A Probability of Event Occurrence
Approach to Performance Estimate

or

Making Maximum Use of Radar Data

Phil the Forecaster
Chadwick
Radar

- Volume Scan Signature of Cell Severity
- Ranked Weight – objective measure of probability of severe weather
Ontario Radar Coverage

May 2004
Goals – *Use Objective Radar Data*

- Better *Severe Convection Climatology* using radar data
- *Calibration of the Radar Signatures* in terms of severity
- Estimate the likely range in *Prediction Performance*
1.25 1.75 2.25

Raw Rank Weight - July 31 to August 23, 2004

Not Very High at All
Not So High
Quite High
High

Raw Rank Weight
July 30 to August 24, 2004
Detected Events – Vetted plus Radar Events with Rank Weight > 2.25

Quite High Probability of Severe Convection
July 30 to August 24, 2004
Detected Events – Vetted plus Radar Events with Rank Weight > 1.75

At Least a High Probability of Severe Convection
July 30 to August 24, 2004
Detected Events – Vetted plus
Radar Events with Rank Weight > 1.25

Not So High and Greater Probability of Severe Convection
July 30 to August 24, 2004
Detected Events – Vetted plus
Radar Events by Rank Weight

Radar Events
Coded by Rank Weight

At Least a Chance of Severe Convection
July 30 to August 24, 2004
Detected Events - Vetted
Radar Rank Weight Distributions

Summarize where the action was. How intense the action was.

July 31 to August 23, 2004
Total Number of "Events" - Regions within 200 km of a Radar

RW=Ranked Weight = Measure of Severity of Radar Signature

Lower Event Probability
Lower Rank Weight

Higher Event Probability due
High Rank Weight

Number of Events

Event Occurrence Probability

3000 “Events”
2700 “Events”
1000 “Events”
350 “Events”
12 Vetted Events

RW > 0 and Vetted
RW > 1.25 and Vetted
RW > 1.75 and Vetted
RW > 2.25 and Vetted
Vetted Only
Message POD - Regions within 200 km of a Radar

- RW > 2.25 and Vetted
- RW > 1.75 and Vetted
- RW > 1.25 and Vetted
- RW > 0 and Vetted
- Vetted Only

Lower Event Probability
Lower Rank Weight

Higher Event Probability due
High Rank Weight
Message POD - Regions within 200 km of a Radar

Highest Estimate of POD
Using ALL Radar and Vetted Events

Lowest Estimate of POD
Using only Vetted Events
Small-Parent-Public Scale

Northern and Southern Ontario
To Approximate Scale

Public Region Size is NOT equal…
Reference Lat and Long and Conservative Area Proposal
Message FAR - Regions within 200 km of a Radar

Using ONLY Vetted Events
Highest Estimate of FAR

Using Vetted and ALL Radar Events
Lowest Estimate of FAR
Increase in POD Attributable to Doppler Information
93km/h Observed Wind
90km/h SVR Wind

Vetted Events and URP Events within 5km and 5 min

OBS Wind as percentage of SVR
OBS Hail as Percentage of SVR

93km/h Observed Wind = 1.03
90km/h SVR Wind

Rank Weight

0 0.5 1 1.5 2 2.5 3 3.5

0 0.5 1 1.5
Conclusions

- Performance measurement by only vetted events severely \textit{underestimates} Actual Performance
- Radar data useful in developing \textit{climatology} of the event in \textit{space and time}
- Radar signatures need to be quantitatively \textit{calibrated}... more than big is bad...