"Smart" PRISM Concept

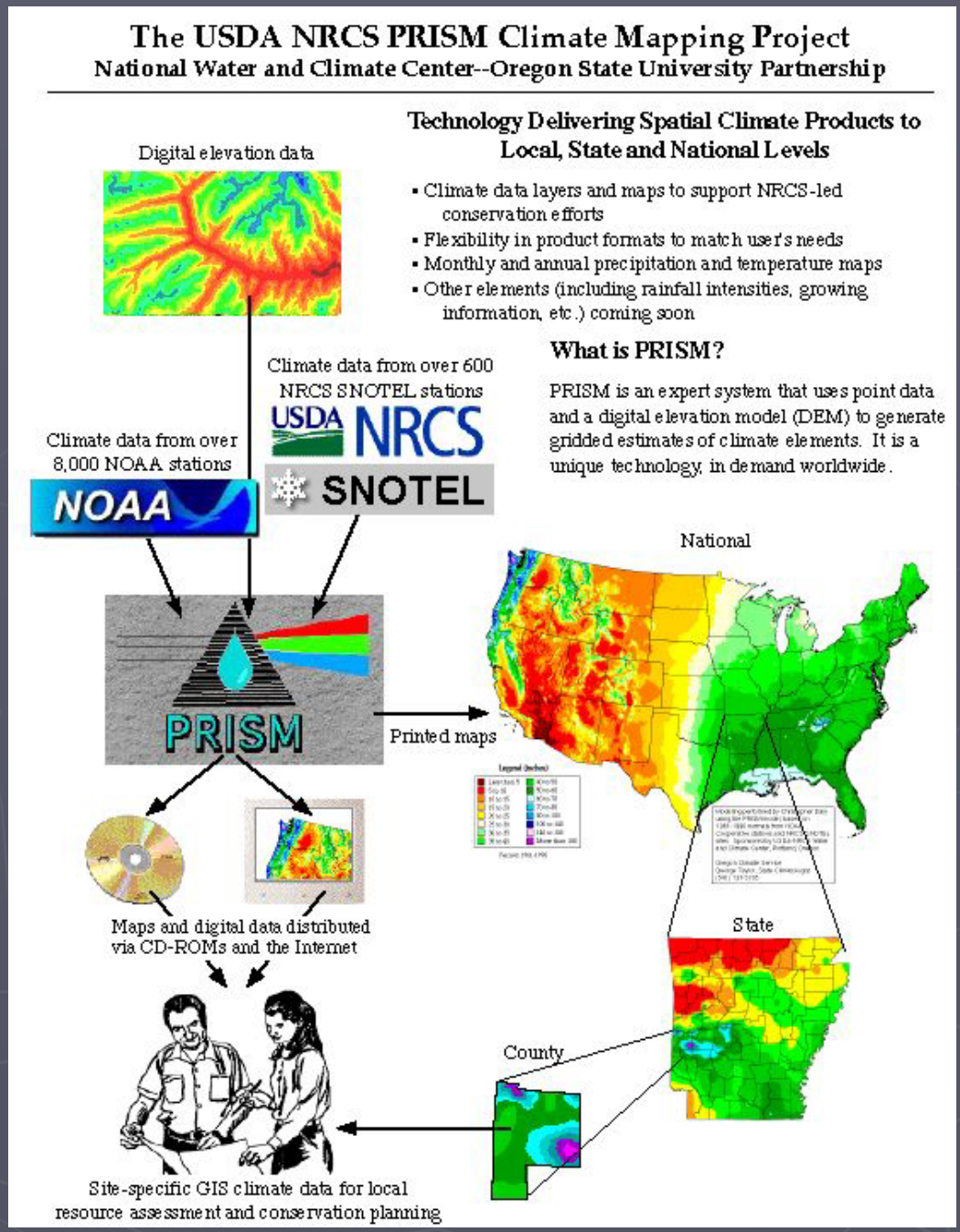
Kevin Werner
WRH/SSD

Outline

- PRISM Mountain Mapper Background
- Why is PRISM "dumb"?
- What is smart PRISM?

PRISM Background

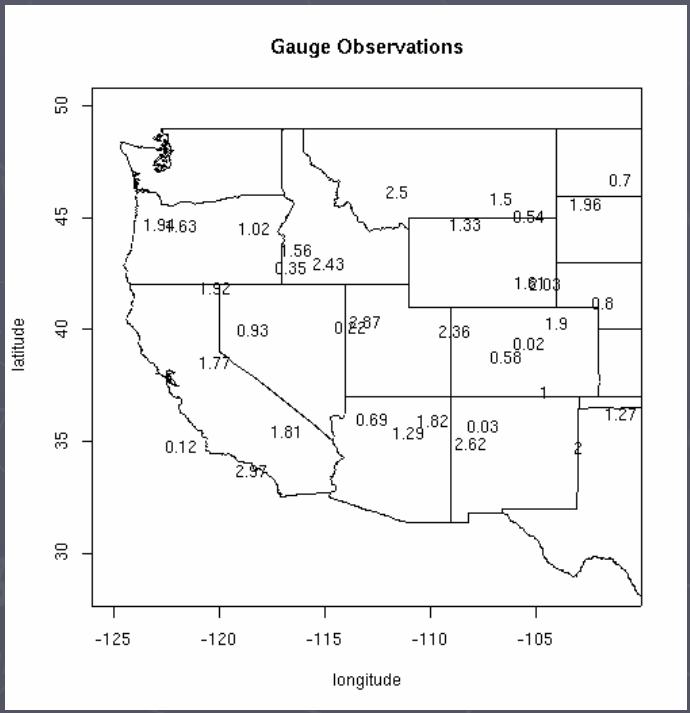
PRISM is a methodology for creating gridded maps of precipitation and temperature typically on climate time scales.



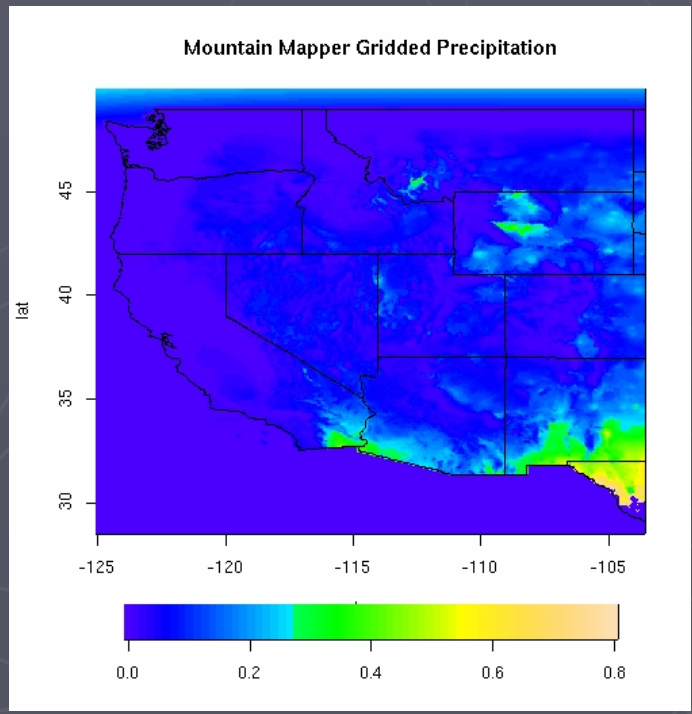
Mountain Mapper

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

How to go from this

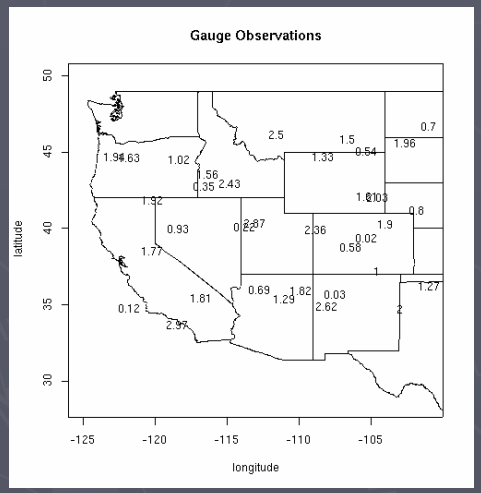


To this…



Mountain Mapper

1. Determine a percent of normal grid



Gauge observations

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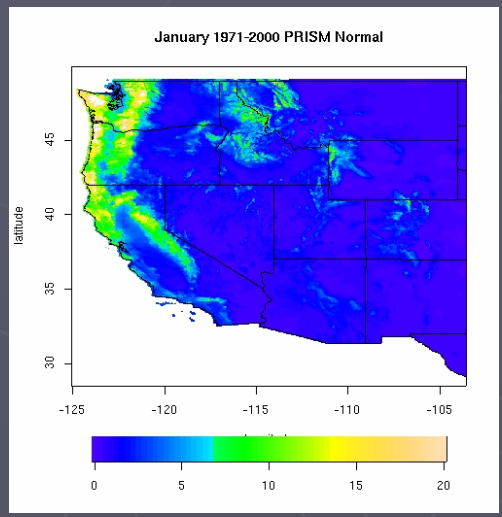

PRISM monthly normal

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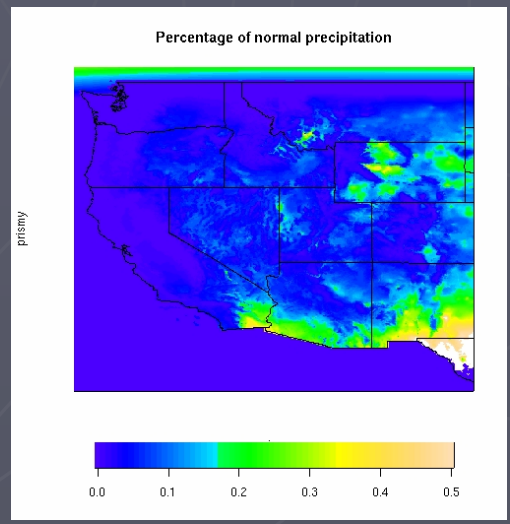
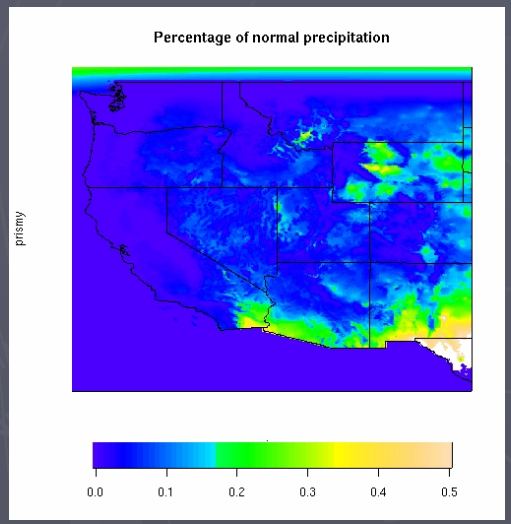


Percent of normal in grid boxes with a gauge… interpolate percentage to all other grid boxes

Mountain Mapper

2. Multiply percent normal by PRISM normal grid



Percentage of normal grid

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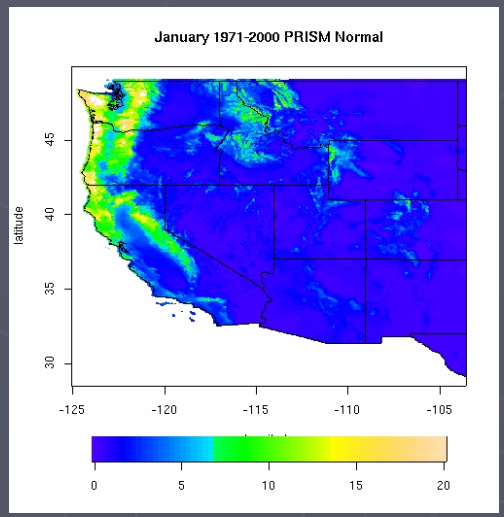

PRISM normal grid

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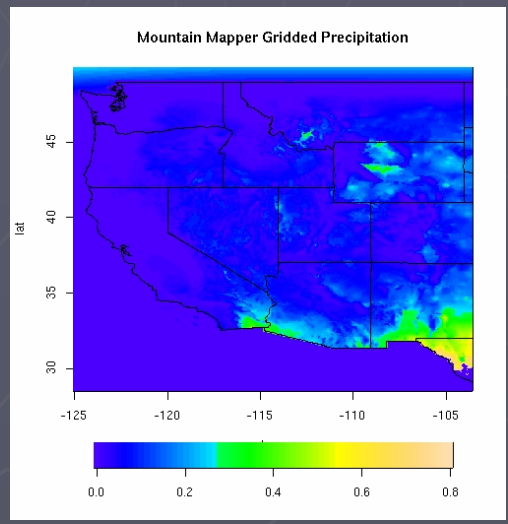


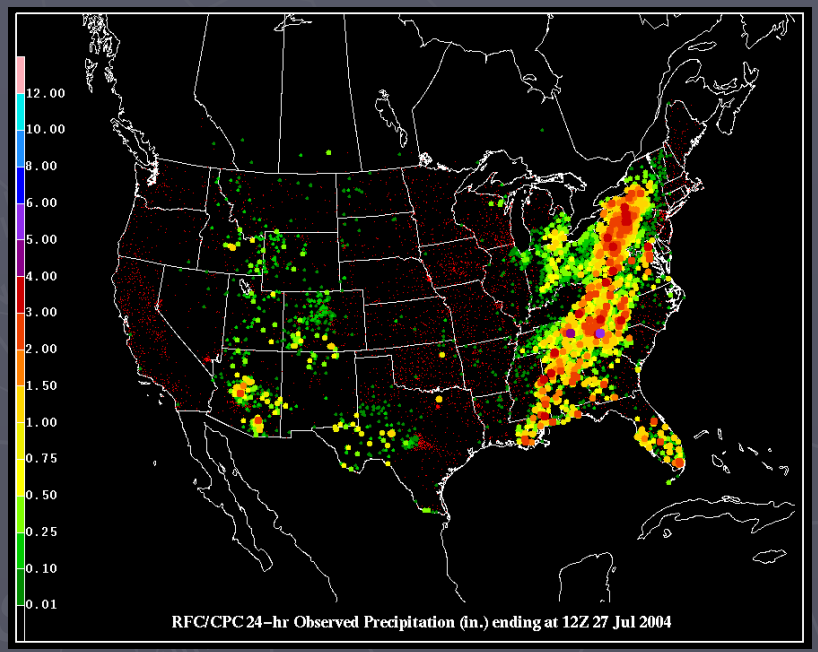
Mountain Mapper QPE grid

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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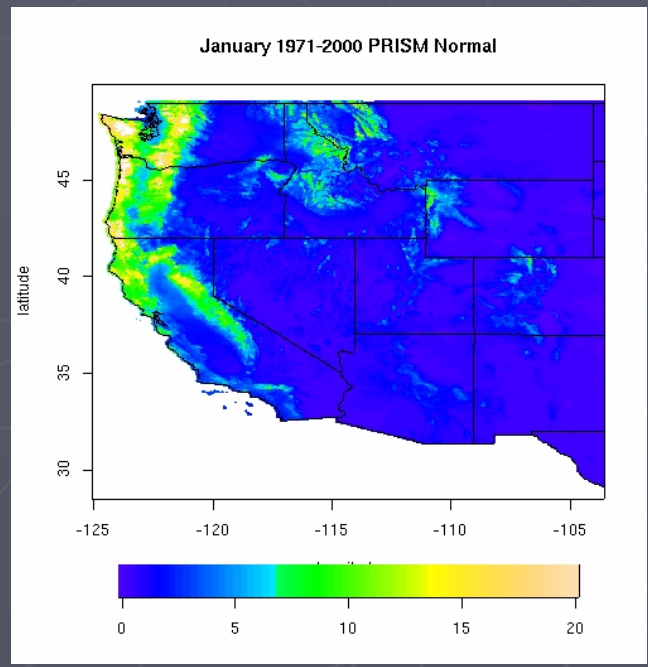


"Smart" PRISM

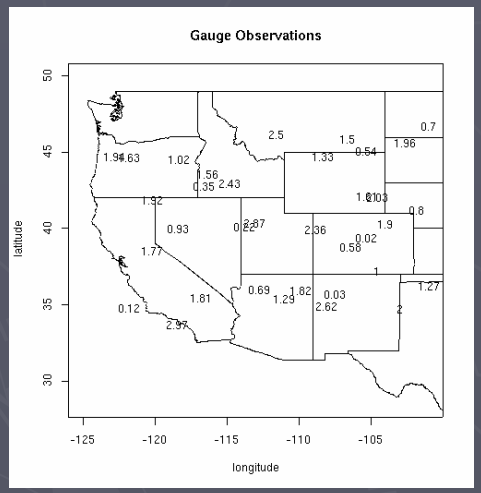
Definition: A climatology targeted to a specific meteorological condition rather than a specific time period.

"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



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UNDER DEVELOPMENT

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UNDER DEVELOPMENT

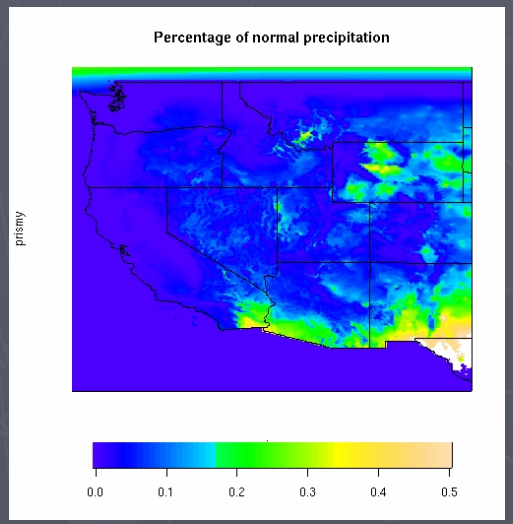
Gauge observations

"Smart" PRISM

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



Percentage of normal grid

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UNDER DEVELOPMENT

"Smart" PRISM normal grid

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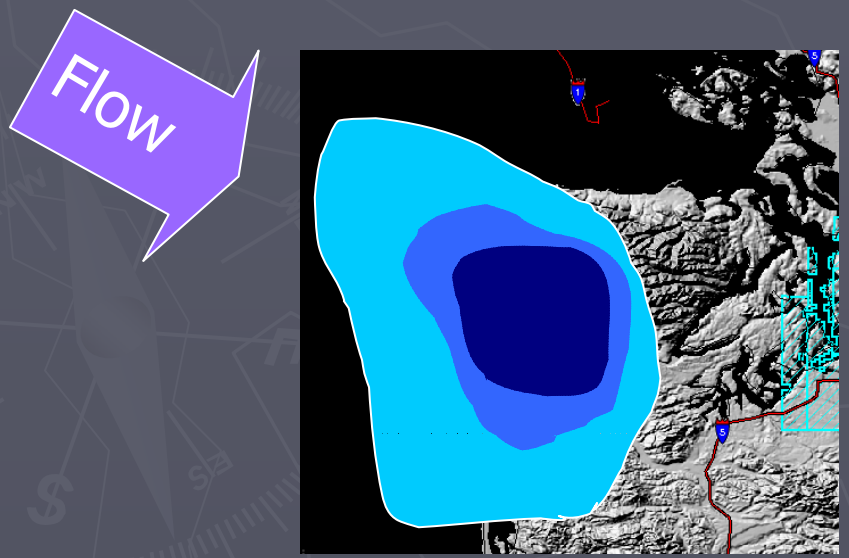
UNDER DEVELOPMENT

"Smart" Mountain Mapper QPE grid

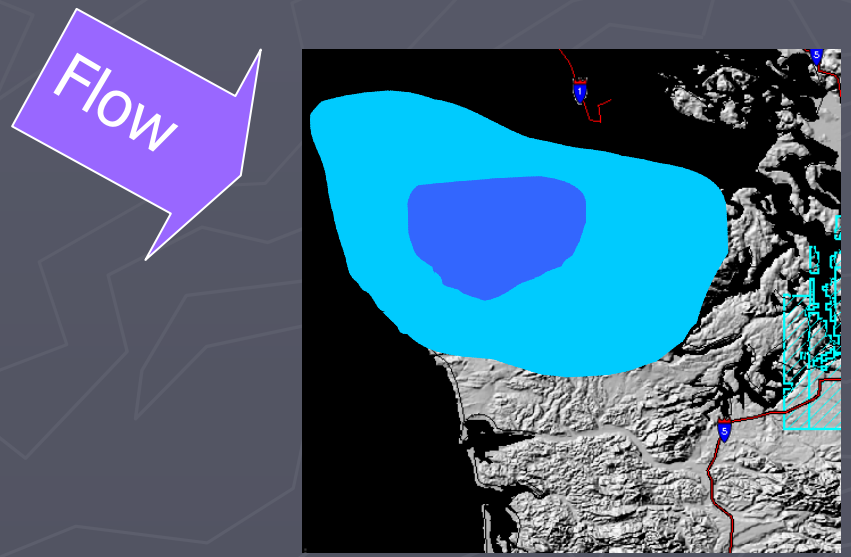
"Smart" PRISM

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

PRISM-based MM



Smart PRISM-based MM

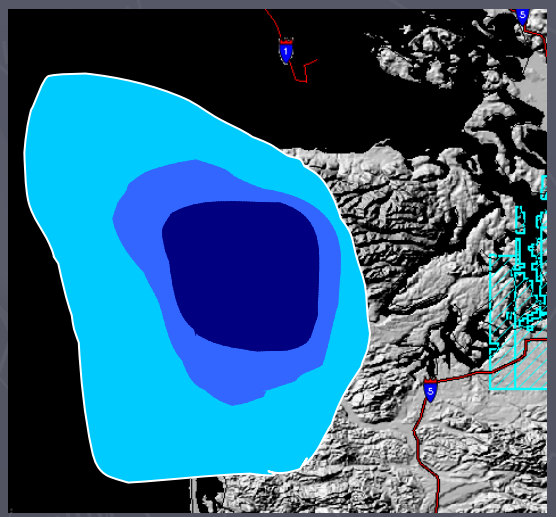


"Smart" PRISM

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

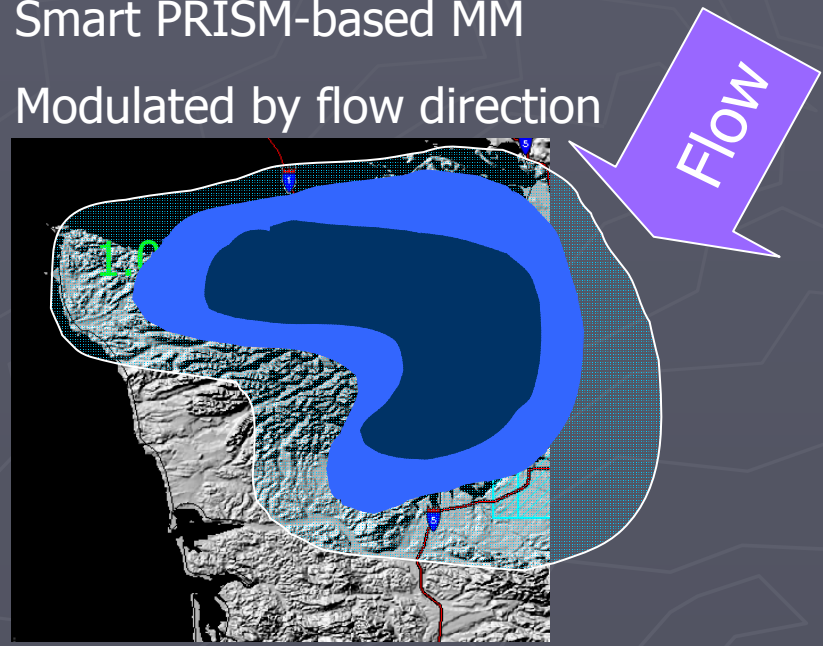
PRISM-based MM

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).