Norwegian Meteorological Institute

NMM31
Reykjavík

TorMic-Project: Radar-Based Detection and Forecasting Tornadoes and Microbursts

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Content

- Background
- Methodology
- First results from the radar
- The Norwegian Deep Convection Database
- Future work

TorMic-Project

MET Norway has recently renewed its procedures for Extreme Weather warnings

Tornado/Microbursts:

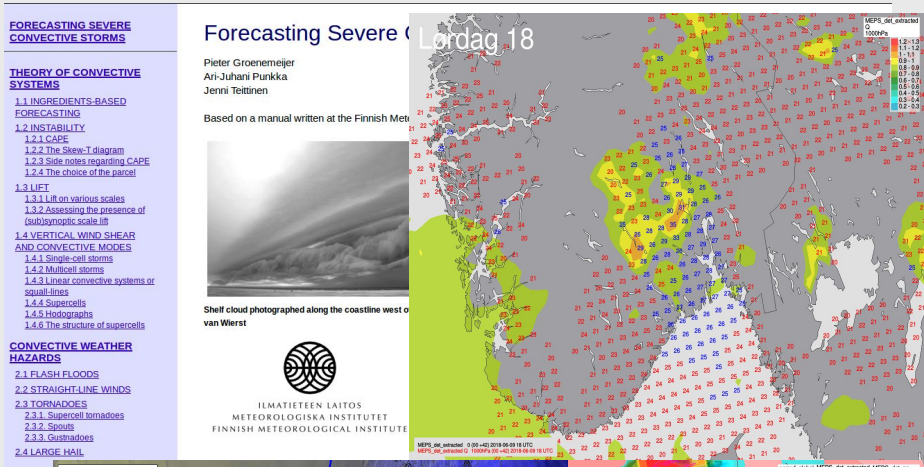
- develop a forecasting methodology suitable for the Norwegian climate
  - model-based (days in advance)
  - radar-based (nowcasting)
  - find thresholds
- develop appropriate warnings for tornadoes / microbursts

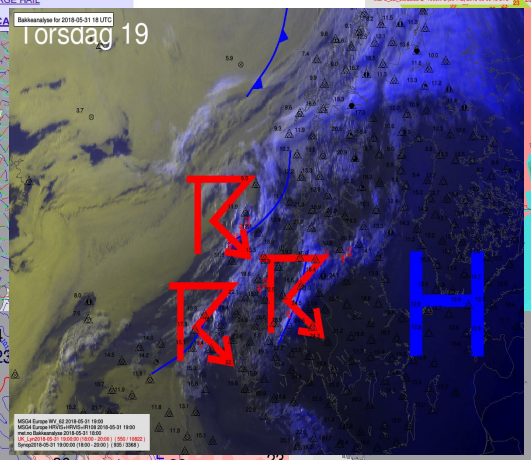
Ingredients based forecasting

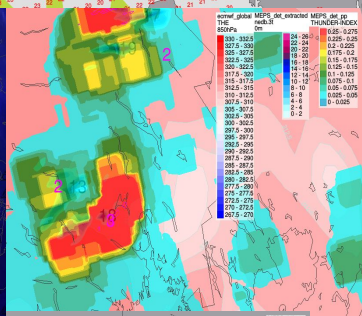
Source: http://www.estofex.org/guide

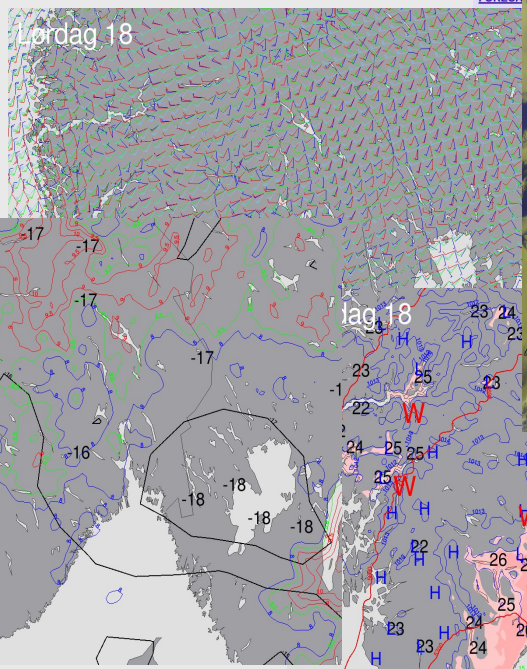
Most important:

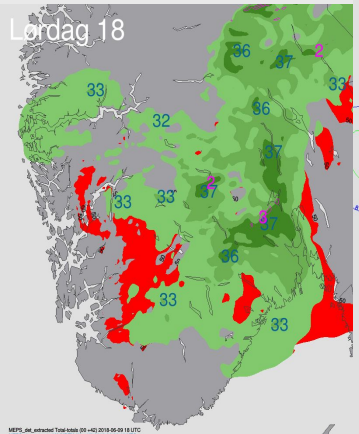
- Latent instability
- sufficient lift to release the instability
- vertical wind shear

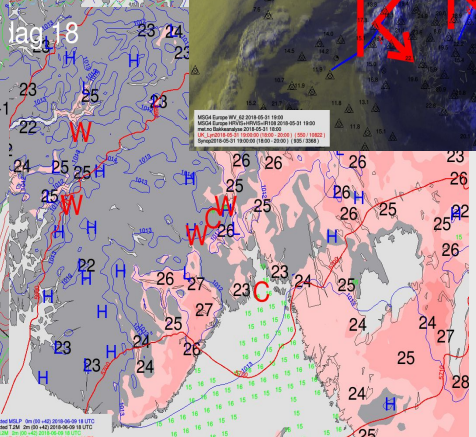


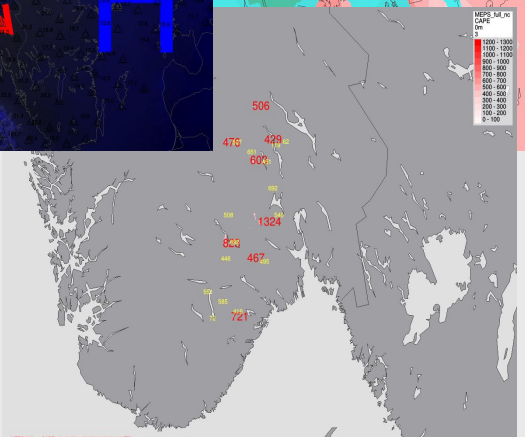








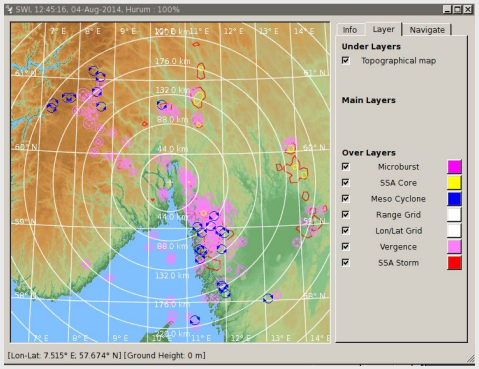


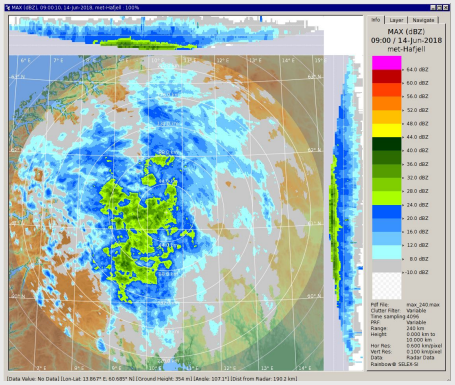


Nowcasting

How to detect severe convection on the Norwegian Radar Network?

How use the radar information most efficient operationally?



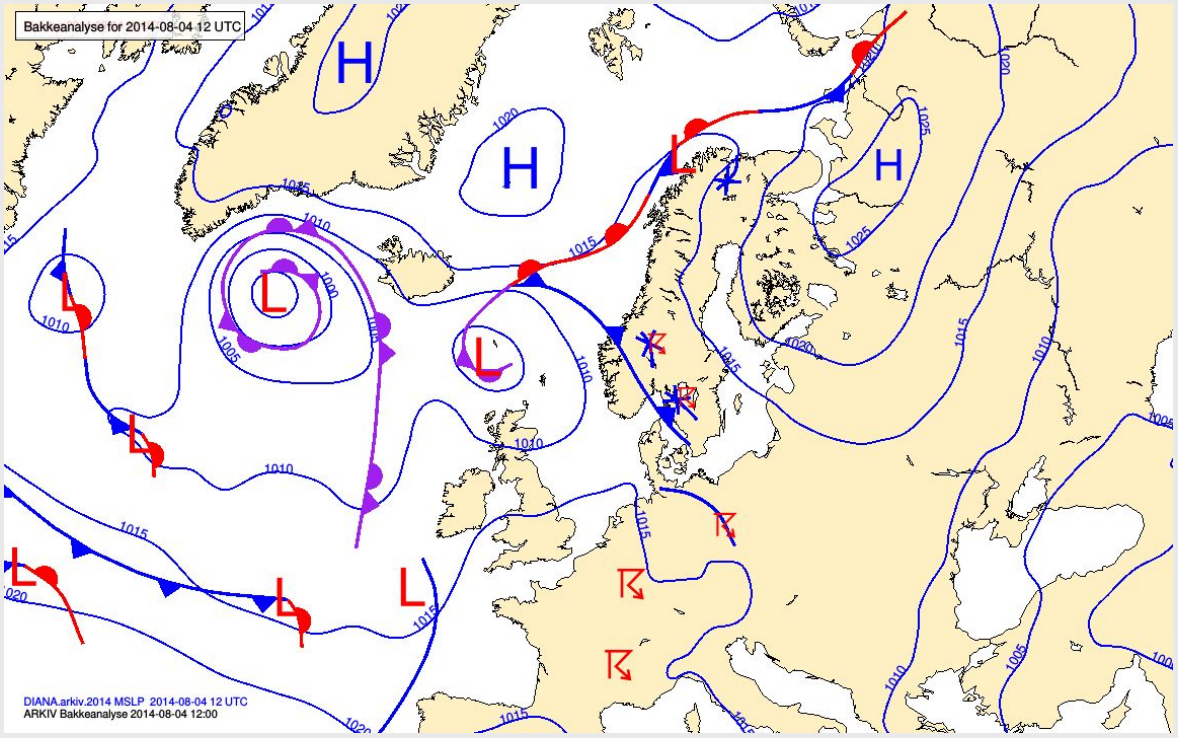


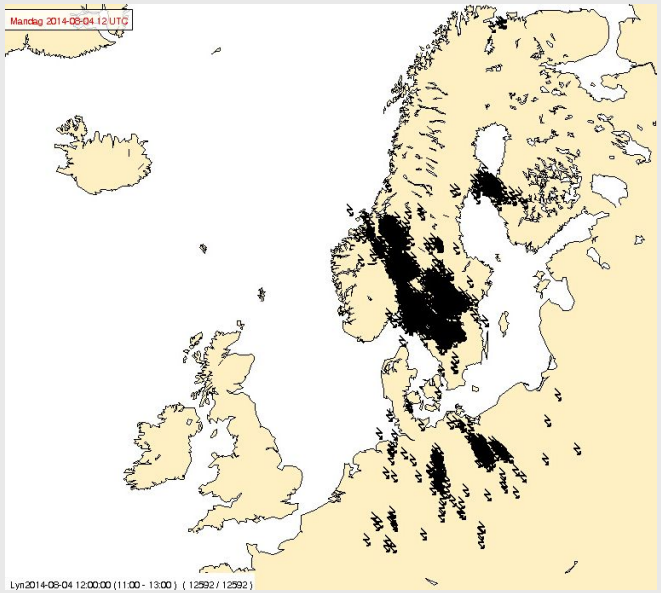
How good are existing detection algorithms (Selex / RainbowDart)?

Radar data used in these results

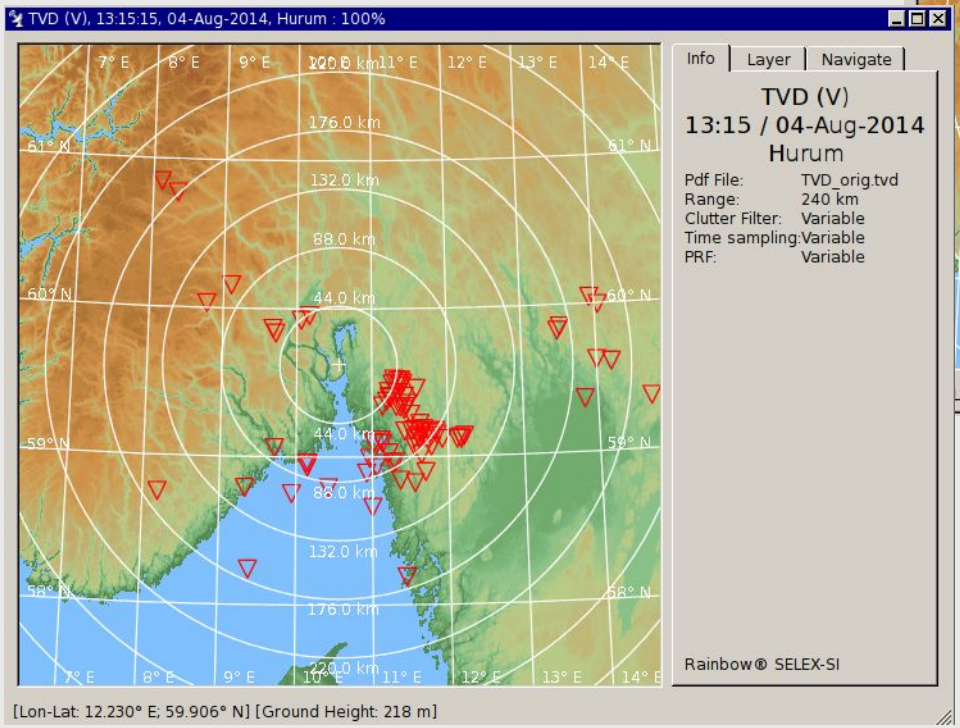
- Hurum weather radar
- Selex Gematronik DP
- Manufacturer specific convective products
- Convective situation 4/8-14

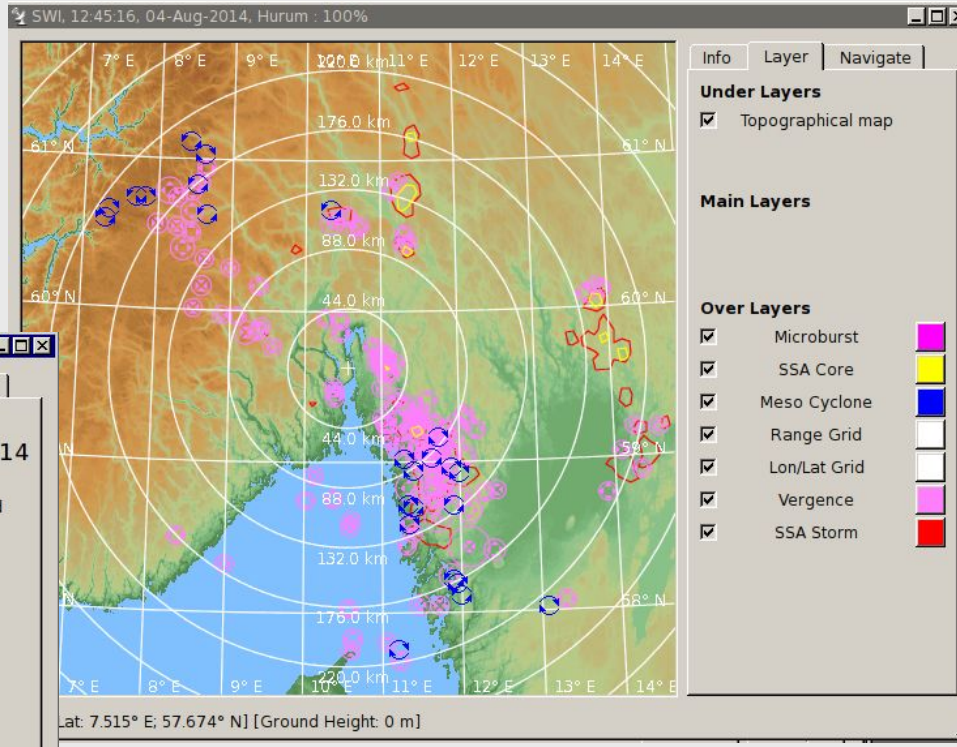
Analysis 4/8-14 12UTC





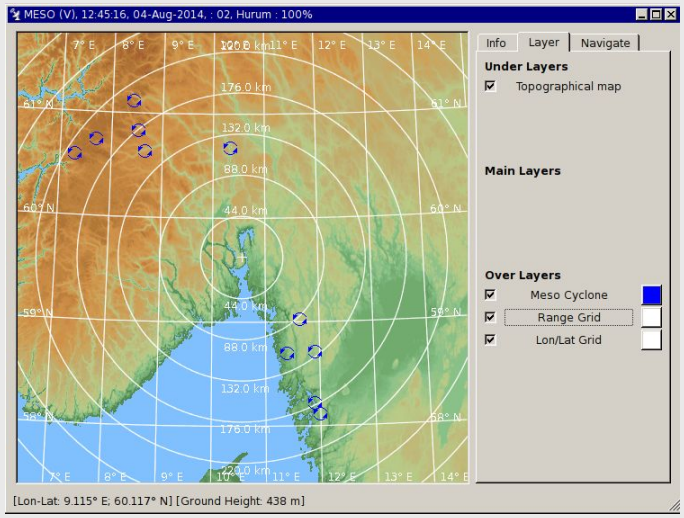
Severe Weather Index and Tornado detection





Test of meso cyclone indicator.

1.



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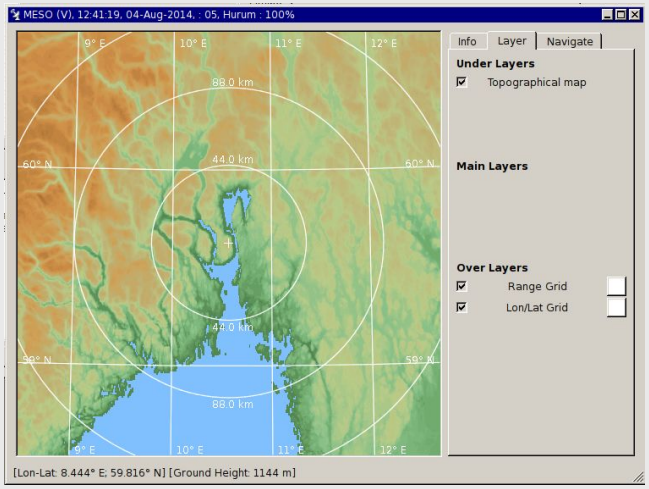

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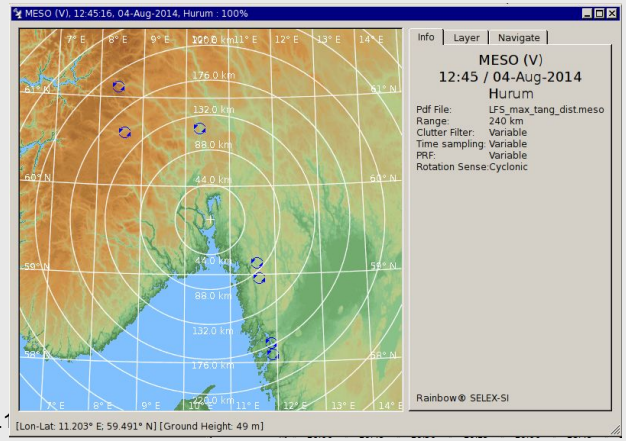
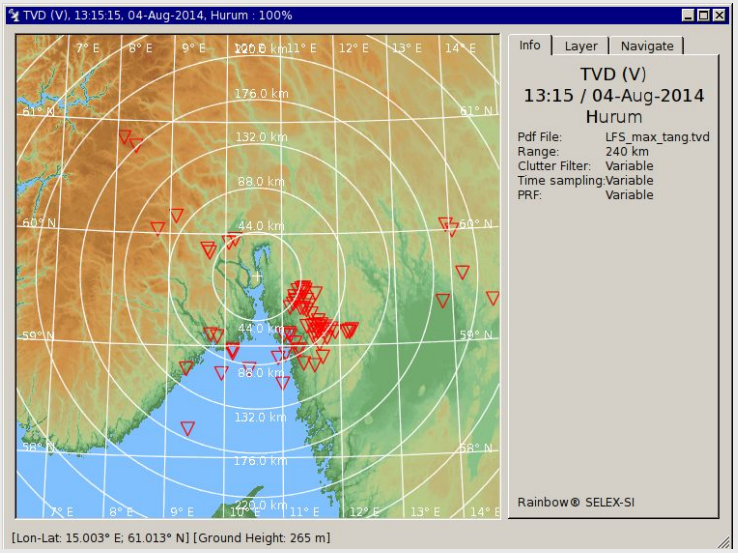


1. wind from reflectivity scan
2. Wind from wind scan
3. adjusted max tangential separation of vortexes

Tornado detection

1. Original
2. Windscan
3. increased pattern number
4. increased tangential distance

1



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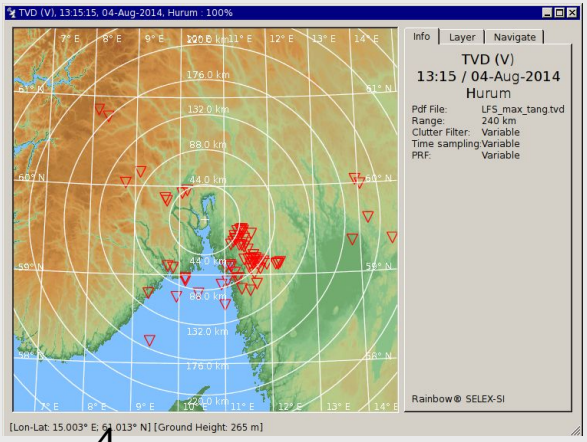

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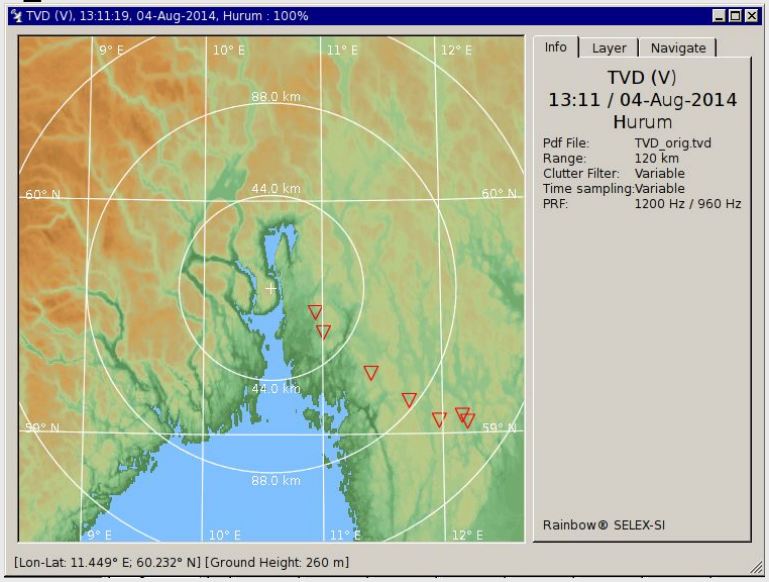

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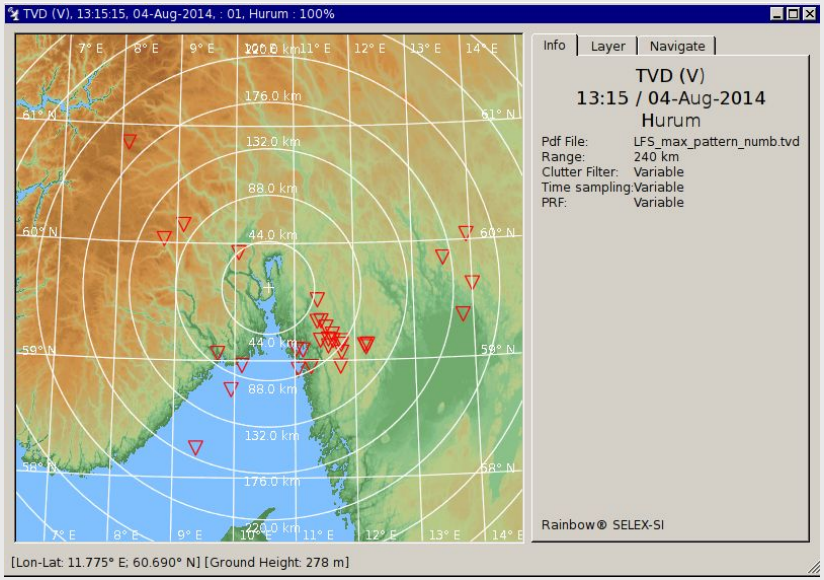
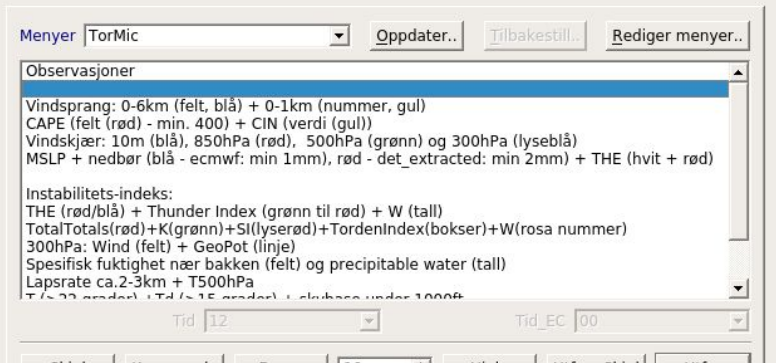


Norwegian Deep Convection Database

- MET does not have a easy available collection of events
- starts summer 2018
- purpose:
  - get possible cases
  - secure data
  - help to tune parameters (model-based and radar-based)
  - statistics
  - research ....



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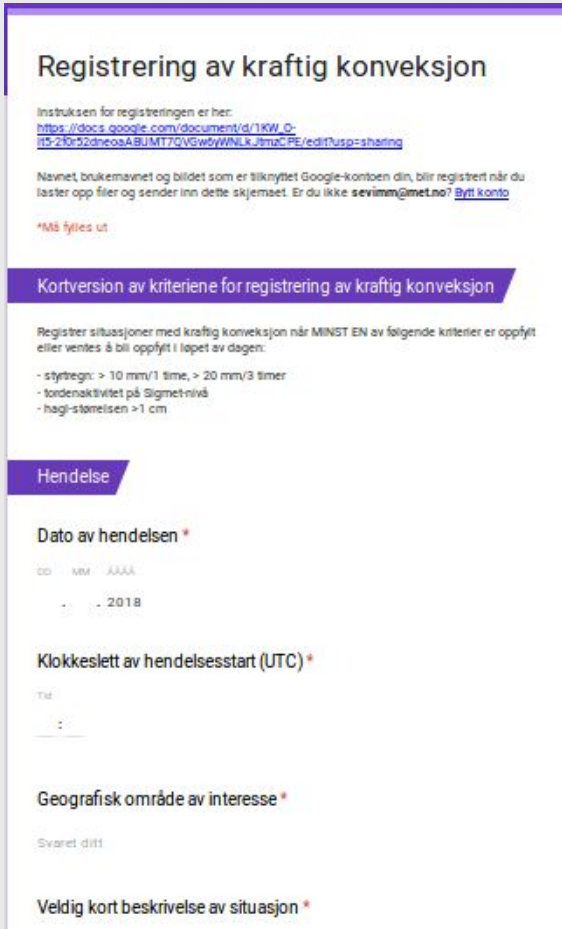
Criteria

At least one of the following criteria should occurred or is expected to occur during the day:

- precipitation:
  - >10 mm / 1 hour or
  - >20 mm / 3 hours
- thunder activity at SIGMET level
- hail > 1 cm


Registrering av kraftig konveksjon

Instruksen for registreringen er her:
https://docs.google.com/document/d/1KW_O-lI5-2f0r52dneoaABUMT7QVGwbyWNLkJtmzCPE/edit?usp=sharing

Navnet, brukernavnet og bildet som er tilknyttet Google-kontoen din, blir registrert når du laster opp filer og sender inn dette skjemaet. Er du ikke sevimm@met.no? Bytt konto

*Må fylles ut

Kortversion av kriteriene for registrering av kraftig konveksjon

Registrer situasjoner med kraftig konveksjon når MINST EN av følgende kriterier er oppfylt eller ventes å bli oppfylt i løpet av dagen:

- styrtregn: > 10 mm/1 time, > 20 mm/3 timer
- tordenaktivitet på Sigmet-nivå
- hagl-størrelsen >1 cm

Hendelse

Dato av hendelsen *

DD MM ÅÅÅÅ

. . 2018

Klokkeslett av hendelsesstart (UTC) *

Tid

:

Geografisk område av interesse *

Svaret ditt

Veldig kort beskrivelse av situasjon *

Afterwards?

Case studies

- evaluate parameters
- evaluate thresholds

Refine methodology

Give MET recommendations:

- Use predefined detection algorithms or develop its own?
- concerning issuing tornado / microburst warning
- participate in ESSL???

And continue the work in 2019….

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Takk!

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