Meteorological Institute University Bonn

LEIBNIZ-INSTITUT FÜR TROPOSPHÄRENFORSCHUNG

Hans-Ertel-Zentrum für Wetterforschung
Deutscher Wetterdienst

# Contribution to DWD's Hans Ertel Research Centre (HErZ): Object-based analysis and seamless prediction(OASE)


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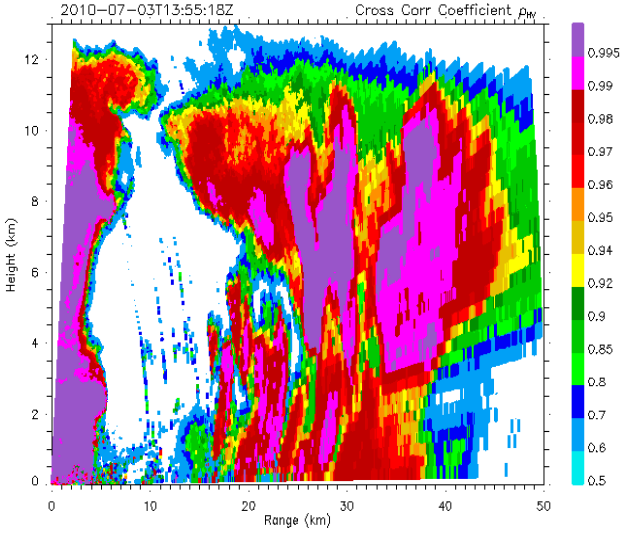
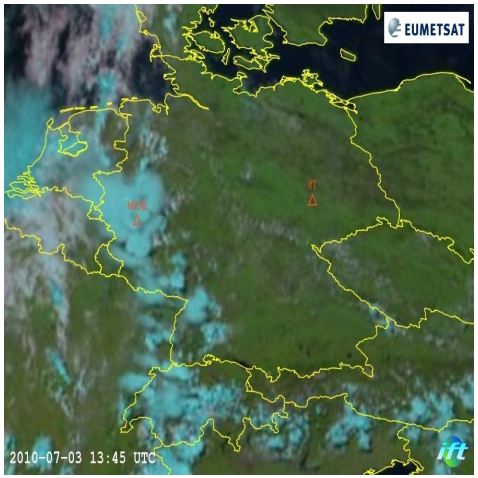



*Hans Ertel (1904 - 1971)*




http://www.herz-tb1.uni-bonn.de

# The Hans Ertel Research Centre

- Goal: establish a network of internationally visible research centres at German universities and research institutions working on topics of relevance for DWD
- Call for contributions in 5 topic areas, (up to 3x) 4 years funding:
  - TB1: Atmospheric Dynamics and Predictability/High Impact Weather Events
  - TB2: Data Assimilation
  - TB3: Model Development
  - TB4: Climate Monitoring and Reanalysis
  - TB5: Optimal Use of Meteorological Information for Society
- Call for proposals in spring 2010, planned start in Jan 2011 (start of TB1: Oct. 2011), evaluation prior to end of first period in Dec. 2014

# Object-based Analysis and SEamless prediction

- Goal: object-based analysis of high-impact weather events
- High temporal and spatial resolution 3D dual observations /products composite containing:
  - Polarimetric rain radar (Uni Bonn/Jülich, later DWD network)
  - SEVIRI geostationary satellite products at 5min resolution (RSS, IfT)
  - DWD lightning network data (DWD)
- Development of 3D tracking algorithm for object-based analysis
- Statistical and model-based ensemble generation and prediction

➡ Seamless prediction of convective events from nowcasting to daily predictions

➡ Better understanding, characterization and quantification of process structure and life cycles of severe weather events

# The OASE Research Team

## Project leads:

Silke Trömel (MIUB), Kathrin Wapler (DWD)

## Scientists:

Malte Diederich, Jürgen Simon (MIUB)
Ákos Horváth, Fabian Senf (IfT)
Vacancy from 2013 onwards (MIUB)

## Radar technicians (MIUB):

Martin Lennefer, Kai Mühlbauer

## Advisors:

Clemens Simmer (MIUB)
Hartwig Deneke (IfT)

# High-resolution dual 3D observation-(micro-)physics composite covering German RADOLAN area

## Observables:

- 3D radar reflectivities and polarimetric moments
- Doppler Velocities
- Satellite reflectances and brightness temperatures
- Lightning location/intensities

Inversion →

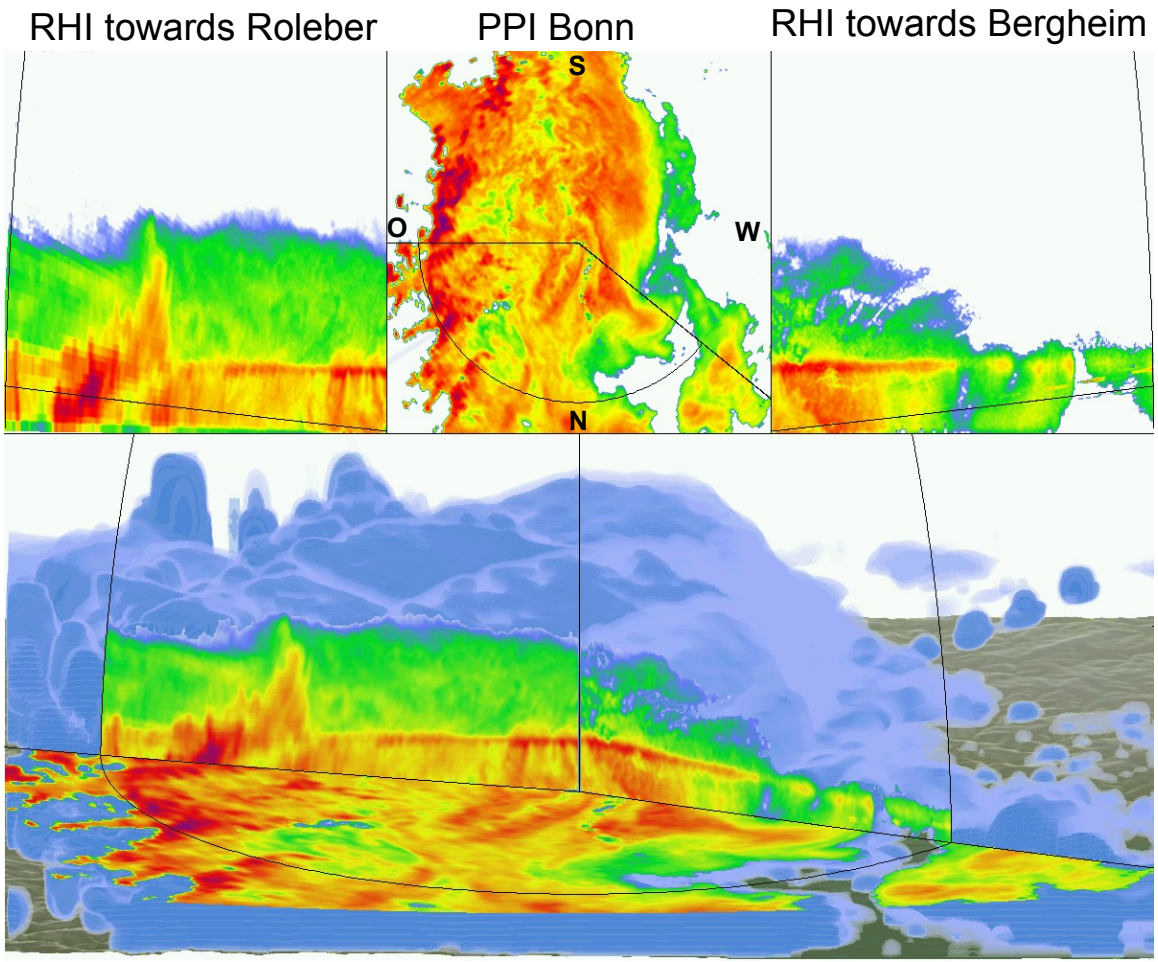
← Forward operators

## Retrieved physical quantities:

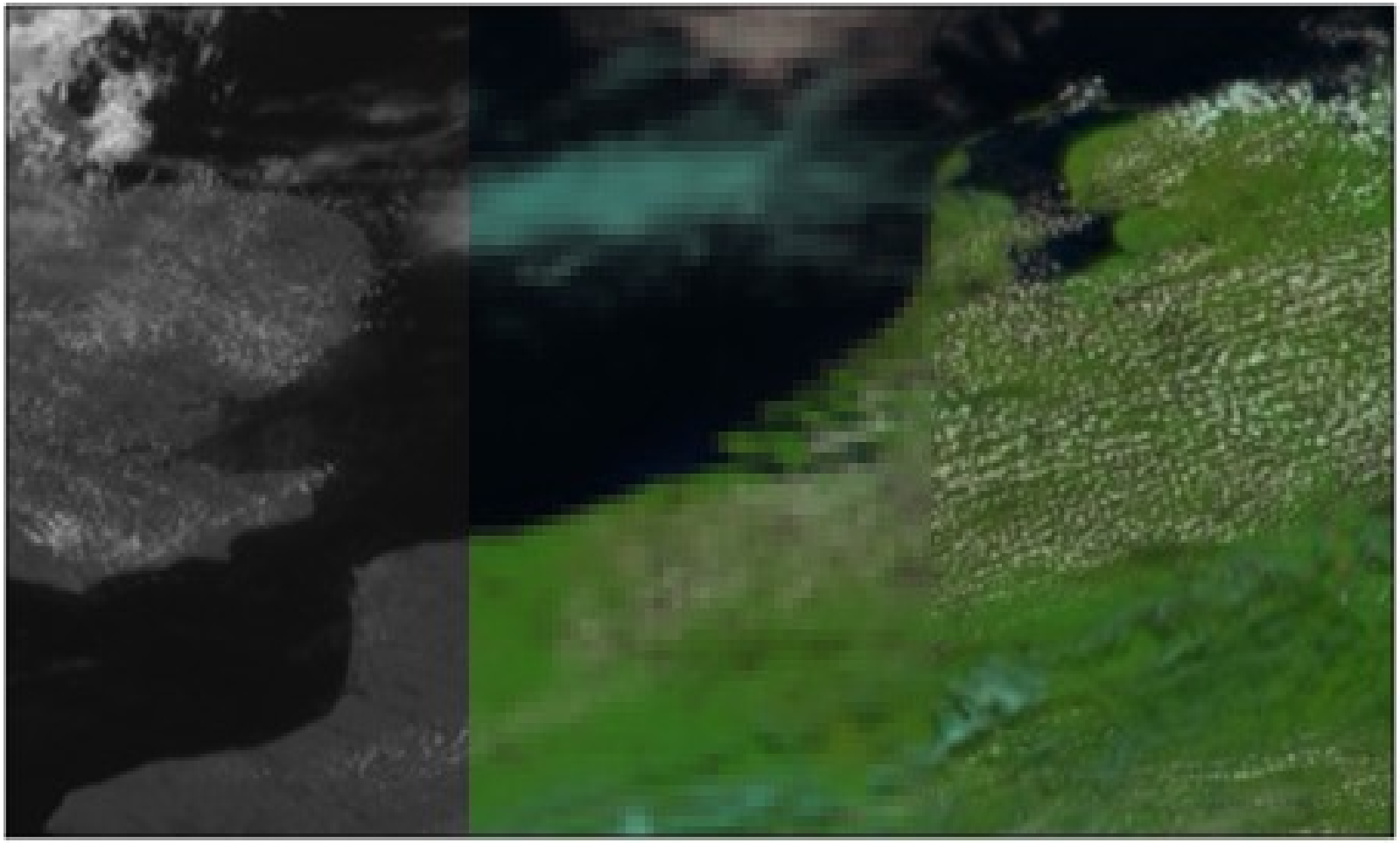
- MSG products from NWC-SAF and CM-SAF:
  - -cloud top temperature
  - -optical depth, -effective radius
  - -AMVs, -convective rain rate, ...
- Radar-derived rain rate, hydro-meteor classification, ...

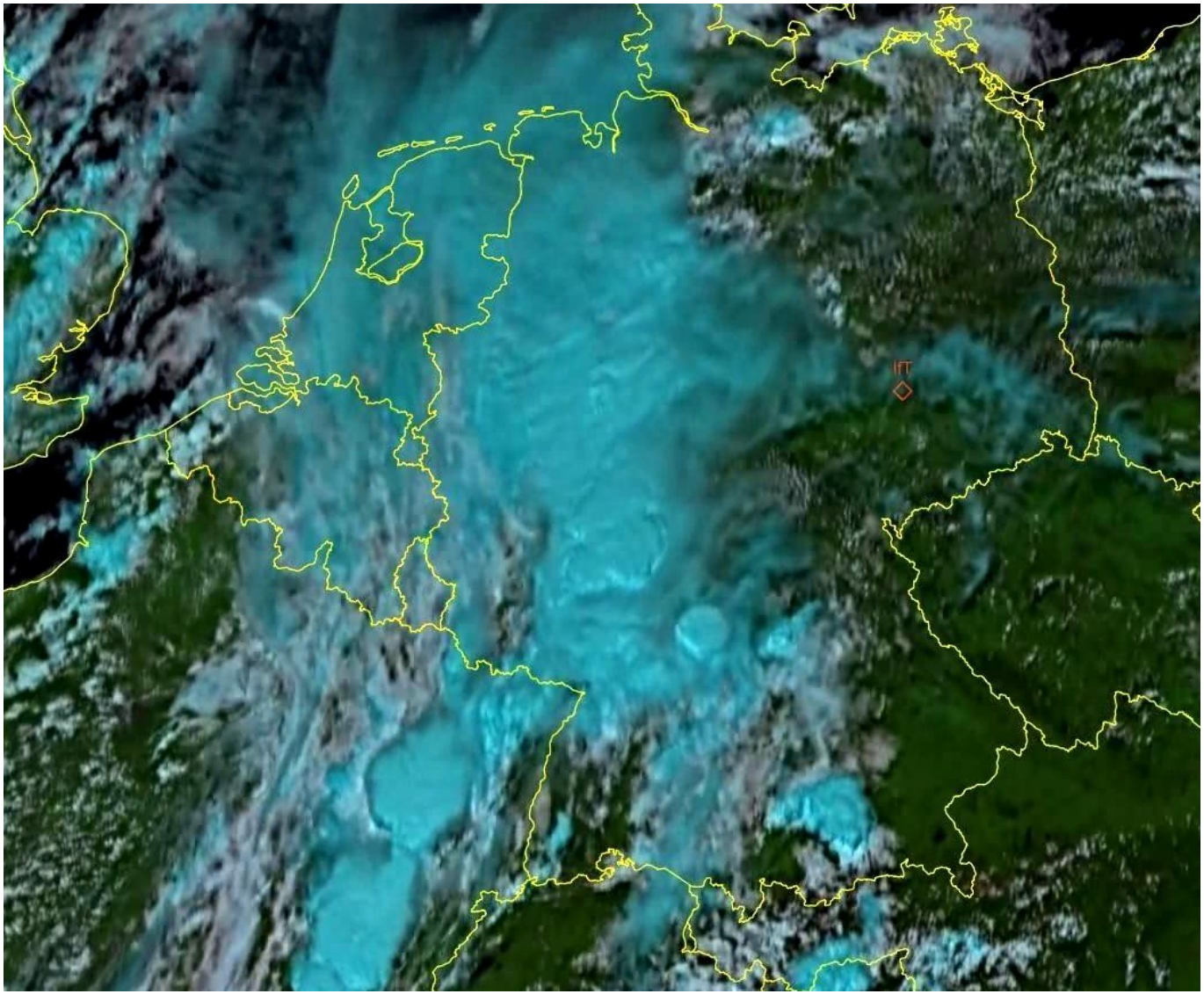
– common data format (CF-compliant netcdf)
– common projection/grid
– basis for tracking, object-based analysis, forecast

# Radar Composite based on XPOL-Radars at Bonn and Jülich



# Merged High-Frequency HRV/Natural Color RGB




IfT

# Current research focus

- Case studies, 6.6.2011, 22.6.2011
- Development/prototyping of Composite and Tracking
- Analysis of life-cycle of convective cells based on Konrad-Tracks (planned: summer 2011)

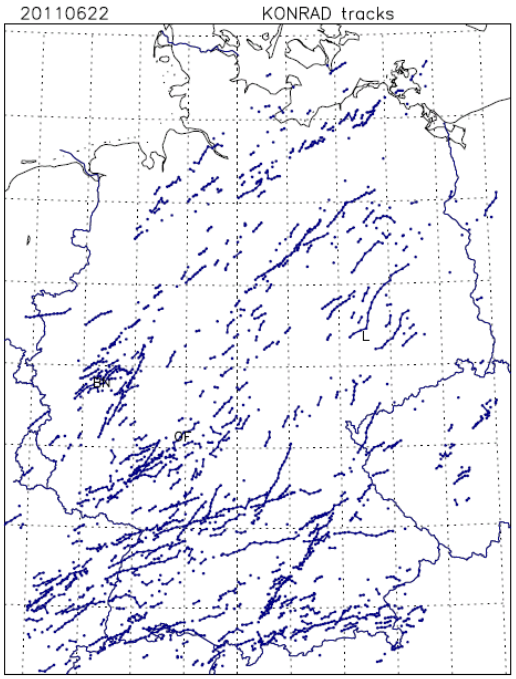



Figure: Konrad tracks on 22.06.2011

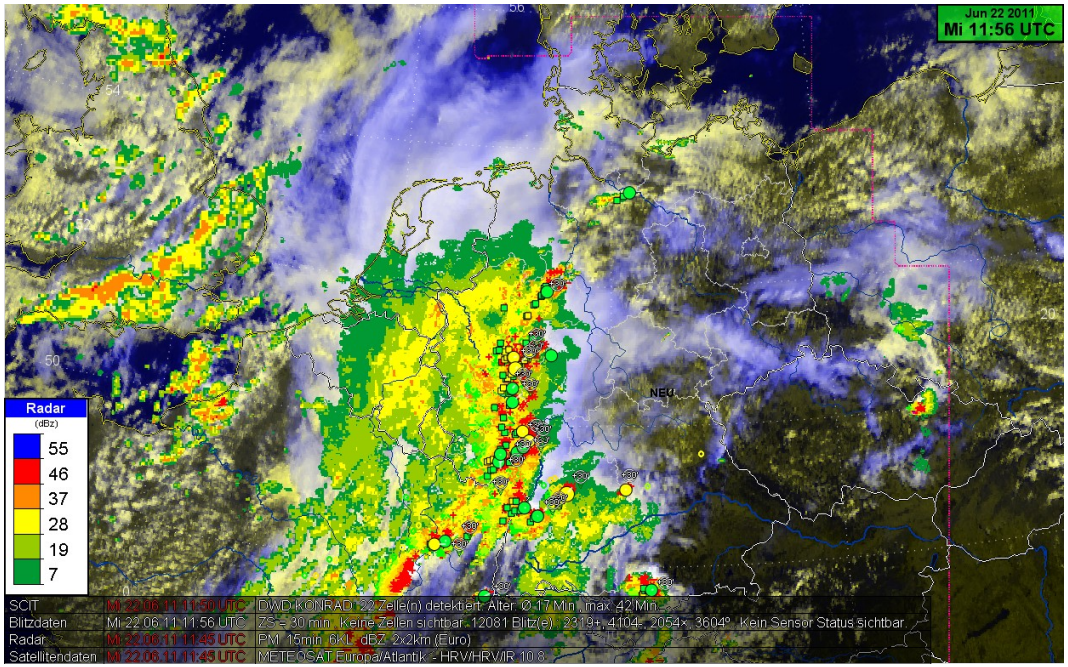



Figure: Konrad cells, lightning, PM-radar product , Meteosat HRV for 22.06.2011, 11:56 UTC