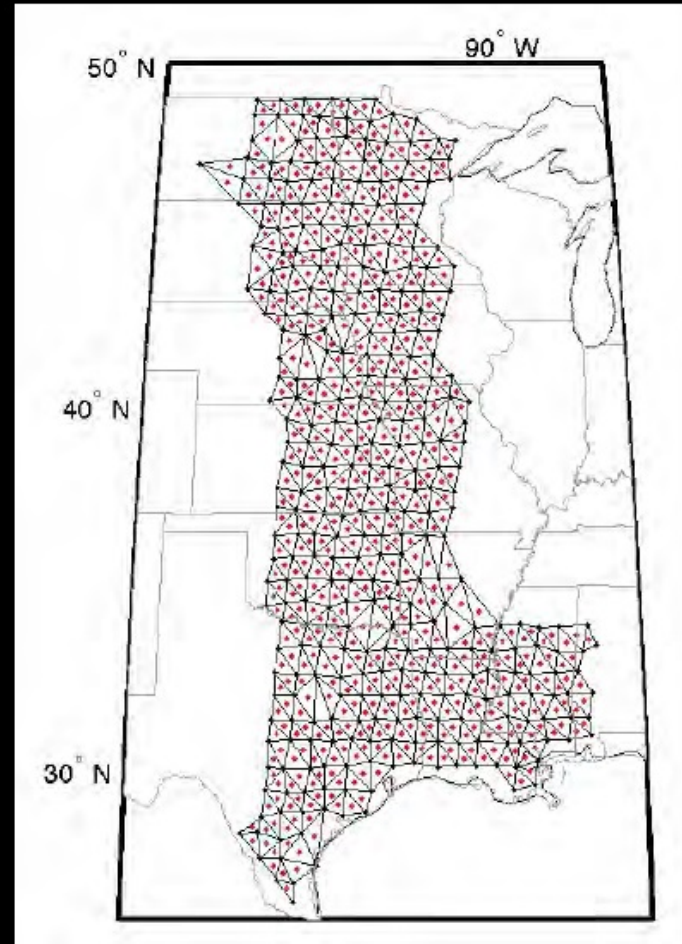# Consider the TA as a massive collection of arrays

Use Delauney triangulation
to define 580 triads
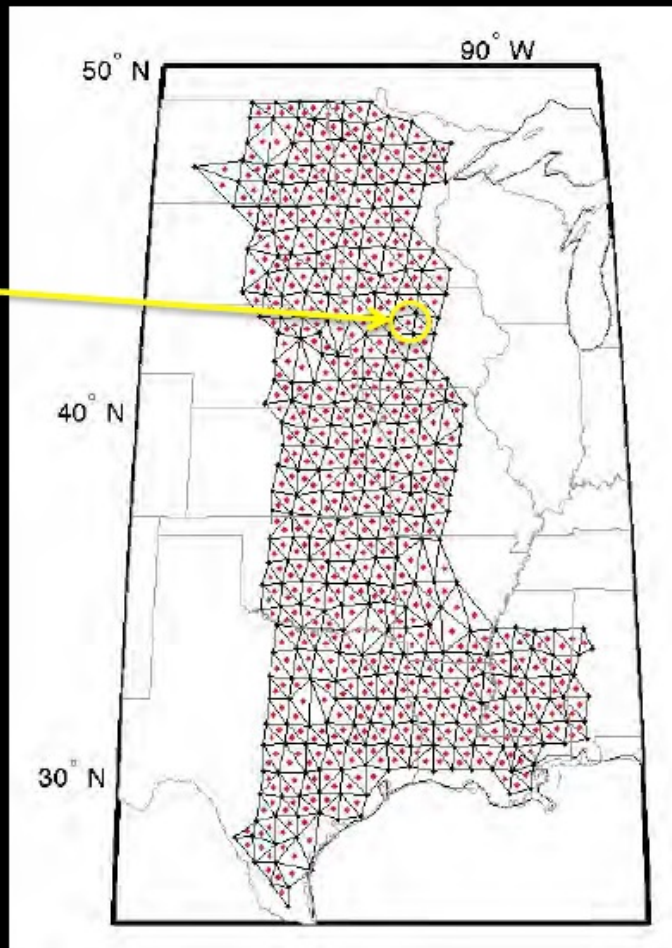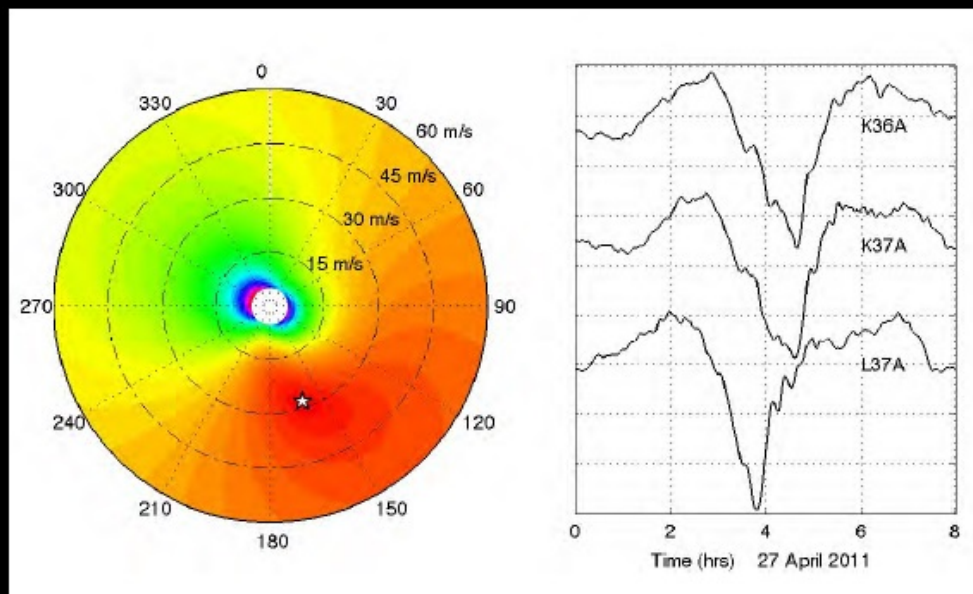
Mapping atmospheric gravity waves
-applications for
Numerical Weather modelling

de Groot-Hedlin, Hedlin and Walker, 2013

Frank Vernon (UCSD)

Filter & cross-correlate to detect coherent signals

(Hedlin EGU, 2016)

$$t_{ij} + t_{jk} + t_{ki} < tcut$$

Consistency criterion, Cansi, 1995

Frank Vernon (UCSD)

May-August: 2010-2014

MJJA NIGHT 60 Pa plus 2 to 6 hr
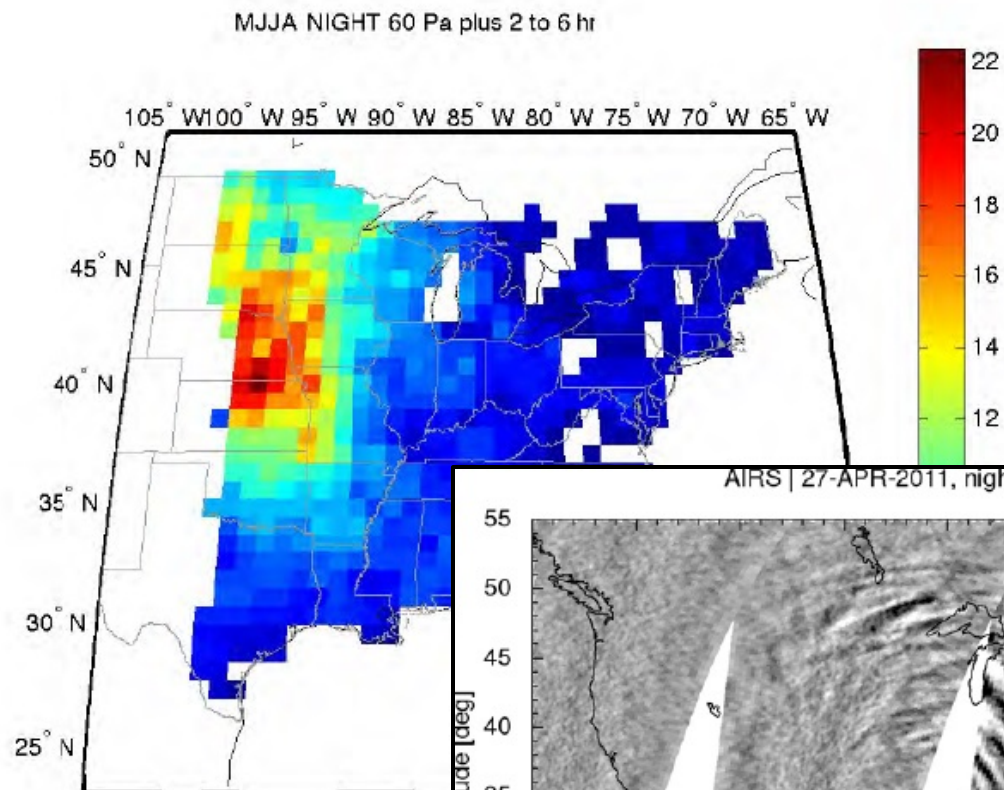
AIRS | 27-APR-2011, nighttime

Frank Vernon (UCSD)

May-August: 2010-2014

MJJA NIGHT 60 Pa plus 2 to 6 hr

gravity waves / seasonal data (MJJA) / nighttime

Frank Vernon (UCSD)
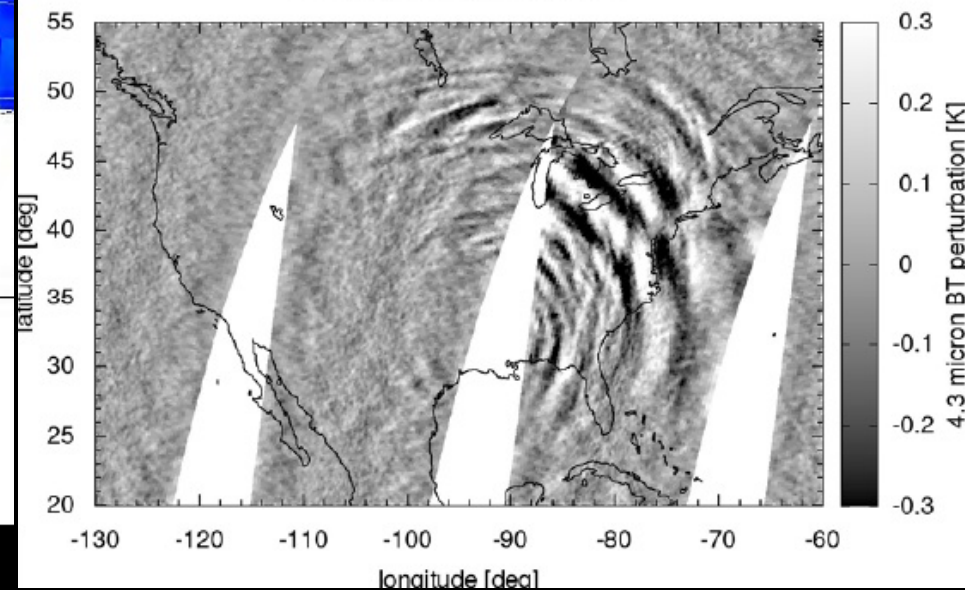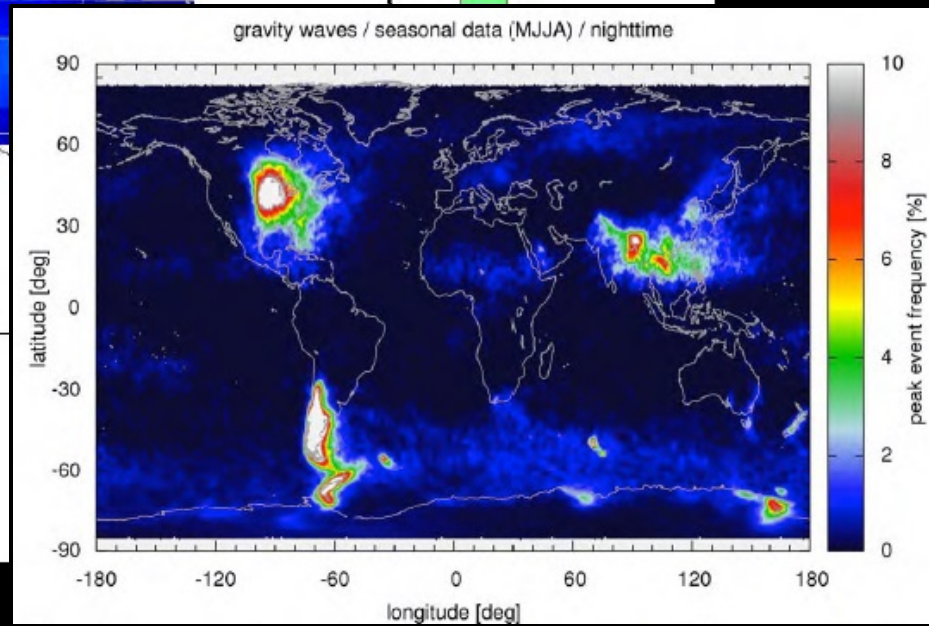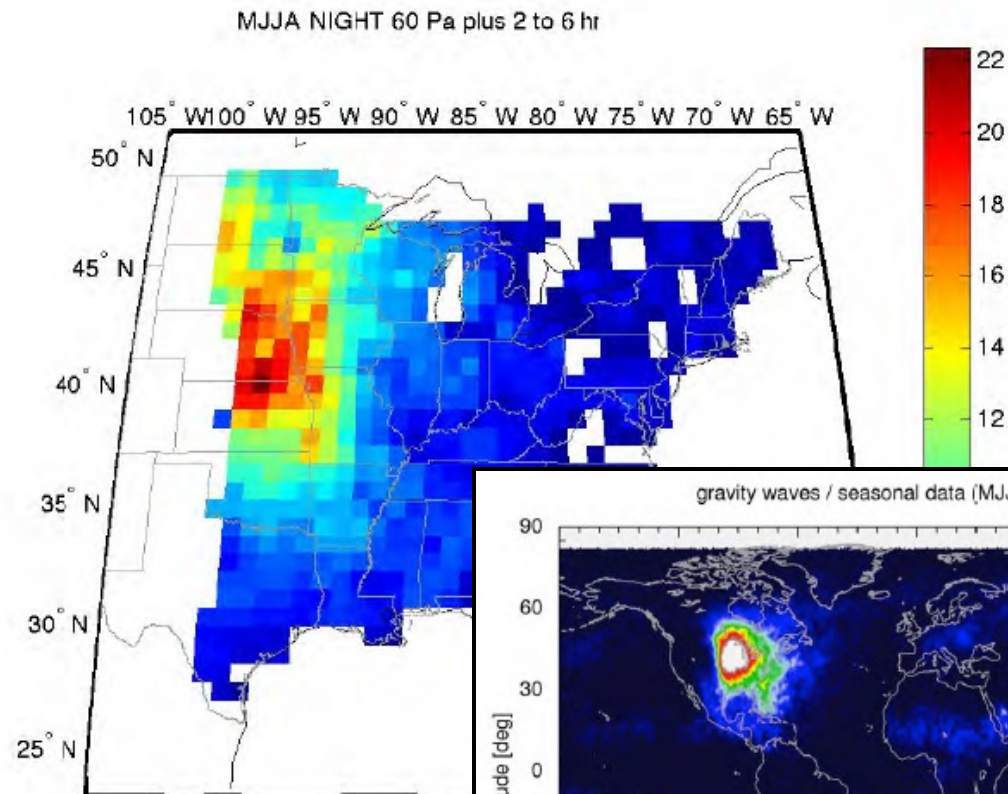
Wavewatch-III swell field and microseism beams. When a large long-period swell hits the Cdn coast, the lower attenuation frequency microseism beam (red arrow) switches to that azimuth, while the double frequency microseisms (magenta arrow) stays on the SSW azimuth (these swells trigger microseisms across entire continent (Schulte-Pelkum et al 2004).

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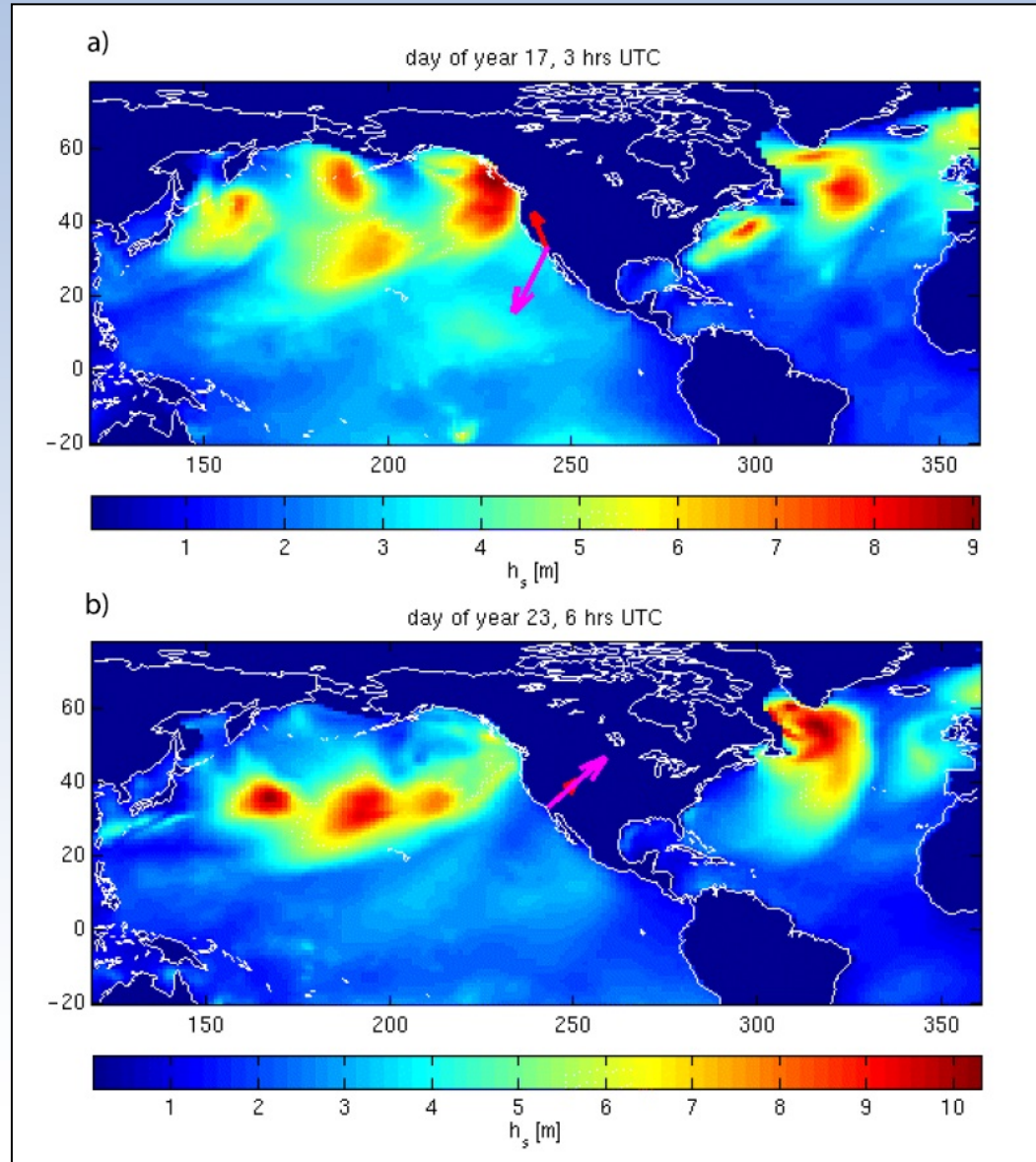
Case Study: 11-12 Aug 2011 MCS Events

- **0900 UTC 12 Aug 2011 Feature Analysis**

Positive Feature #2
Lifetime: **7.6 h**
Max Pert.: **4.5 hPa**
Med. Speed: **20.8 m s^{-1}**

Negative Feature #1
Lifetime: **9.0 h**
Max Pert.: **5.8 hPa**
Med. Speed: **22.1 m s^{-1}**

Positive Feature #1
Lifetime: **10.1 h**
Max Pert.: **4.9 hPa**
Med. Speed: **22.4 m s^{-1}**

Radar Reflectivity (dBZ)

Mesoscale Pressure Perturbation (hPa)
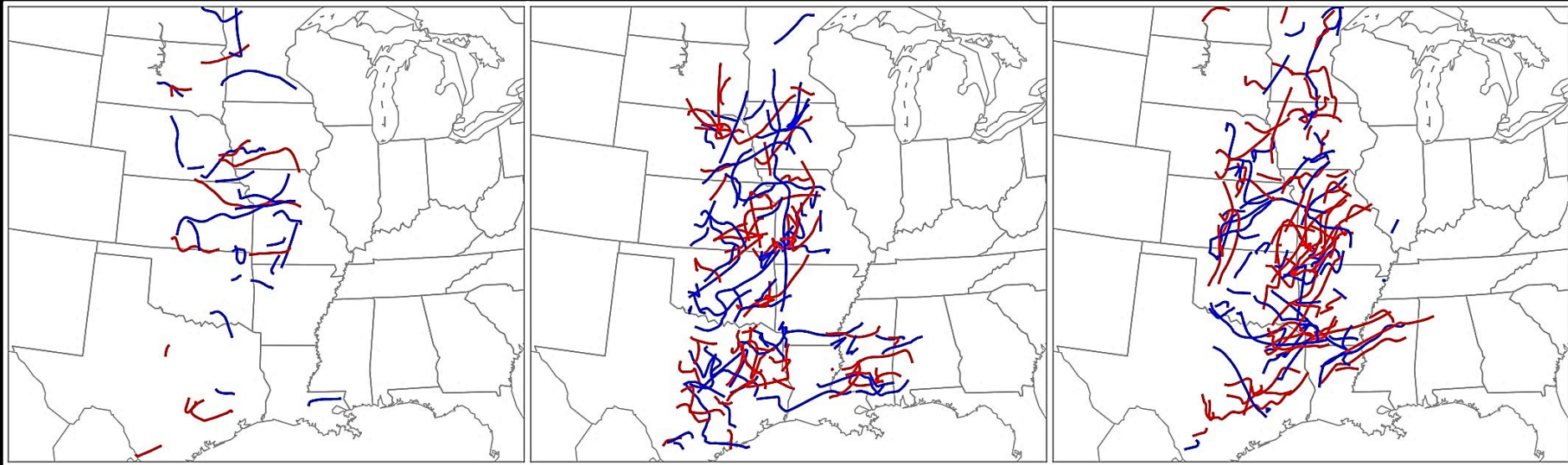
Frank Vernon (UCSD)
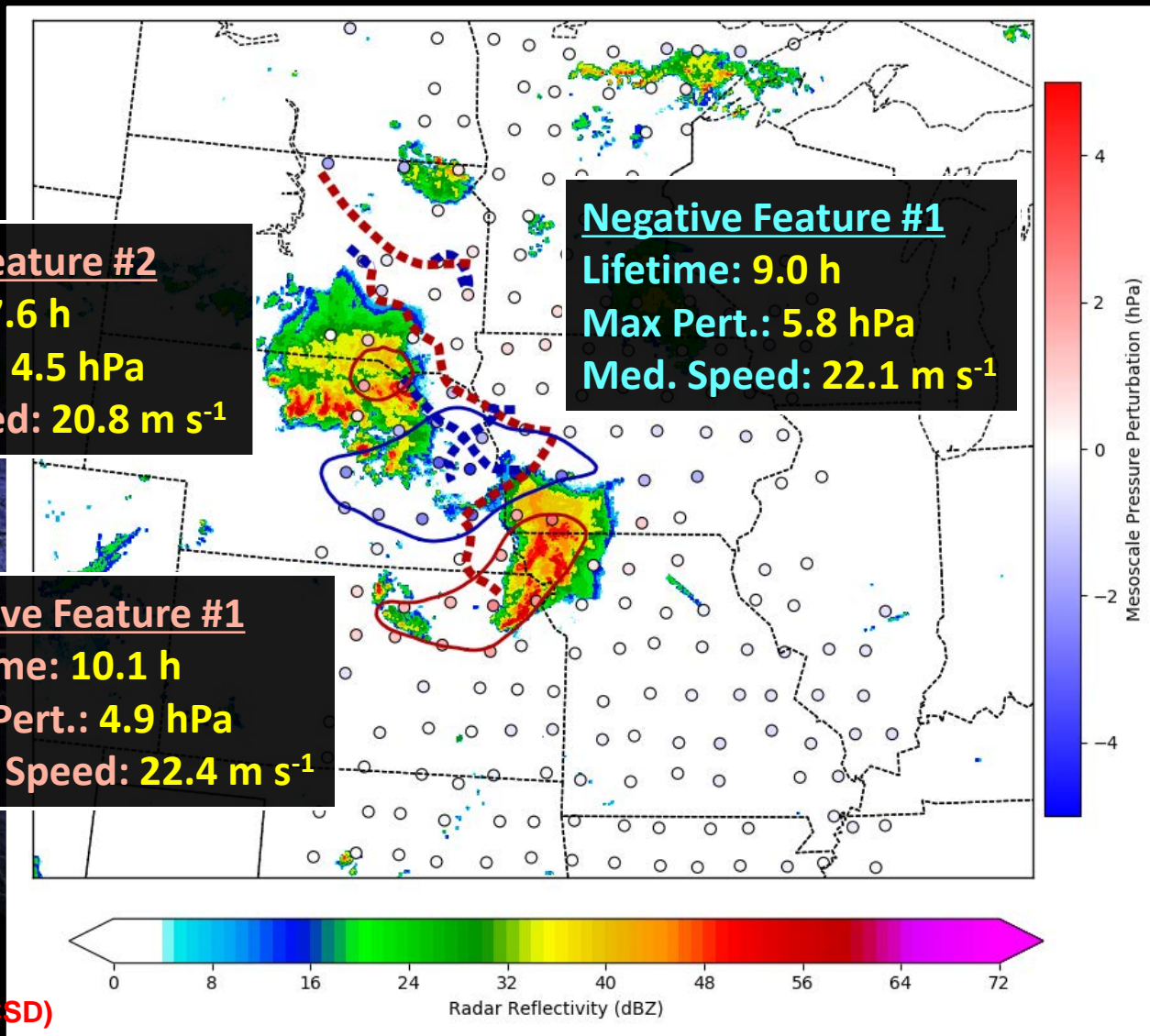
Prominent Feature Statistics

- **Spring (March, April, May) 2011 Assessed Feature Tracks**
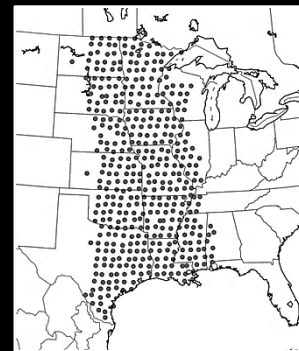 - **Positive** perturbations **red,** **negative blue**
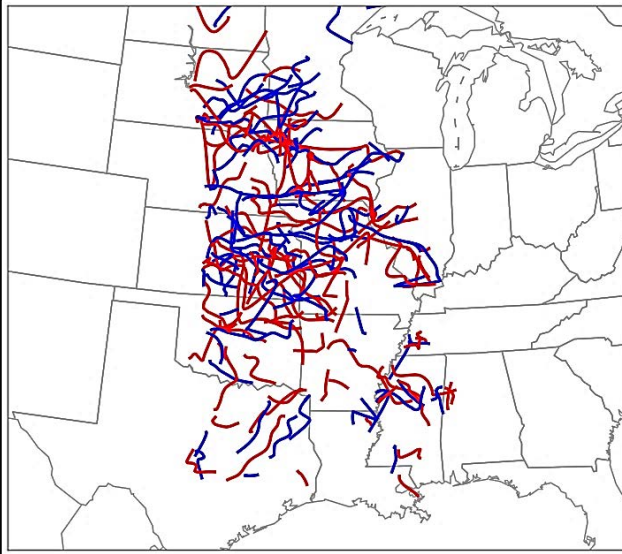

March   April   May

- **Majority of assessed features:**
  - **Originate across southern and central Great Plains**
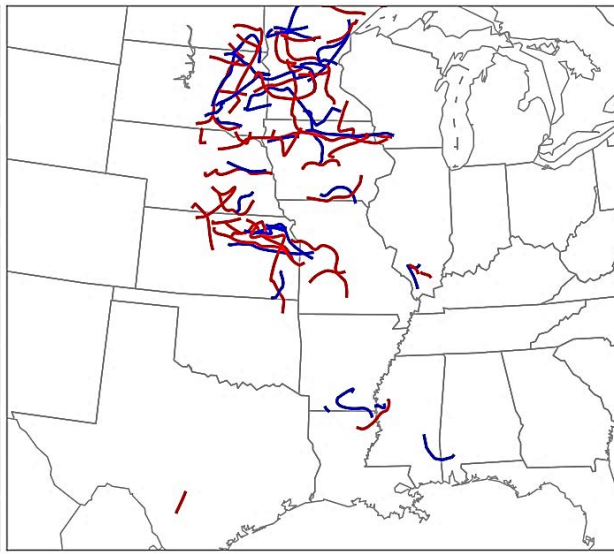 - **Move in east-northeasterly directions**

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Prominent Feature Statistics

- **Summer (June, July, August) 2011 Assessed Feature Tracks**
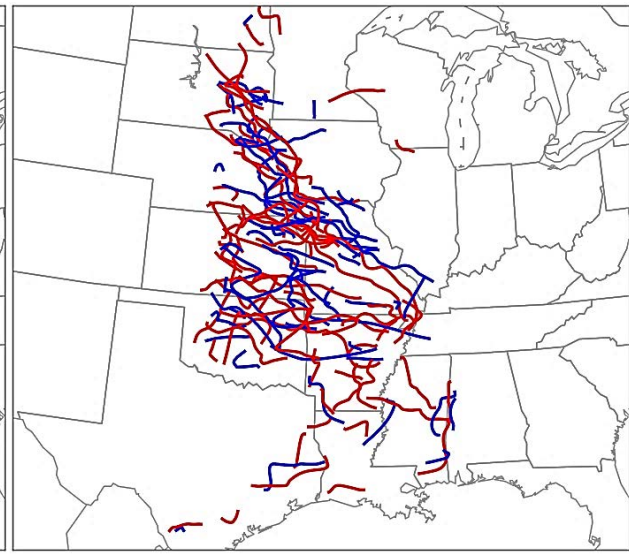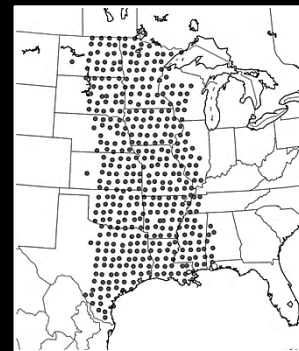 - **Positive perturbations red negative blue**

June   July   August
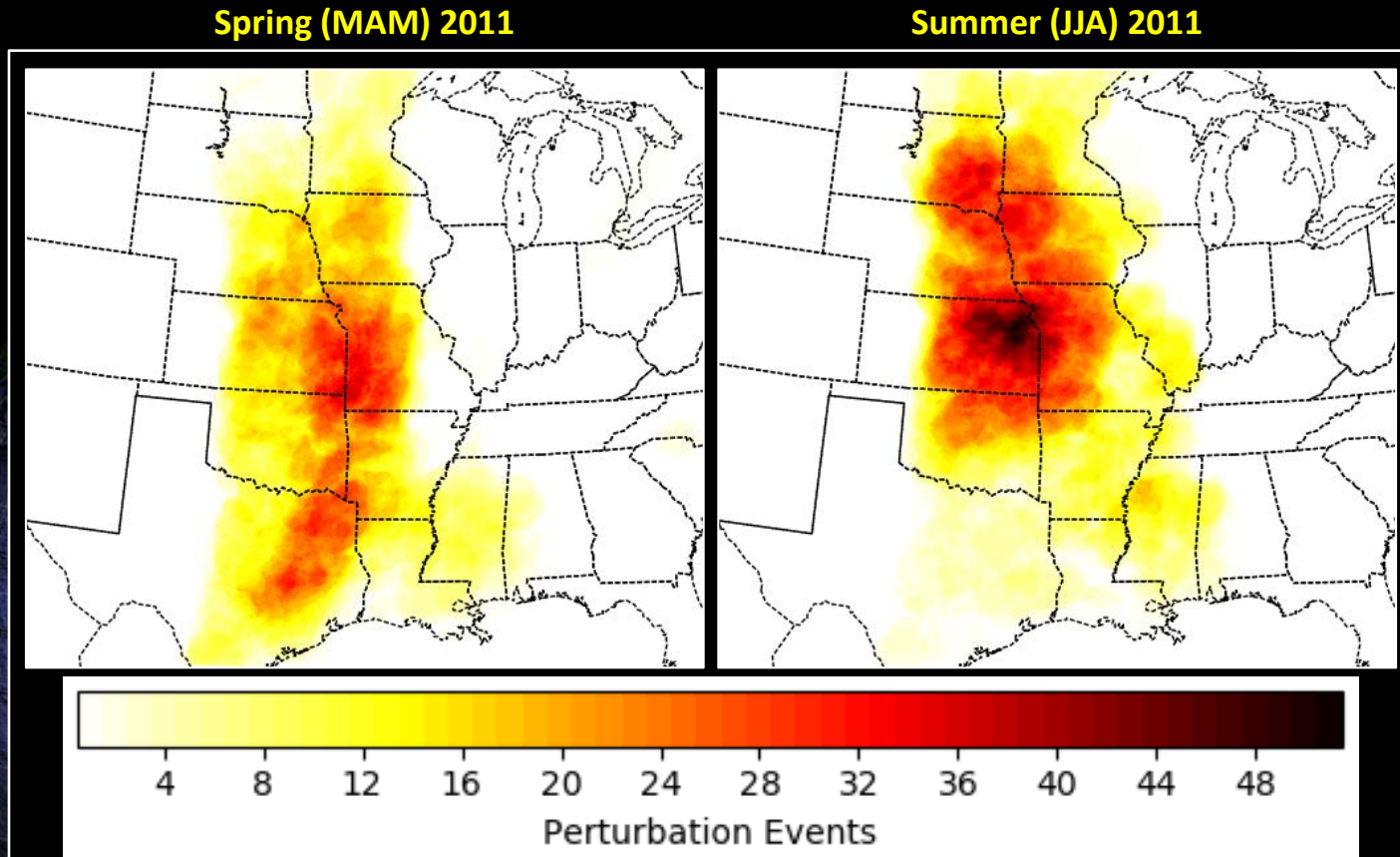

- **Feature origin shifts northward during summer months**
- **Propagating direction shifts to easterly and southeasterly**

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Prominent Feature Statistics

- **Spring and Summer Perturbation Occurrence "Heat Maps"**

Spring (MAM) 2011   Summer (JJA) 2011

- **Plots interpreted as "this 5 km grid box location experienced X unique perturbations during the period assessed"**
- **Seasonal shift northward in occurrences assessed**

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