return period for each grid cell between 1981-2000 and 2046-2065.

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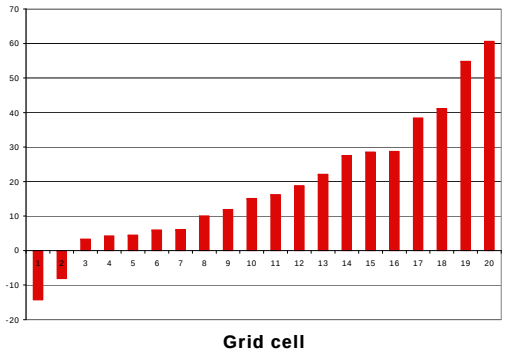
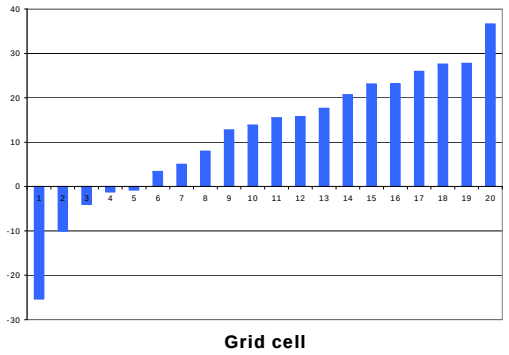
(2046-2065 versus 1981-2000)

	SRES A1B	SRES B1
IPSL		
ECHAM5		
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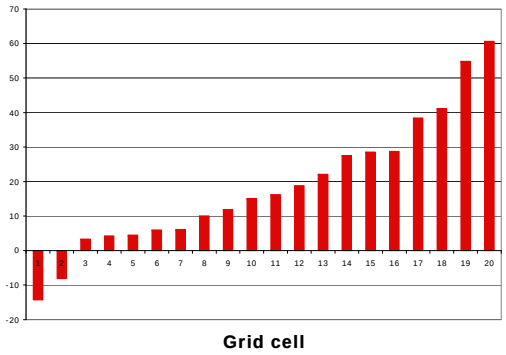
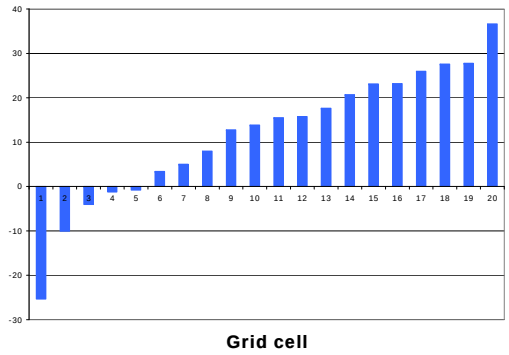
IPSL	 +18.8%	 +11.8%
ECHAM5		
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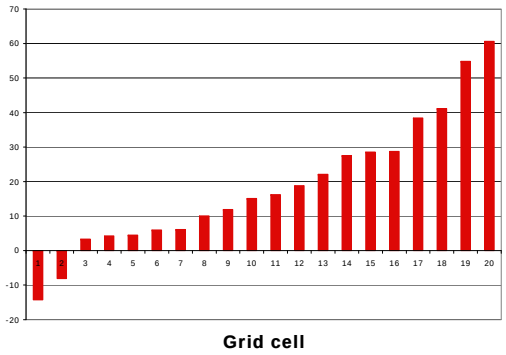
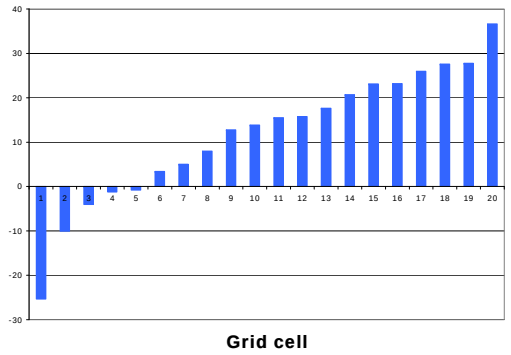
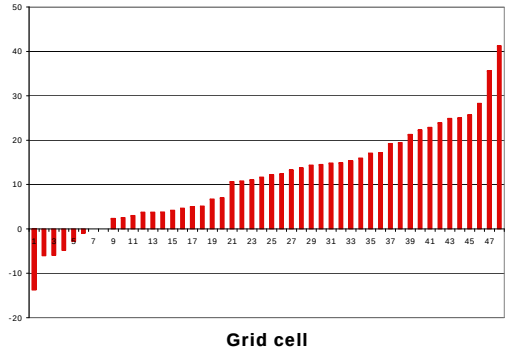
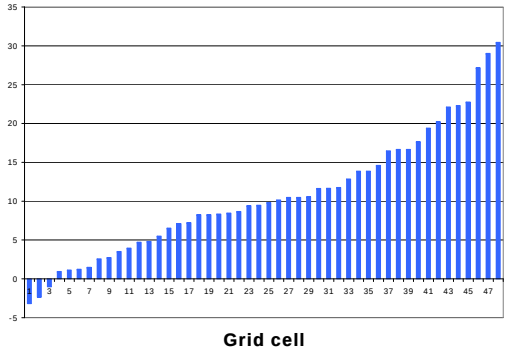
IPSL	 +18.8%	 +11.8%
ECHAM5	 +11.4%	 +10.6%
CCSM3		

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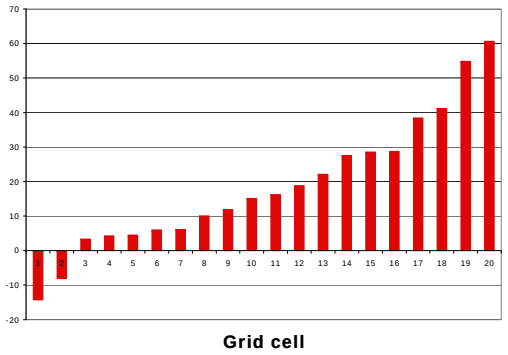
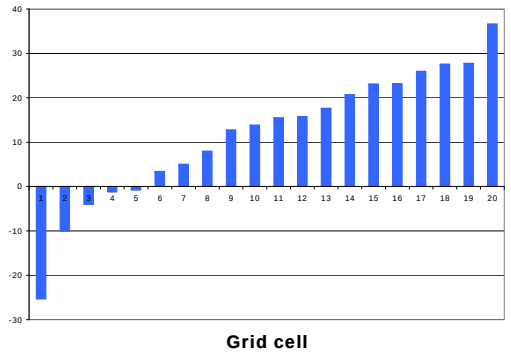
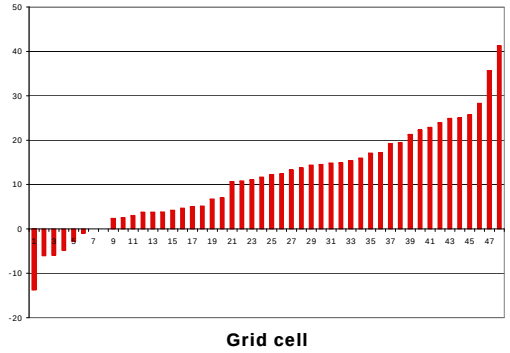
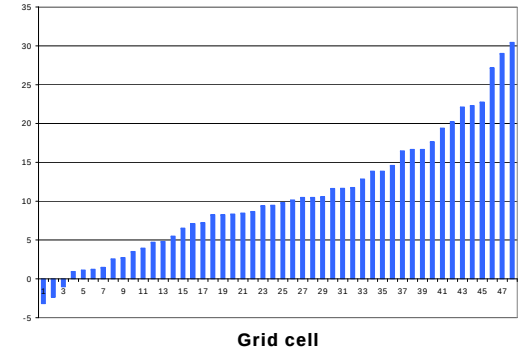
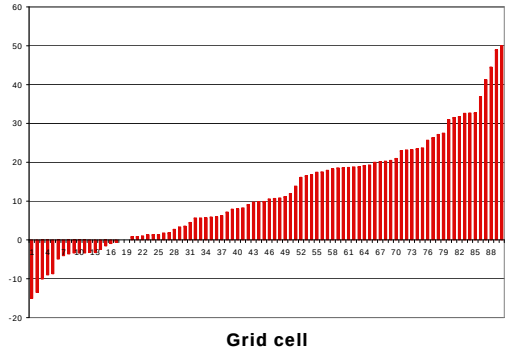
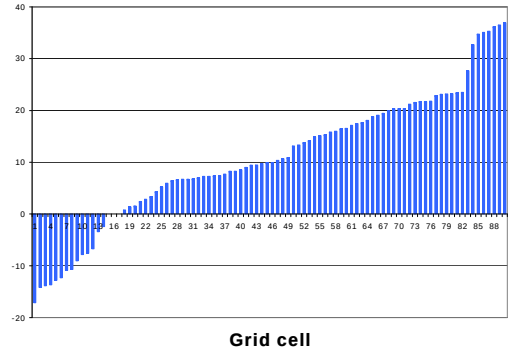
IPSL		+18.8%		+11.8%
ECHAM5		+11.4%		+10.6%
CCSM3		+12.2%		+10.8%

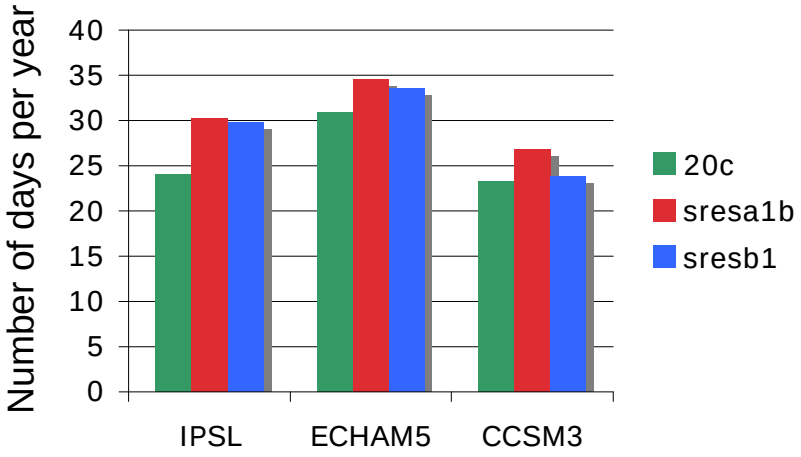
Percentages of change in the annual maximum daily precipitation with a 10 years return period for each grid cell between 1981-2000 and 2046-2065.

What for the future in the PNW?

(2046-2065 versus 1981-2000)

Number of days per year with

P > 0.4 inches



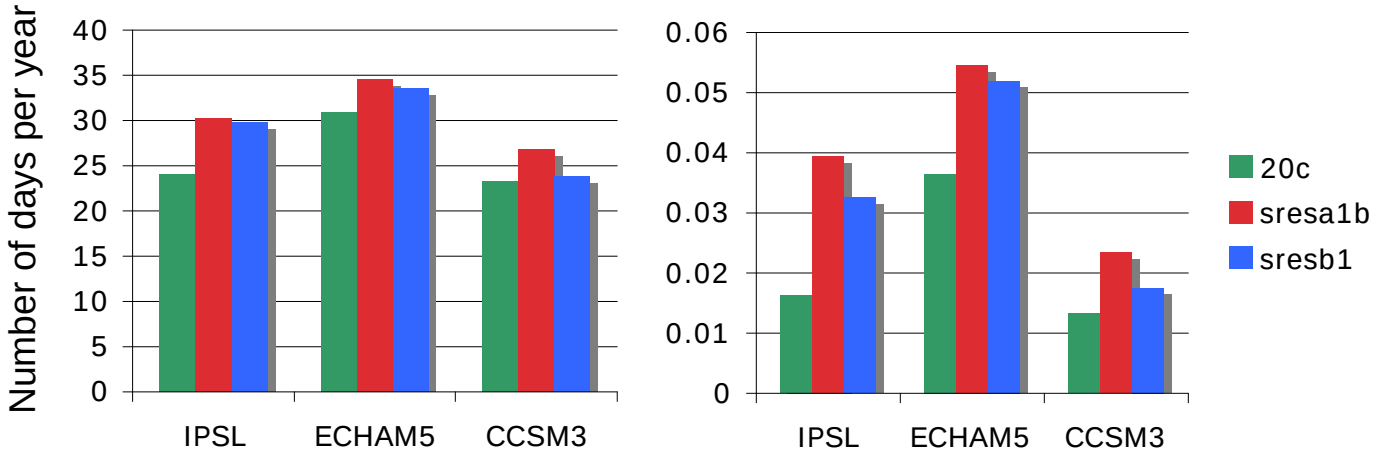
What for the future in the PNW?

(2046-2065 versus 1981-2000)

Number of days per year with

P > 0.4 inches

P > 1.6 inches



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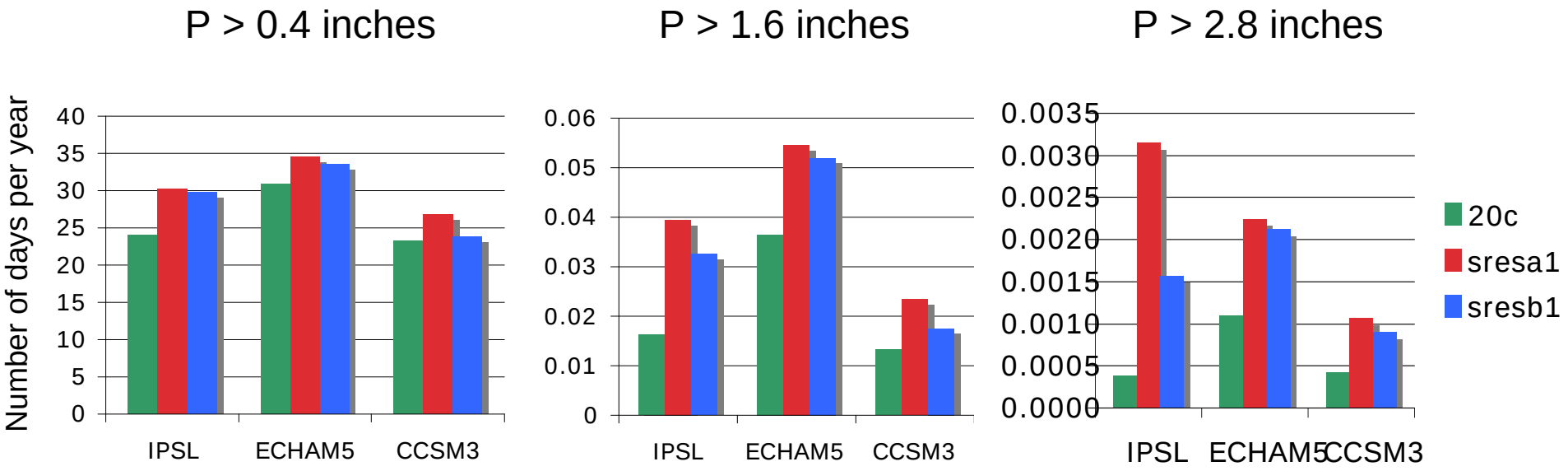


Conclusions :

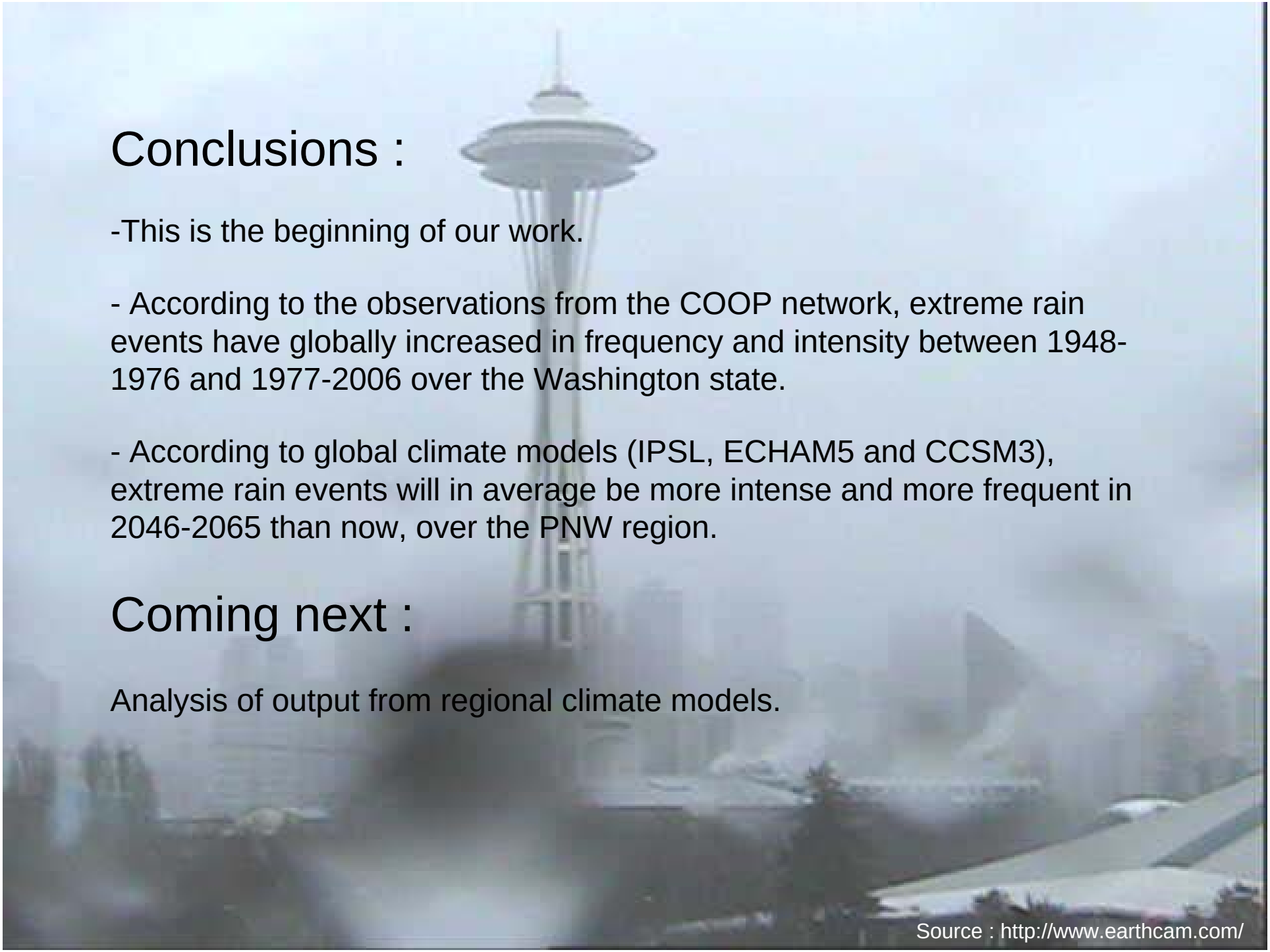
-This is the beginning of our work.

- According to the observations from the COOP network, extreme rain events have globally increased in frequency and intensity between 1948-1976 and 1977-2006 over the Washington state.

- According to global climate models (IPSL, ECHAM5 and CCSM3), extreme rain events will in average be more intense and more frequent in 2046-2065 than now, over the PNW region.

Coming next :

Analysis of output from regional climate models.



Source : http://www.earthcam.com/


Thanks!
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