

"Smart" PRISM Concept

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Outline

- ▶ PRISM Mountain Mapper Background
- ▶ Why is PRISM “dumb”?
- ▶ What is smart PRISM?

PRISM Background

PRISM is a methodology for creating gridded maps of precipitation and temperature typically on climate time scales.

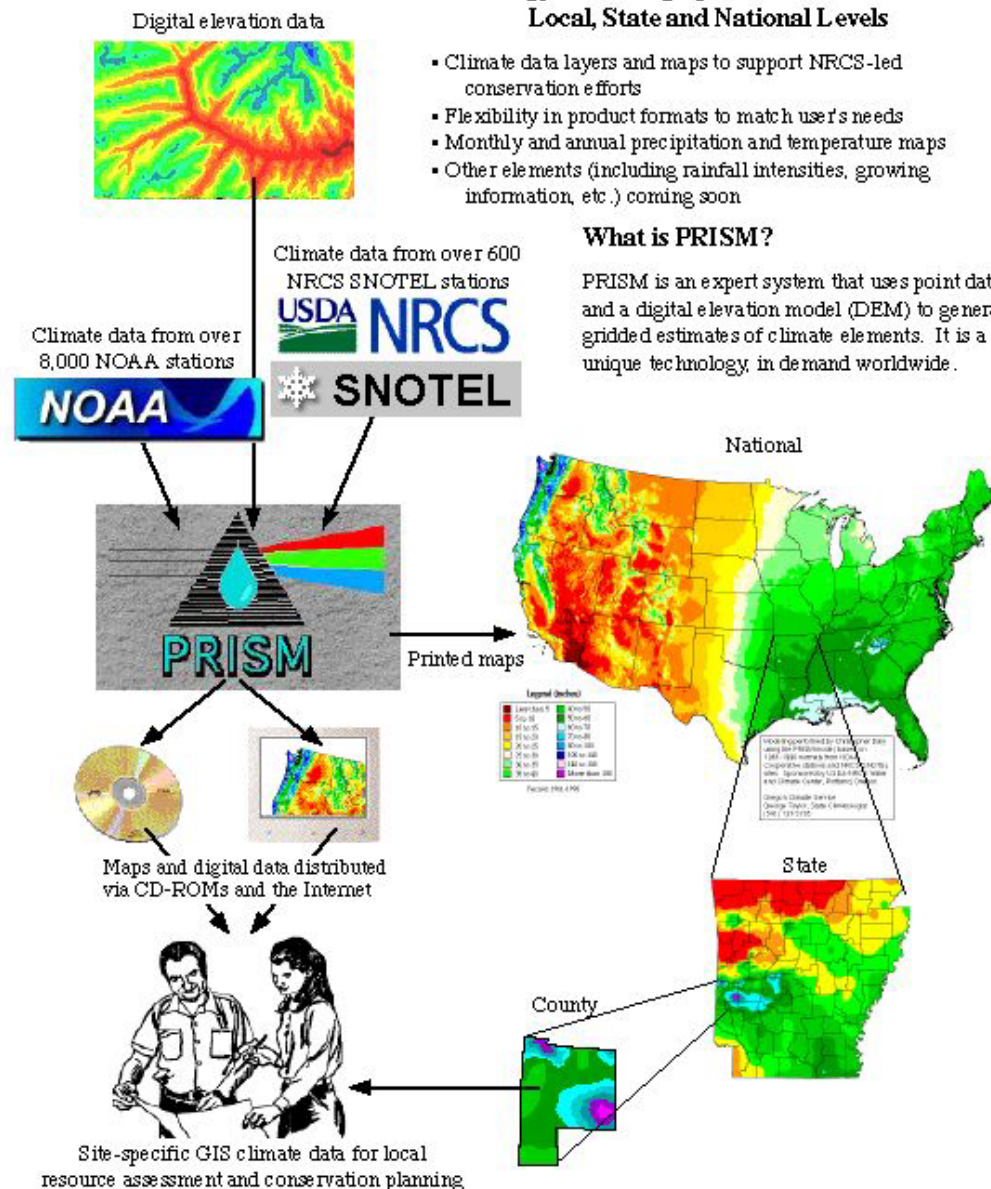
The USDA NRCS PRISM Climate Mapping Project National Water and Climate Center--Oregon State University Partnership

Technology Delivering Spatial Climate Products to Local, State and National Levels

- Climate data layers and maps to support NRCS-led conservation efforts
- Flexibility in product formats to match user's needs
- Monthly and annual precipitation and temperature maps
- Other elements (including rainfall intensities, growing information, etc.) coming soon

What is PRISM?

PRISM is an expert system that uses point data and a digital elevation model (DEM) to generate gridded estimates of climate elements. It is a unique technology, in demand worldwide.

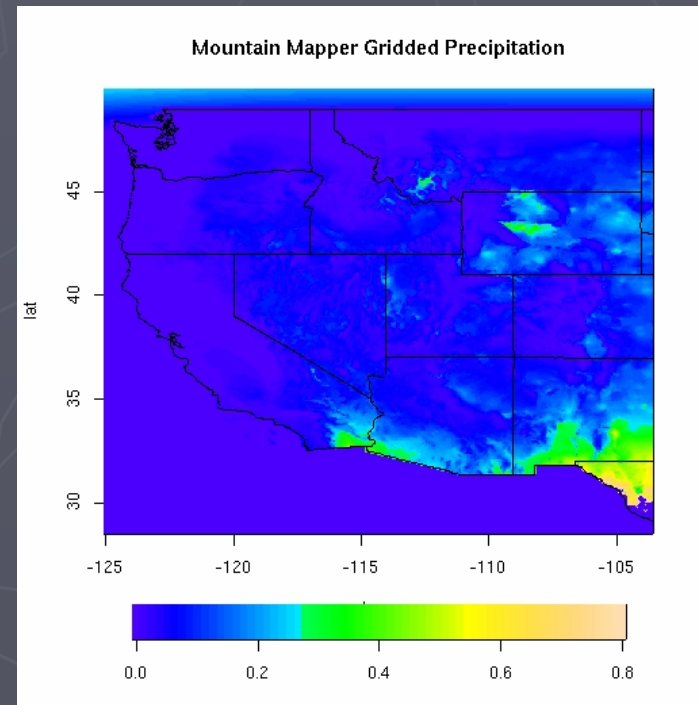
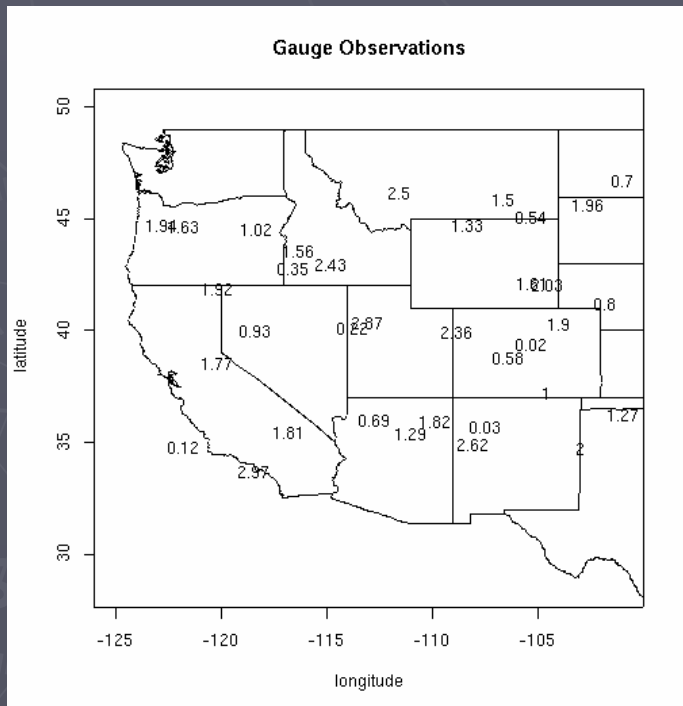


Mountain Mapper

Challenge: How to intelligently fill in gaps when producing a gridded analysis between gauges over complex terrain.

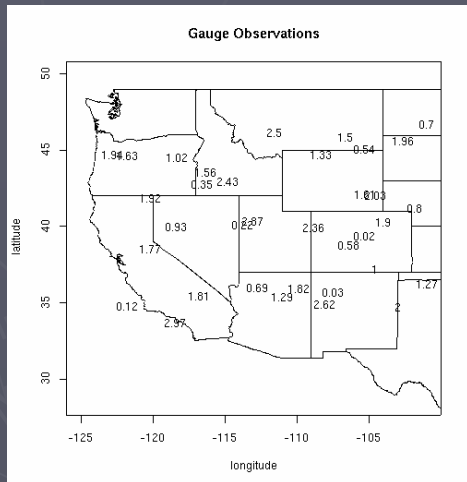
How to go from this

To this...

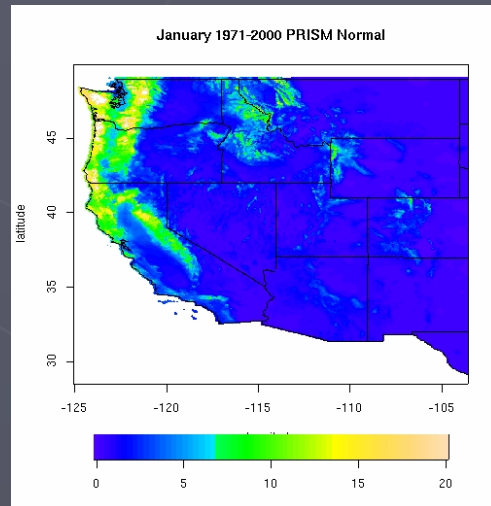


Mountain Mapper

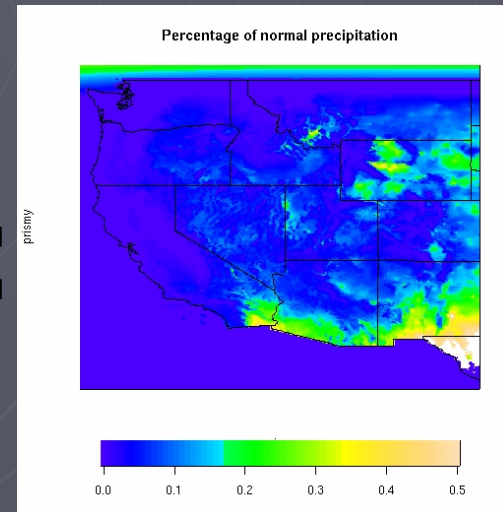
1. Determine a percent of normal grid



Gauge observations



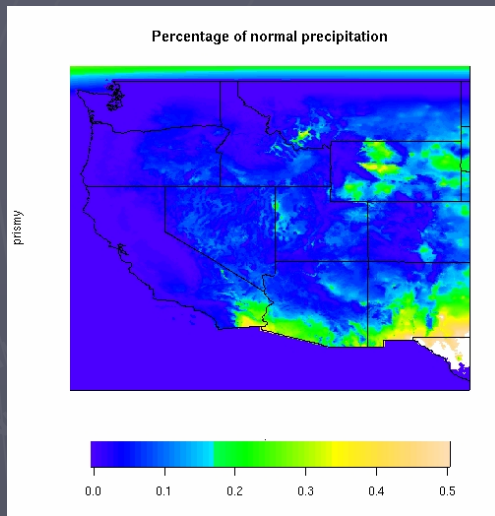
PRISM monthly normal



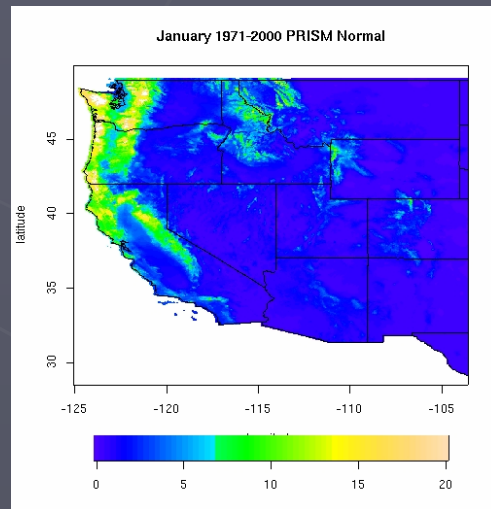
Percent of normal in grid boxes with a gauge... interpolate percentage to all other grid boxes

Mountain Mapper

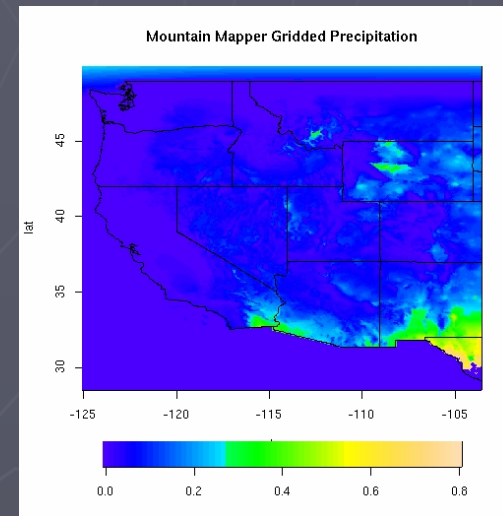
2. Multiply percent normal by PRISM normal grid



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Percentage of normal
grid

PRISM normal grid

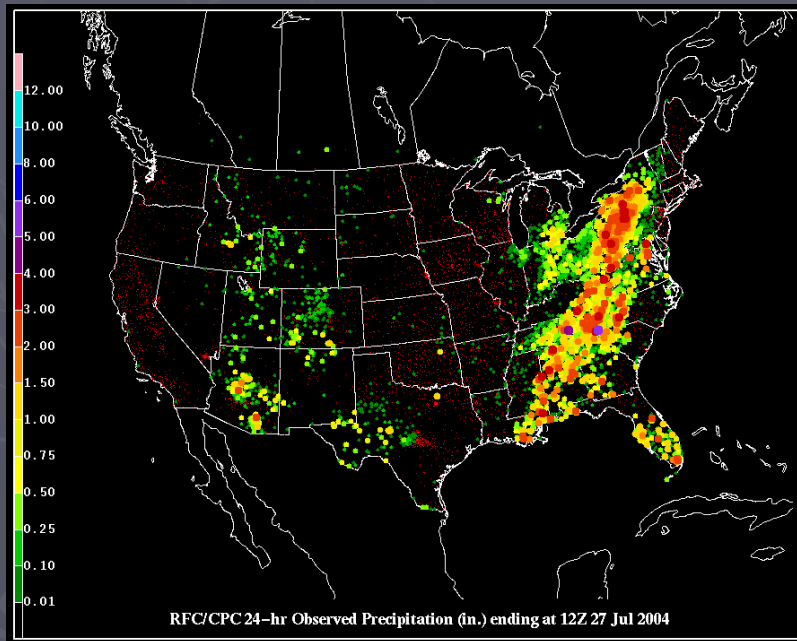
Mountain Mapper
QPE grid

Why is MM “dumb”?

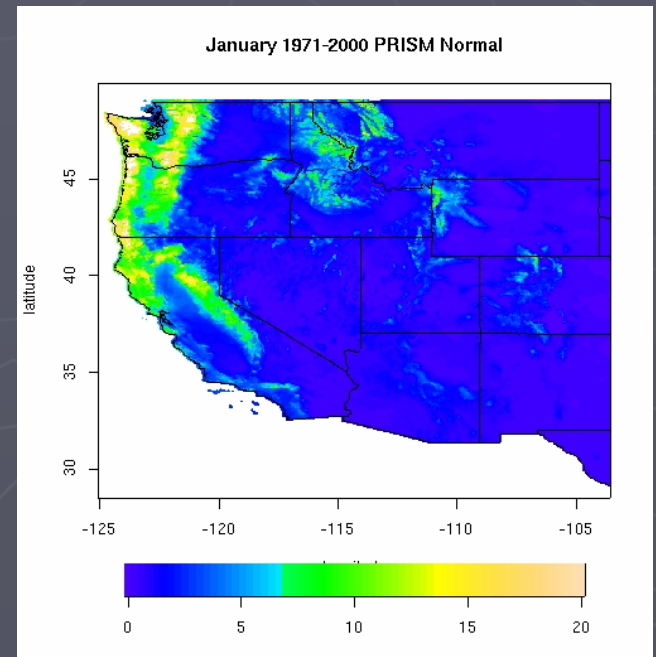
MM uses climatological precipitation PATTERNS to compute individual storm precipitation grids that may be very different from climatology...

Why is MM "dumb"?

On this particular day, the precipitation pattern did not resemble normal at all...



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“Smart” PRISM

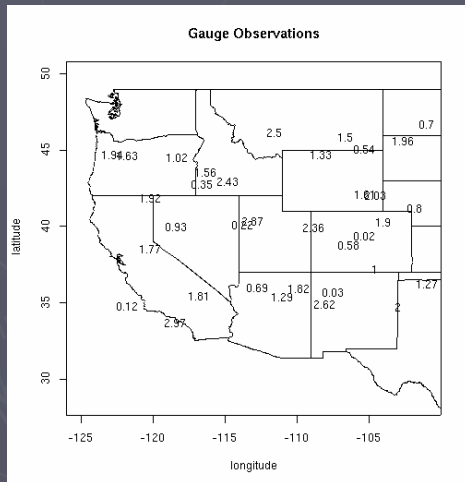
Definition: A climatology targeted to a specific meteorological condition rather than a specific time period.

“Smart” MM Concept: Instead of using monthly means for a background map, MM would use the appropriate “smart” PRISM map(s) to capture the storm scale precipitation based on synoptic conditions.

"Smart" PRISM MM

MM Works the same but with "smart" PRISM grids instead of monthly normals...

1. Determine a percent of "normal" grid



Gauge observations

UNDER
DEVELOPMENT

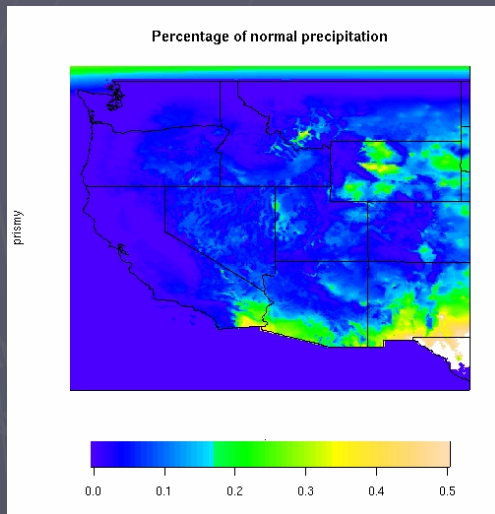
"Smart" PRISM

UNDER
DEVELOPMENT

Percent of "normal" in grid boxes with a gauge... interpolate percentage to all other grid boxes

"Smart" PRISM MM

2. Multiply by "smart" PRISM grid



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UNDER
DEVELOPMENT

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UNDER
DEVELOPMENT

Percentage of normal
grid

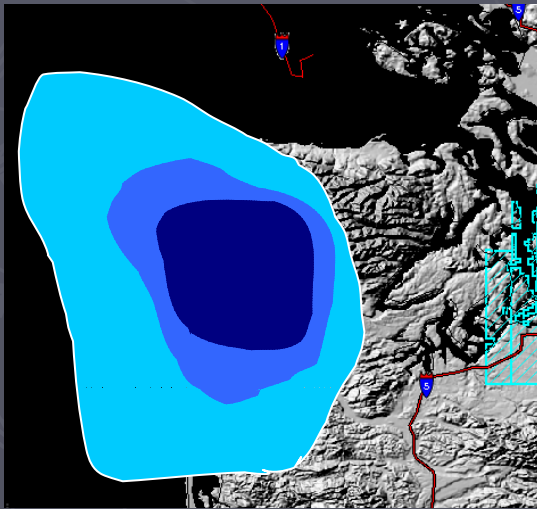
"Smart" PRISM
normal grid

"Smart" Mountain
Mapper QPE grid

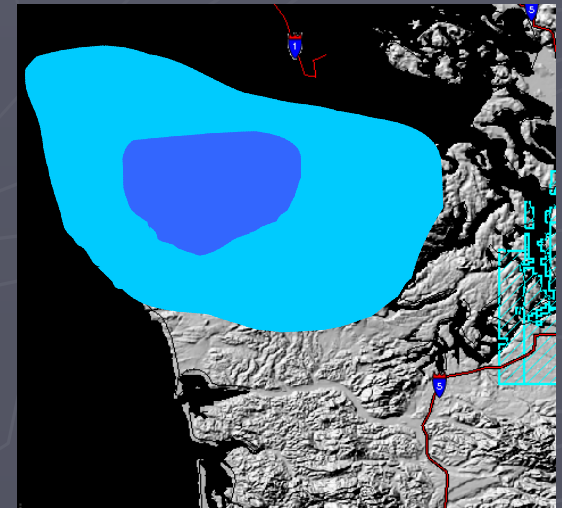
"Smart" PRISM

With a Northwest flow, QPE grids may look like this...

PRISM-based MM



Smart PRISM-based MM

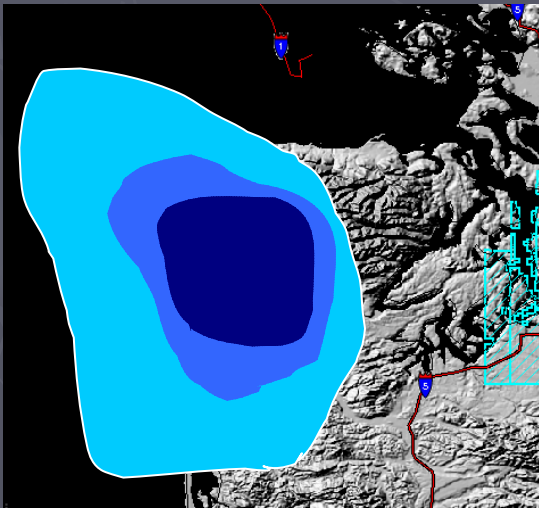


"Smart" PRISM

With a Northeast flow, QPE grids may look like this...

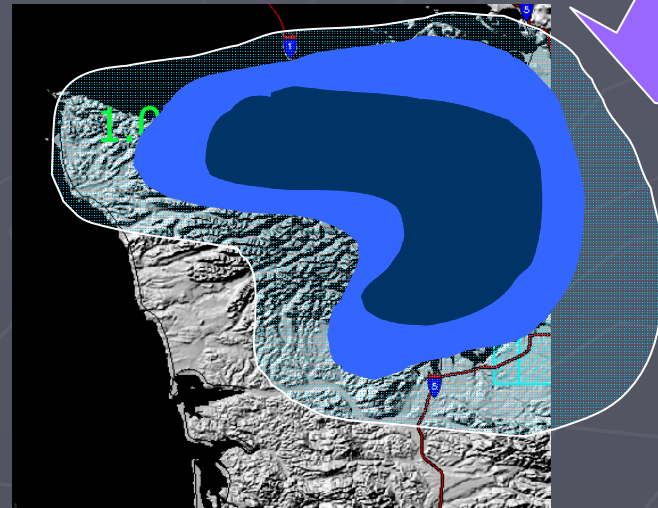
PRISM-based MM

Same as before



Smart PRISM-based MM

Modulated by flow direction



"Smart" PRISM

Complications:

- (1) More than one way to make smart PRISM maps – composite or map type techniques to be explored
- (2) How to categorize a synoptic regime
- (3) How to apply over large areas where more than one synoptic regime may be present

"Smart" PRISM

Goal of OSU collaboration:

- ▶ To conduct a proof of concept in a small geographic area which will quantify any improvement this technique adds to the gridded precipitation analysis. This analysis is an important input to hydrologic models and can be used for verification of the WFO IFPS precipitation fields.

Credits

- ▶ PRISM was developed by Chris Daly and is a product of Oregon Climate Service.
- ▶ MM was developed by Craig Peterson and Art Henkel at the CBRFC in the early 1990s.
- ▶ Discussion and concepts of SMART PRISM to enhance MM first took place in the mid 90s at the CBRFC (Brandon/Henkel/Peterson).