

CONCEPTUALIZATION OF CONVECTIVE INITIATION IN NEW JERSEY FOR

Purpose

- ☛ Determine Convective Initiation
- ☛ Identify Patterns & Coverage
- ☛ Movement, Intensity, Duration
- ☛ Incorporate nine years of data
- ☛ Create operational conceptual model to better forecast thunderstorms in terms of distribution and characteristics in the New Jersey region (including portions of PA, NY)



OPERATIONAL PREDICTION

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Event
Convective activity initiating after 15UTC (diurnal)

Contaminate
Ongoing occurrence initiating before 15UTC

Null
No convective activity observed 1200-0000 UTC

NORTHWEST FLOW

SOUTHWEST FLOW

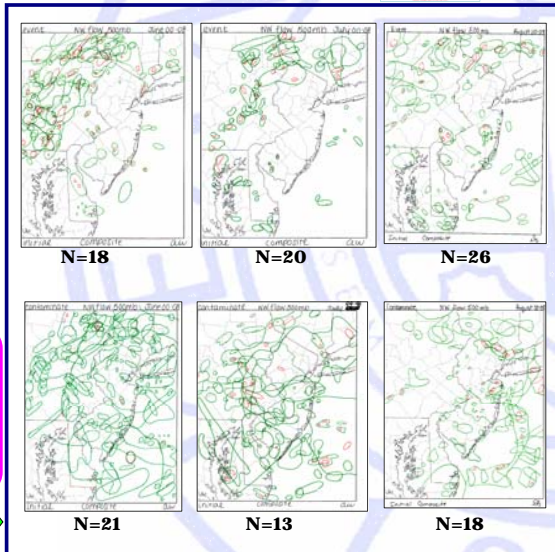
North West Flow Events

- The focus is in Pennsylvania with elevation & features
- NJ initiation is near zero
- Activity spreads & expands as the season progresses

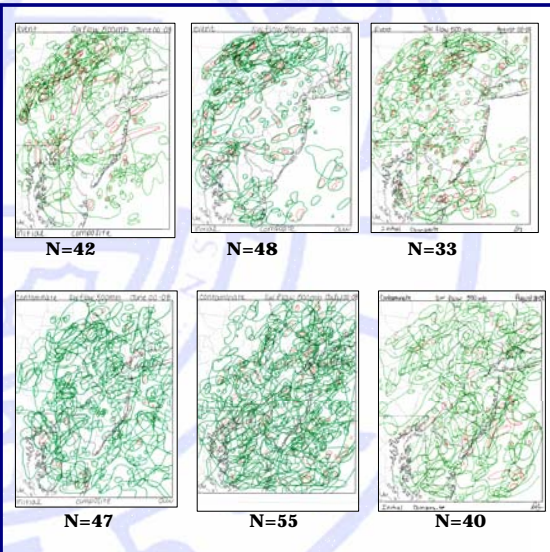


North West Flow Contaminates

- Preferred regions are inconsistent within & between
- More ocean activity
- NJ coverage spotty but more than elevation



EVENTS CONTAMINATION



South West Flow Events

- There is an emphasis on the terrain in Pennsylvania (Orographic lift)
- "Holes" in NJ
- Sea breeze factor



South West Flow Contaminates

- Coverage near complete
- No preference case to case
- High dependence on initial conditions
- Reduced emphasis on terrain in Pennsylvania



SEVERE

Methods:

- Storm Prediction Center maps (SPC) and reports including tornado, hail, and winds
- Developed excel spreadsheet to classify and partition data
- Determined wind direction, 500mb flow for each day

| Year | Northwest | | Southwest | |
|------|-----------|--------|-----------|--------|
| | Event | Nearly | Event | Nearly |
| 2000 | 1 | 2 | 1 | 3 |
| 2001 | 1 | 1 | 1 | 1 |
| 2002 | 1 | 1 | 1 | 1 |
| 2003 | 1 | 1 | 1 | 1 |
| 2004 | 1 | 1 | 1 | 1 |
| 2005 | 1 | 1 | 1 | 1 |
| 2006 | 1 | 1 | 1 | 1 |
| 2007 | 1 | 1 | 1 | 1 |
| 2008 | 1 | 1 | 1 | 1 |

| Event | Northwest | | Southwest | |
|-------|-----------|------|-----------|------|
| | Tornado | Wind | Tornado | Wind |
| 2000 | 0 | 1 | 1 | 1 |
| 2001 | 0 | 1 | 1 | 1 |
| 2002 | 0 | 1 | 1 | 1 |
| 2003 | 0 | 1 | 1 | 1 |
| 2004 | 0 | 2 | 4 | 4 |
| 2005 | 1 | 4 | 1 | 1 |
| 2006 | 1 | 1 | 0 | 0 |
| 2007 | 1 | 1 | 1 | 1 |
| 2008 | 1 | 4 | 2 | 1 |

| Yearly | Northwest | | Southwest | |
|--------|-----------|------|-----------|------|
| | Tornado | Wind | Tornado | Wind |
| 2000 | 0 | 1 | 1 | 1 |
| 2001 | 0 | 1 | 0 | 1 |
| 2002 | 1 | 1 | 1 | 1 |
| 2003 | 0 | 1 | 1 | 1 |
| 2004 | 0 | 2 | 4 | 4 |
| 2005 | 1 | 4 | 1 | 1 |
| 2006 | 1 | 1 | 0 | 0 |
| 2007 | 1 | 1 | 1 | 1 |
| 2008 | 0 | 4 | 2 | 1 |

Methods:

- **Data Inventory** organized an excel spreadsheet for easy classification and analysis
- **Day to Day** gathered wind directions for 925, 850, 700, 500, 300, 250mbs and surface features, determined event, contaminate, or null, recorded PWAT, dew points for 750 and 500mb, lifted index, CAPE, and CIN text discussions/zone forecasts. Analyzed real time and archive radar data by mapping dBz thresholds (30 and 50)
- **Archive Analysis** NCDC radar archive. Requested, sketched, categorized. 2000-2005. Only 500mb flow and surface feature
- **Severe Weather** Defining severe cases based on severe activity in OKX and PHI CWA's (*Event*); severe activity in neighboring states (i.e. PA, NY, MA, CT) but not in CWA (*Nearby*); and no severe activity (*Null*) in CWA or surrounding region

