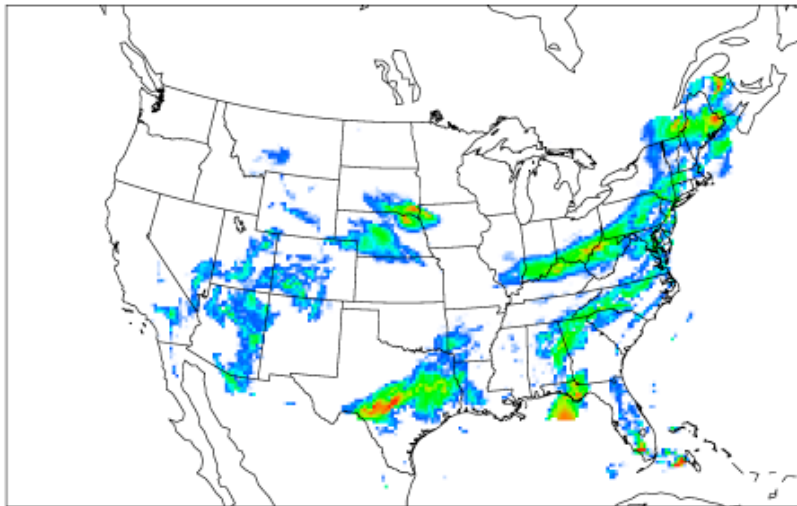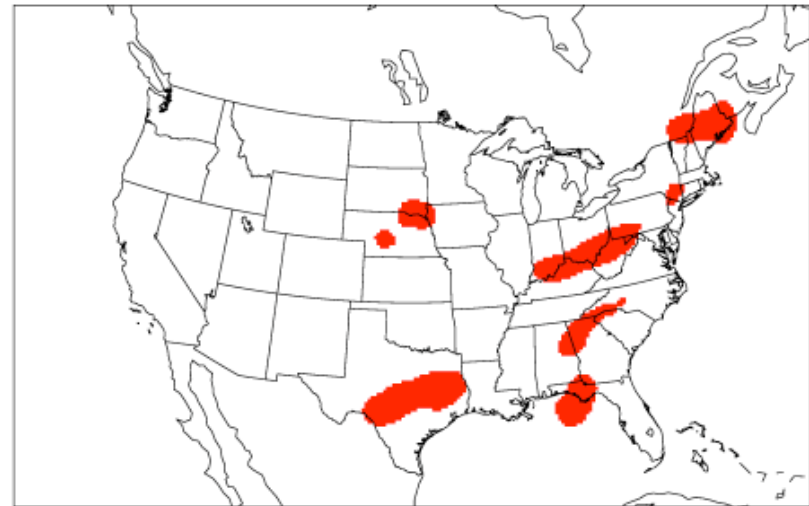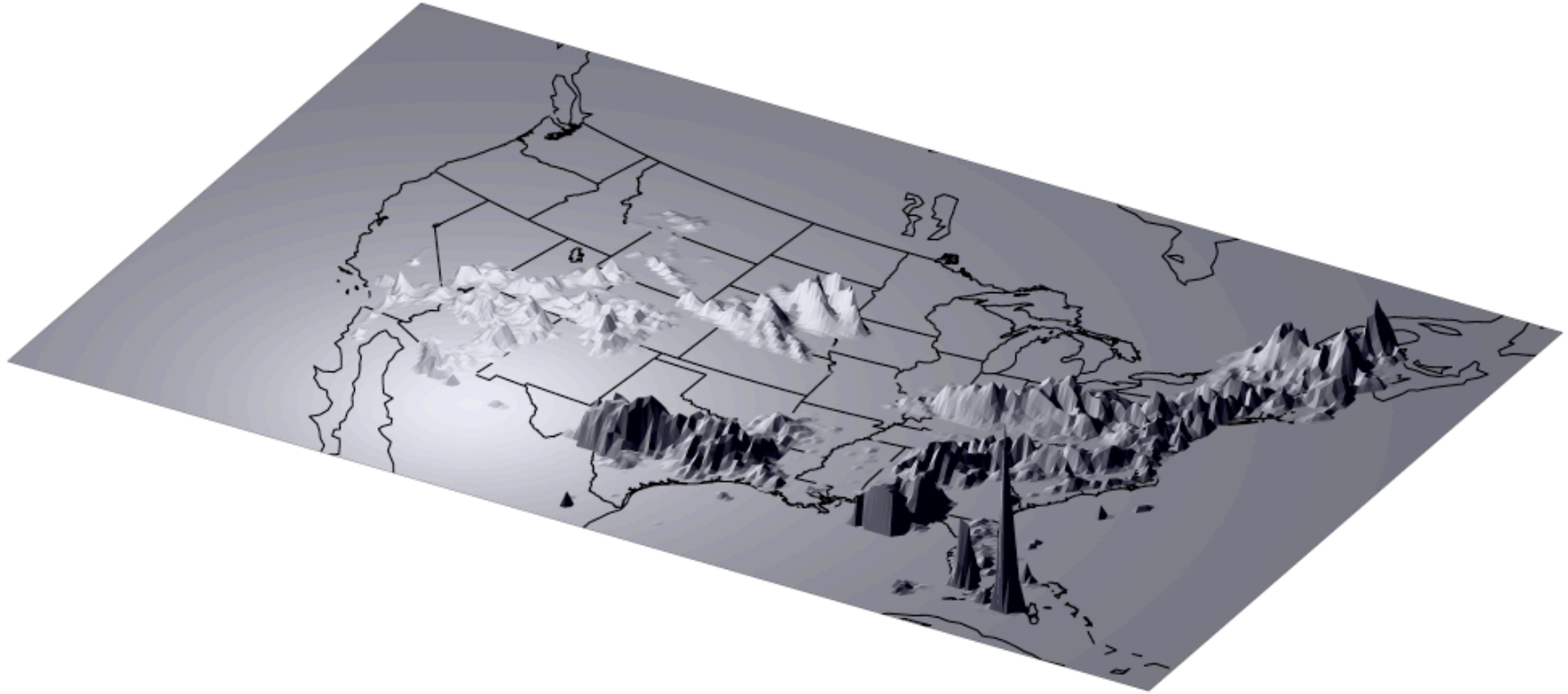# Defining Objects in MODE

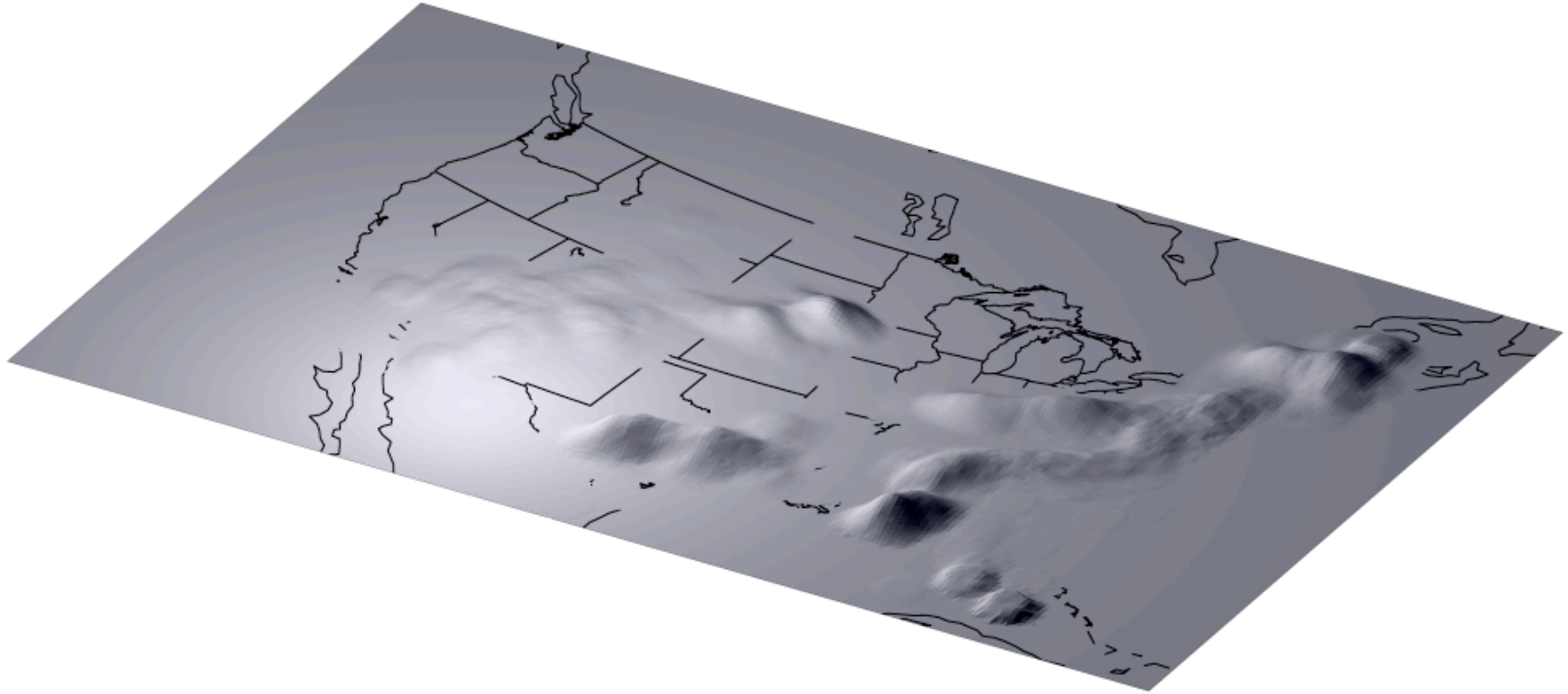# What are Objects?

Raw Field

Object Field

Objects are Regions of Interest

Step #1

Start with the raw data field.
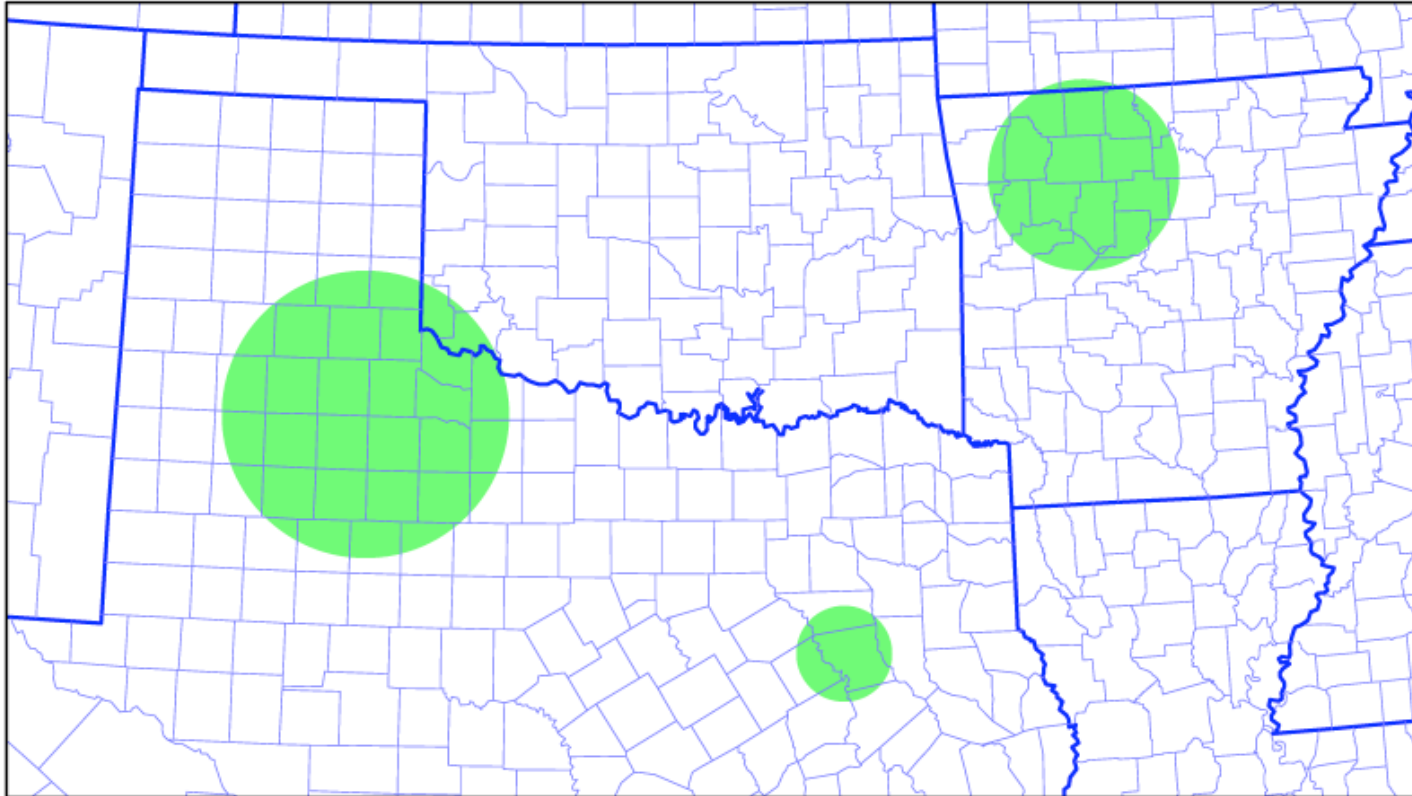
In this case, a precipitation field.

Step #2

Apply convolution operator.

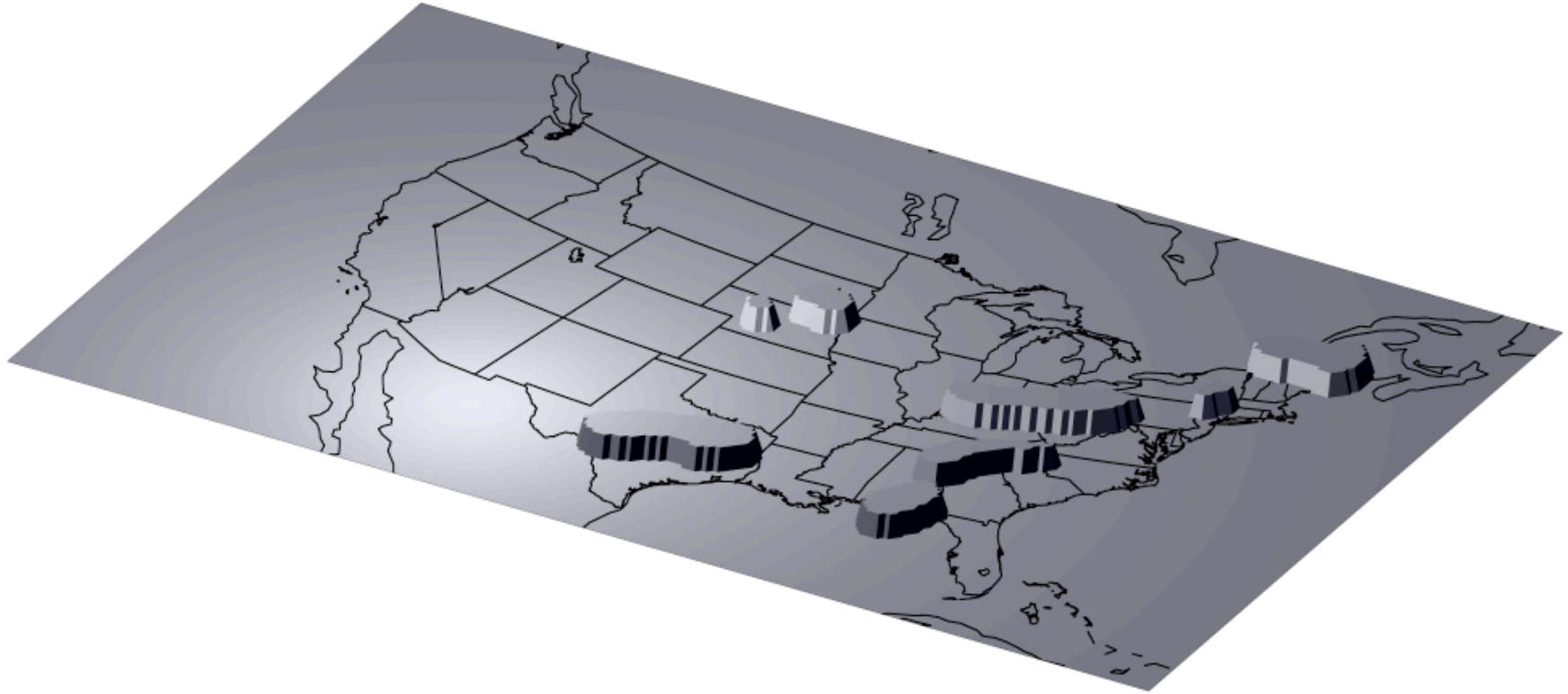This is basically a smoothing operation.

Convolution Radius

Radius of Influence

Convolution

Uses raw field $f(x, y)$ and

filter function $\phi(x, y)$

$$C(x, y) = \sum_{(\hat{x}, \hat{y}) \in G} \phi(\hat{x}, \hat{y}) \, f(x - \hat{x}, y - \hat{y})$$
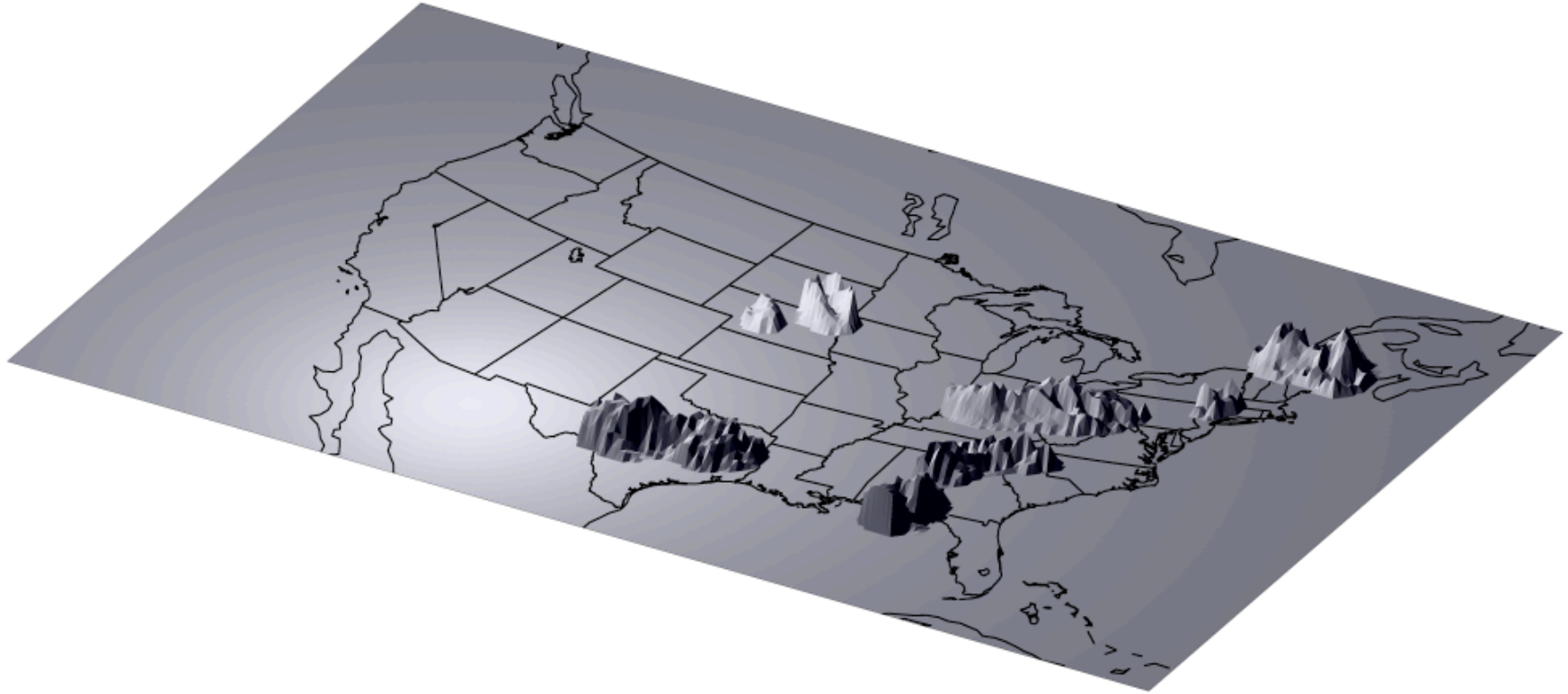
Step #3

Threshold the smoothed field.

This produces an on/off mask field.

Masking

Uses convolved field $C(x, y)$

and threshold T

$$M(x, y) = \begin{cases} 1 & \text{if } C(x, y) \geq T \\ 0 & \text{else} \end{cases}$$

Step #4

Restore original data to object interiors.

This gives us our objects.

Changing Object-Definition Parameters

Raw Field

R = 2
T = 2.29

R = 5
T = 0.76

R = 10
T = 0.76