Spatial Distributions of Precipitation Events from Regional Climate Models

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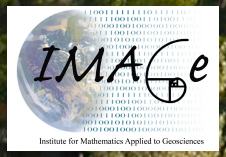

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Outline

- Climate Models
- North American Regional Climate Change Program
- Proportion plots
- Empirical orthogonal functions

Challenges:

Spatial and functional data, design and analysis of computer experiments, computational statistics for large problems.

What is climate?

Climate is what you expect . . .
weather is what you get.

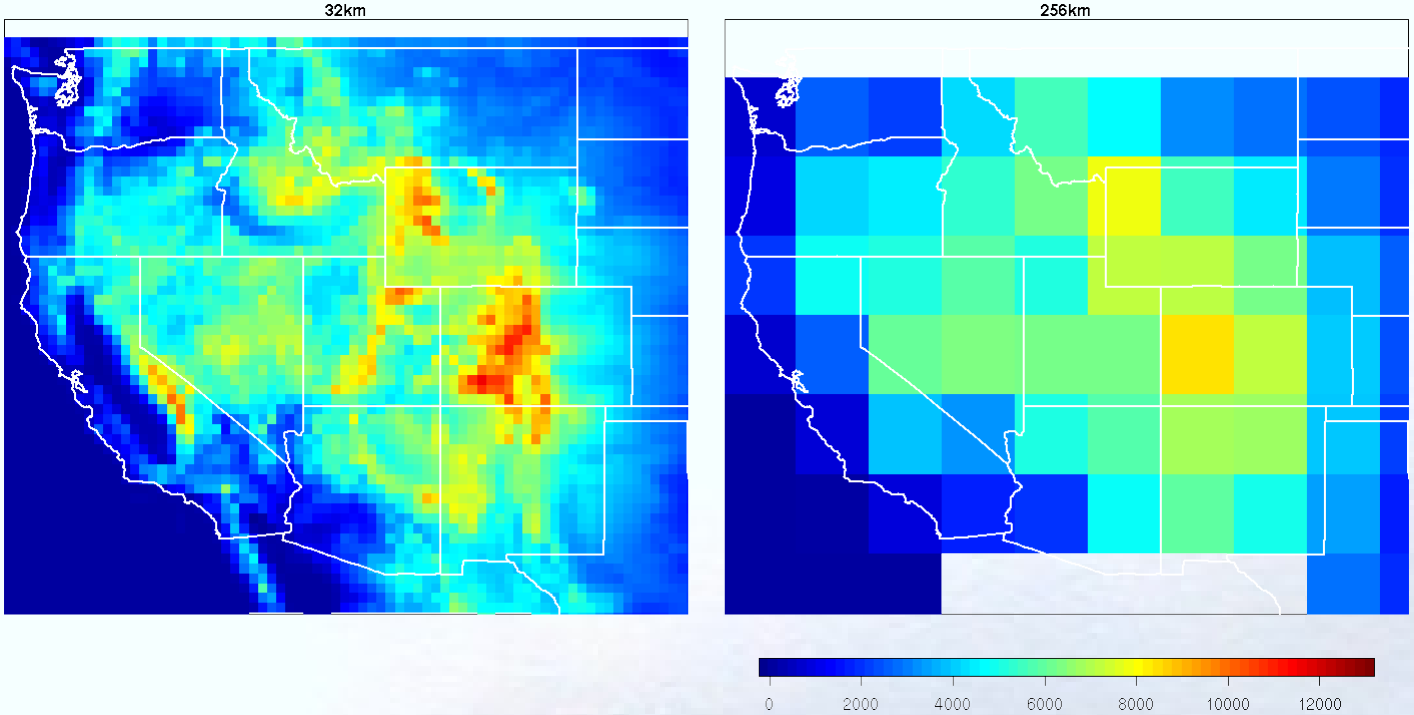
Weather:

Climate: For example, the 30 year *average* rainfall for this area.
Refers to the *distribution* of extreme events.

Why Regional Climate Models?

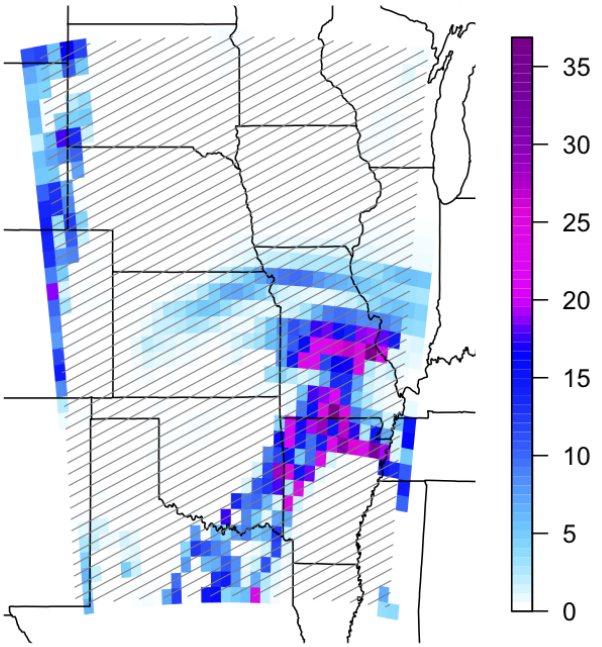
The global models on their own do not give enough detailed information at regional and local scales.

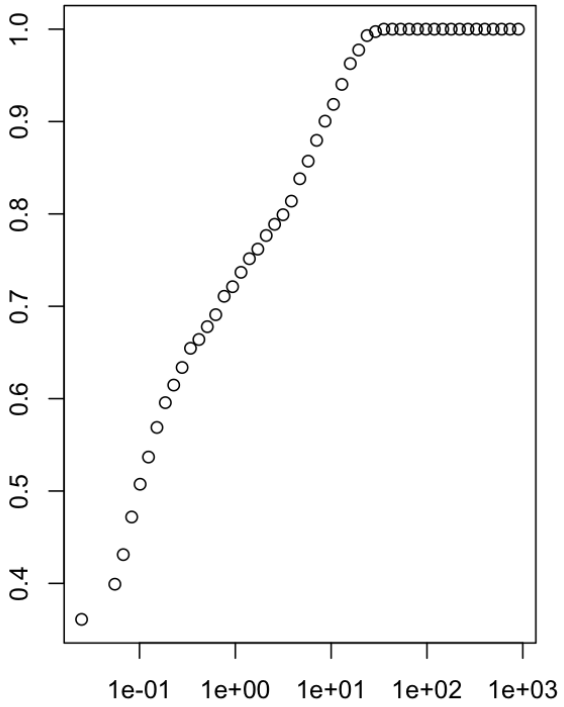
32km *256km*



Proportion Plots

$$\hat{z}(x) = \frac{1}{N}\{\#P_{\mu,\nu} : P_{\mu,\nu} > x\}$$



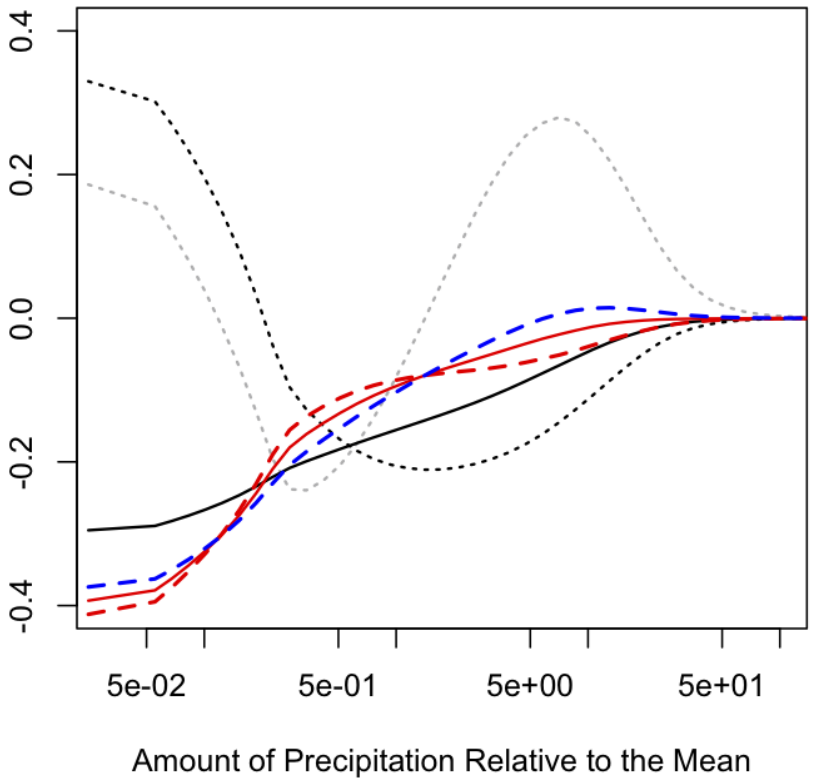


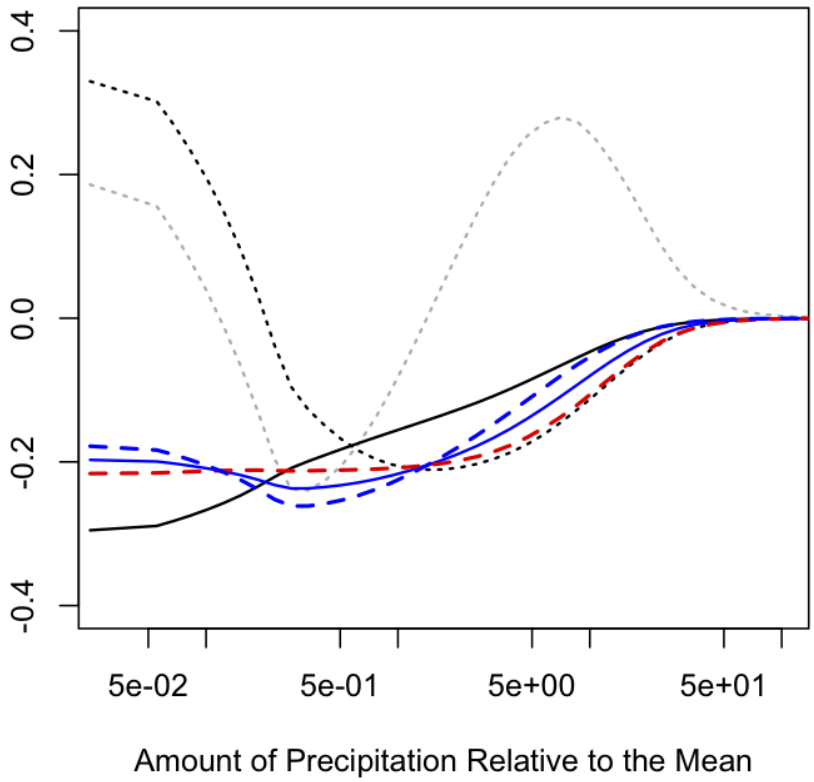
Singular Value Decomposition

$$z(x) = \sum_{j=1}^{J} \alpha_j \delta_j(x) \tag{1}$$

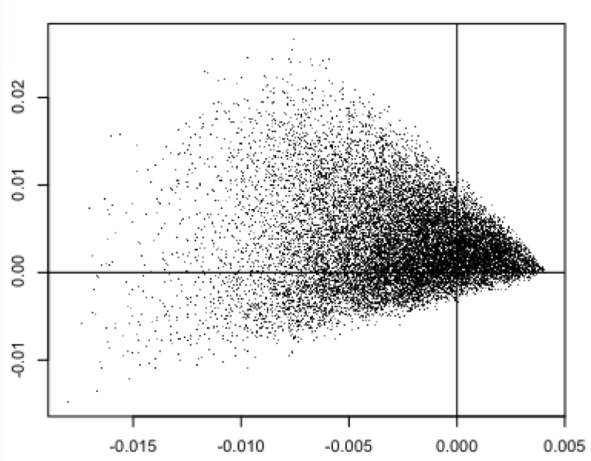
$$z = UDV^T \tag{2}$$

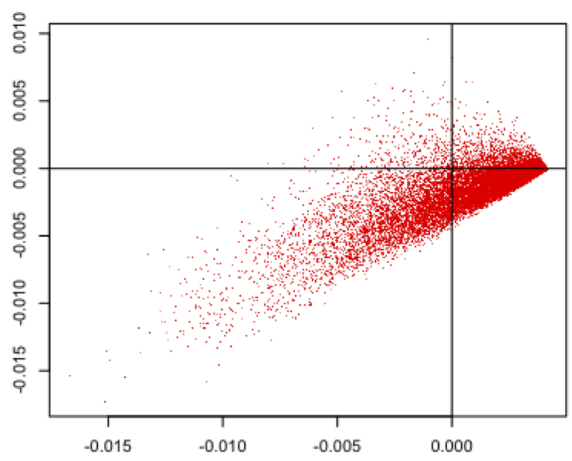
Basis Functions

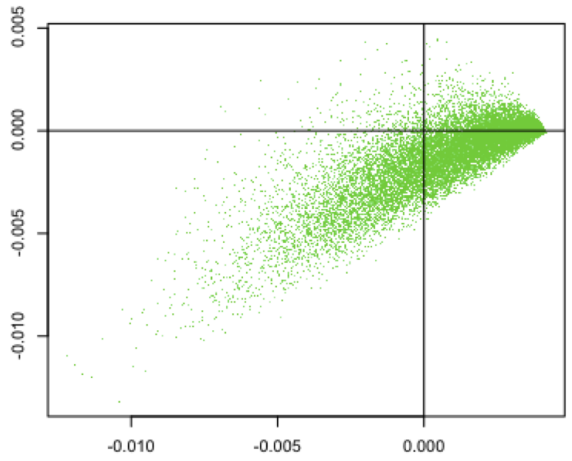


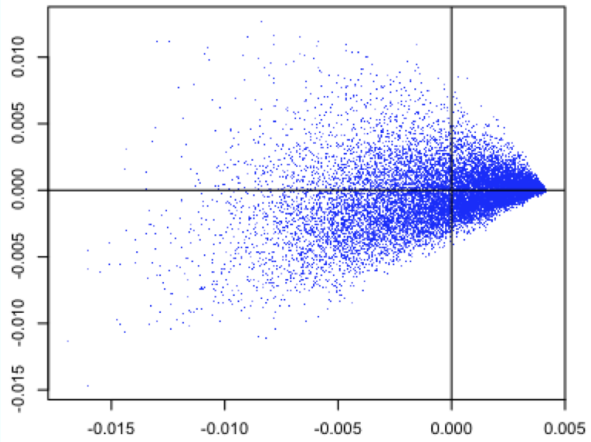


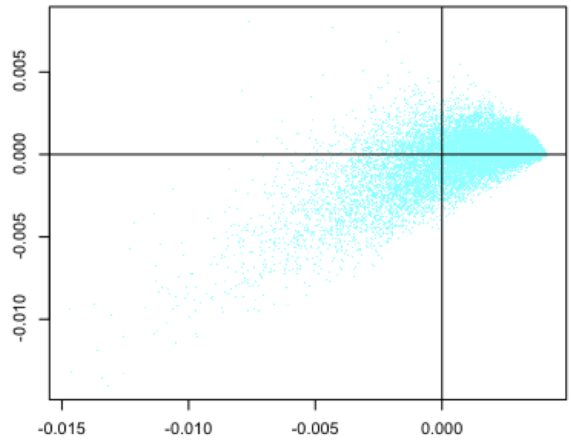
Coefficient Plots

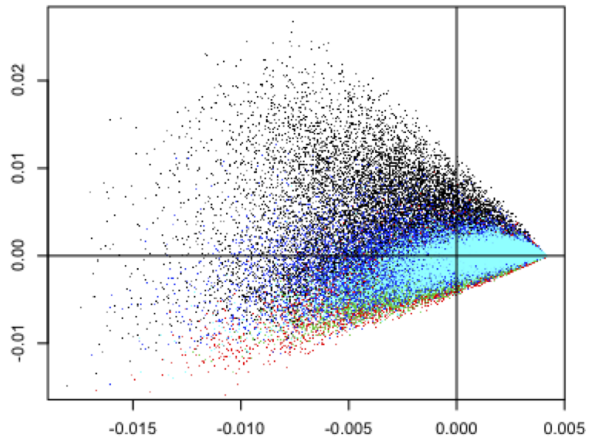




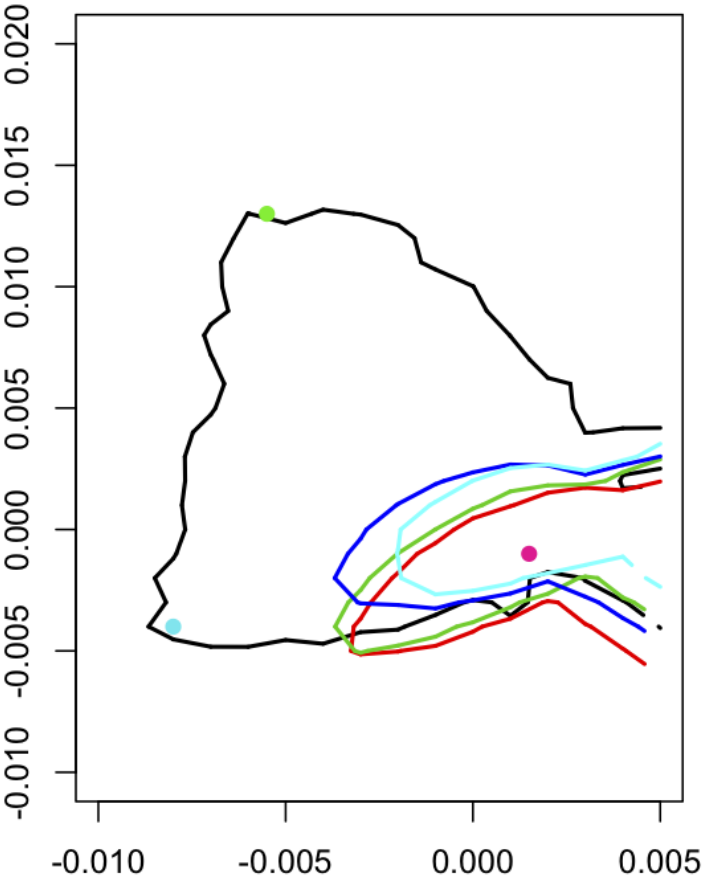








Contours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0.000
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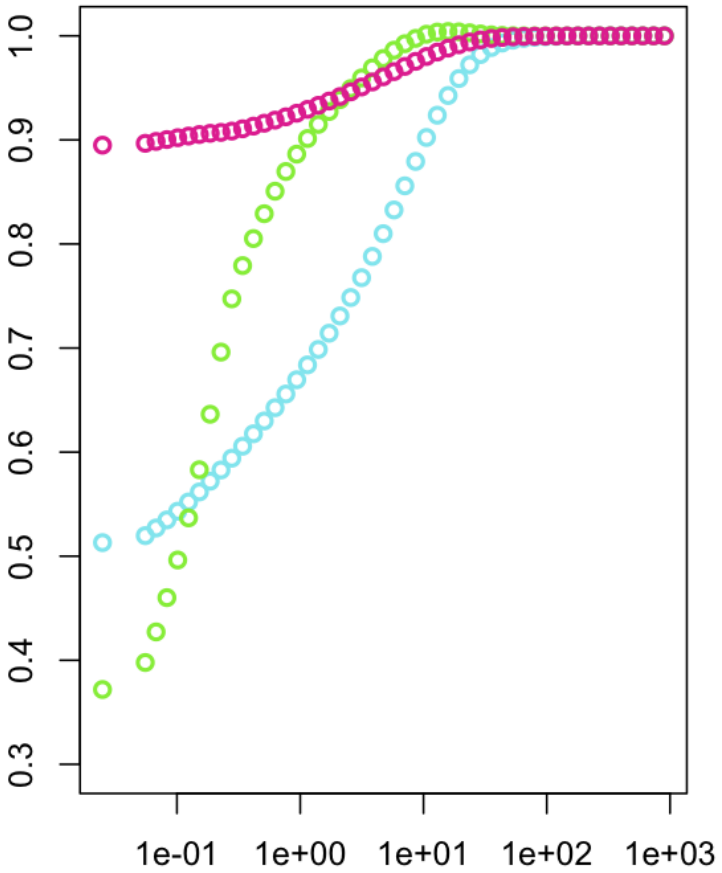
-0.010
-0.010
-0.005
0.000
0.005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0.8
0.7
0.6
0.5
0.4
0.3
1e-01
1e+00
1e+01
1e+02
1e+03

Thank you!

Questions?