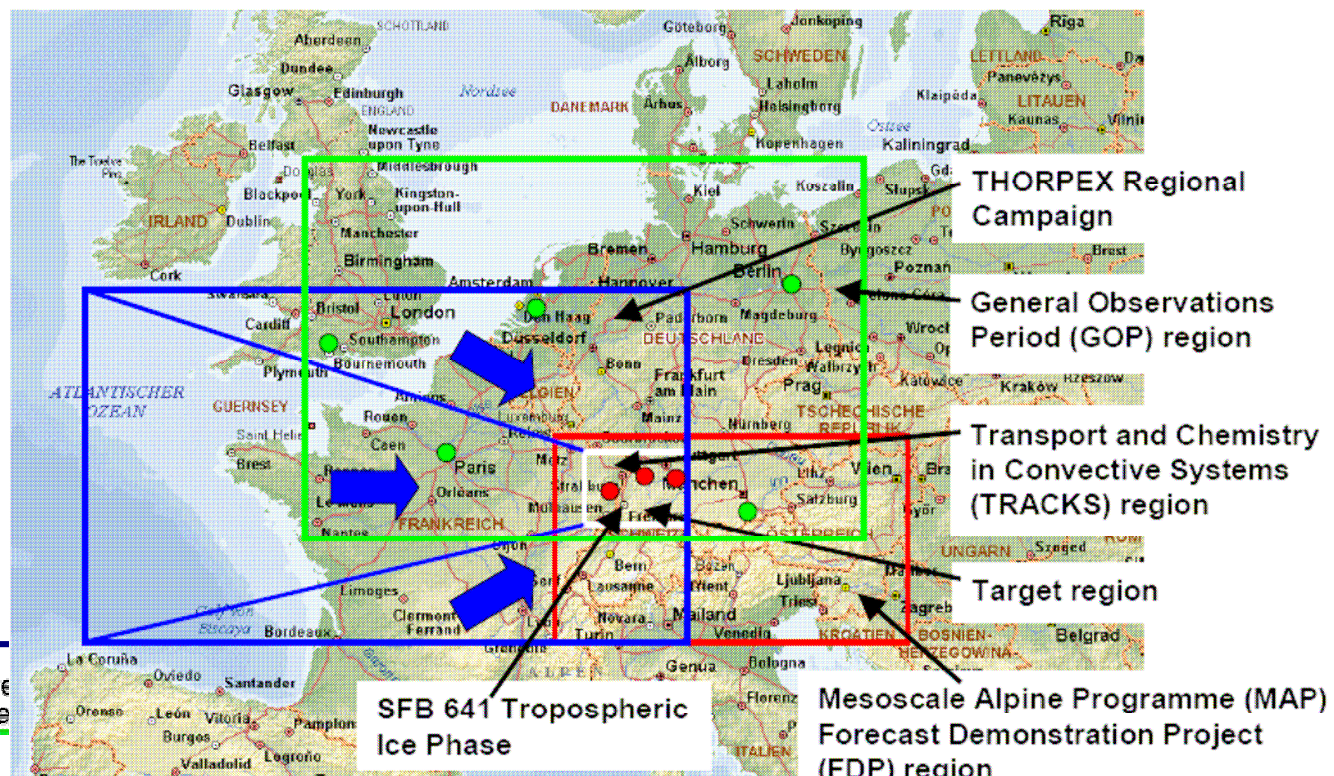# Goals of the General Observation Period (GOP) and its links to COPS

**Susanne Crewell and Nicole van Lipzig**
**Meteorologisches Institut**
**Ludwig-Maximillians-Universität (LMU) München**

# GOP Characteristics

- **General Observation Period** from January to December 2007

- Comprehensive data set suitable for testing hypotheses and new modeling techniques developed within the QPF-Program.

- The **GOP** encompasses **COPS** both in time and space
  - to provide information of all kinds of precipitation types and
  - to relate the COPS results to a broader perspective



THORPEX Regional Campaign

General Observations Period (GOP) region

Transport and Chemistry in Convective Systems (TRACKS) region

Target region

SFB 641 Tropospheric Ice Phase

Mesoscale Alpine Programme (MAP) Forecast Demonstration Project (FDP) region

27. Juni 2005

# GOP Observations

- Optimized exploitation of **existing instrumentation**
  - routine measurements normally not available to the scientific community
  - continuous/coordinated operation of existing instrumentations

- **GOP** ingredients
  - ground-based observations
  - satellite data
  - short-term model forecasts (LMK)
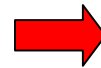
- **long-term evaluation**

- **identification of case studies**



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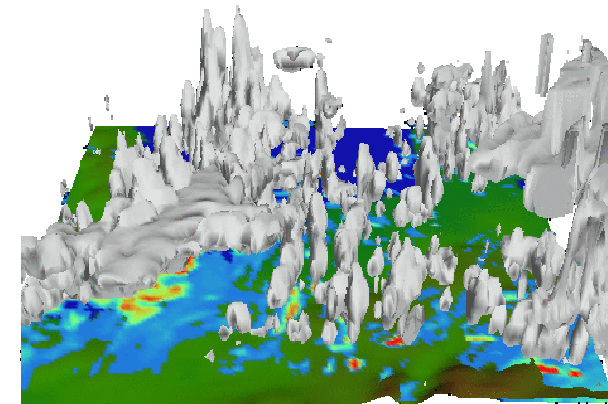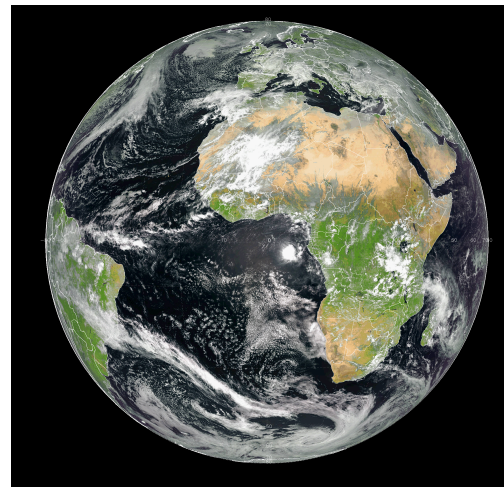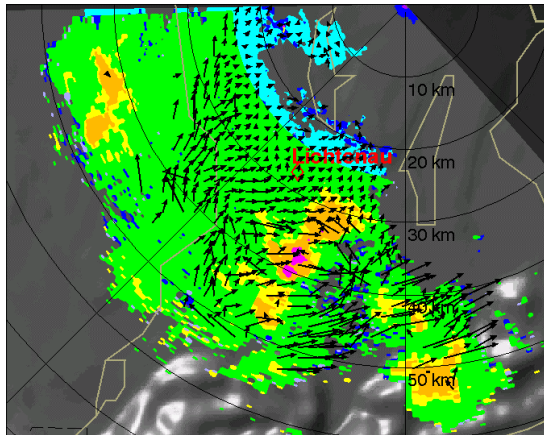
# Long-term Evaluation (LTE)

- Errors in the determination of initial conditions should average out
  ⟹ **Identification of systematic model biases**



van Meijgaard [2004]
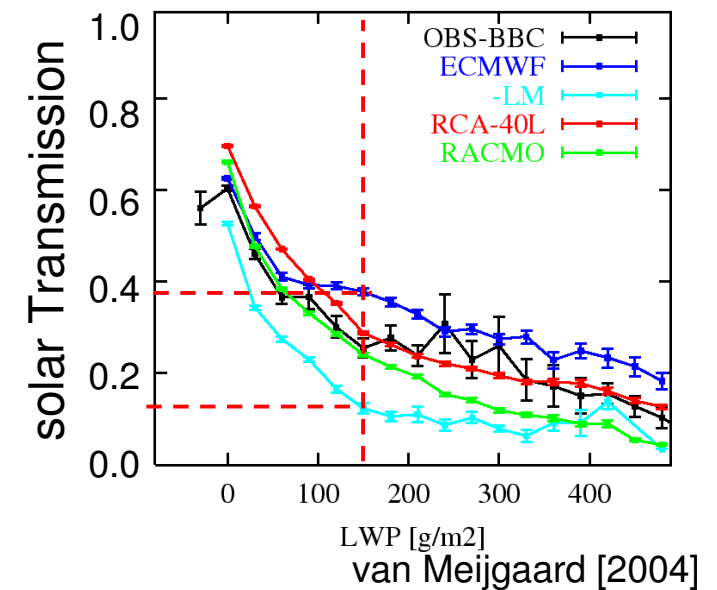
# GOP Ground-based Observations

- **in situ precipitation**
  DWD, various water authorities and environmental agencies

- **weather radar**
  - 16 C-band DWD radars
  - polarimetric research radars: POLDIRAD, DLR;
    DWD Observatory Hohenpeissenberg
  - C-Band radar (Karlsruhe); X-Band radar (Bonn),
  - operational radars in neighboring countries

- **atmospheric observatories**

- **networks**
  - GPS network for integrated water vapor
  - Conventional lightning detection system (BLIDS)
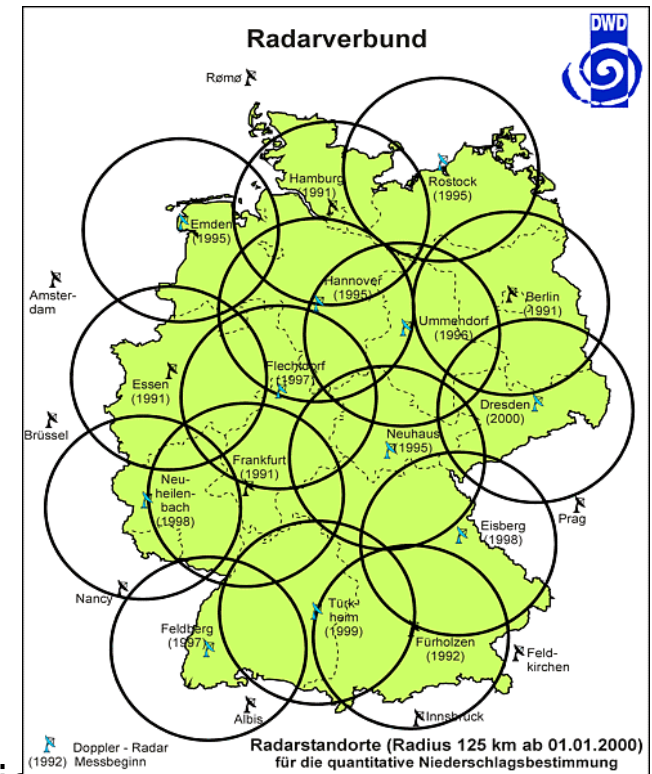  - VHF network in Northern Germany
  - VLF lightning detection system in Southern G.

- **auxillary observations**
  - aerosol/water vapor from coordinated lidar observations (Earlinet)
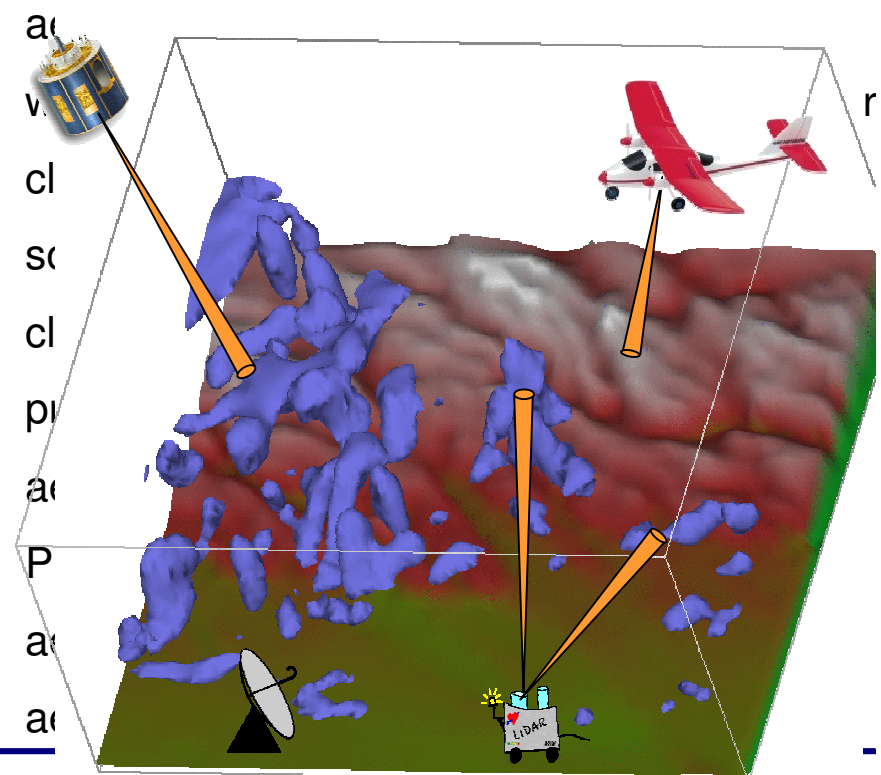  - micro rain radars (UniHamburg),......
  - Arm Mobile Facility



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# GOP Observatories

| Location | Institute | Short information |
|---|---|---|
| Bonn | Meteorologisches Institut | precipitation (radar), clouds, radiation +met |
| Frankfurt | Institut für Atmosphäre und Umwelt | Taunus Observatory |
| Geesthacht | GKSS Research Center | clouds and water vapor |
| Garmisch | FZ Karlsruhe IFU | ae |
| Hamburg | University and MPI | w... r |
| Hannover | Institut f Met. und Klimaforschung | cl |
| Jülich | Forschungszentrum | so |
| Kiel | Institut für Meereskunde | cl |
| Karlsruhe | FZ Karlsruhe IMK | p |
| Leipzig | IfT und Universität | ae |
| Lindenberg | DWD Observatory | P |
| München | Meteorologisches Institut und DLR | ae |
| Zugspitze | Schneefernerhaus und Zugspitzgipfel | ae |

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**Munich Mountain Testbed M³T**

# Example Station Bonn

| Instrument | Description | Status |
|---|---|---|
| Lidar Ceilometer CT25K | backscatter profile, cloud base height | operational |
| Microwave radiometer MICCY | liquid water path, temperature and humidity profile | operational |
| Infrared Radiometer KT19.85 | cloud base temperature | operational |
| Micro Rain Radar (MRR) | profile of drop size distribution | operational |
| X-Band Radar | radar reflectivity and radial velocity | operational |
| Scintillometer "Scintec BLS900" | sensible heat flux | operational |
| Rain gauge | rain rate (5 min average) | operational |
| Meteorological weather station | T, rh, p, wind, rad. | operational |
| Radiative flux measurements | | planned |
| Cloud camera | | planned |
| Flux (profile) station | | to be installed |
| Soil moisture | | to be installed |

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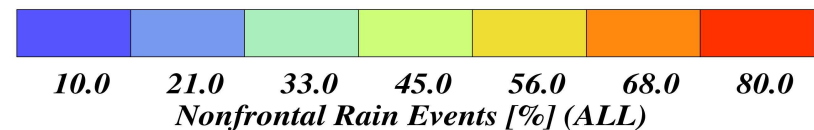
Hohenheim, 27. Juni 2005

# Radar and Satellite Observations

- **statistical evaluation of cloud and precipitation structure**

- **convective/frontal**

- **cell tracking**

- **vertical structure (hydrometeor distribution)**

- **regional characteristics**

- **sub-grid properties**

- **diurnal cycle**
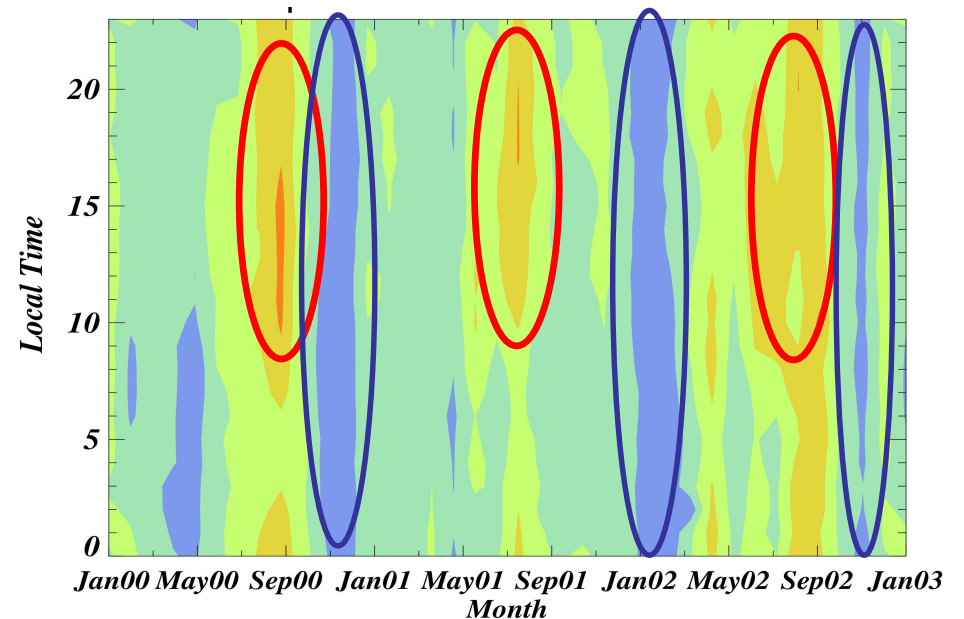


**afternoon convection in summer**

**frontal passages**

BALTEX radar data analysis, courtesy of Andi Walther (FUBerlin)

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Hohenheim, 27. Juni 2005

**... you want to learn more about weather radar systems ????**

# Herbstschule Radarmeteorologie

**4. – 7. Oktober 2005**
**Universität München**

**Sorry,**
**in German**

**Themen der Herbstschule Radarmeteorologie:**
Grundlagen zur Wolkenphysik und Niederschlagsentstehung
Technik eines Wetterradars
DWD Radarverbund und Produkte
Windfeldbestimmung mit Doppler Radar
Anwendung polarimetrischer Radarmessungen
Quantitative Niederschlagsmessung
Radarmessungen für die Hydrologie
Assimilation von Radardaten in numerische Modelle
Evaluierung numerischer Modelle mit Radar
Wolkenradar und Windprofiler

**Weitere Informationen unter:**
http://www.meteo.physik.uni-muenchen.de/~crewell/herbstschule

DWD

PQP
**Praecipitationis**
**Quantitativae**
**Praedictio**

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# GOP Preparation

- **Establishment of the data base**
  - coordination with <u>DWD</u> and data owners
  - coordination with <u>COPS campaign</u> data
    - ⟹ how to set-up and how to get funding

- **Quality control of the observations**
  - rain gauge estimates (<u>UniBonn</u>)
  - radar and satellite observations (<u>QUEST</u>)
  - joint effort of data owners

- **Tailoring model output to data available from GOP**
  - definition of model domain, horizontal resolution, boundary conditions...
  - preparation of special model output (integration into NUMEX)
    - → time series in model time step resolution at selected stations
    - → selected 3D-fields at asynoptic times for satellite/radar comparisons

- **Model evaluation using GOP observations**
  - observation-to-model and model-to-observation approaches
  - representation of spatial and temporal scales (aggregation/probability)

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Hohenheim, 27. Juni 2005

# GOP preparation

**Preparation meeting
on July 21, 2005 at 11:00 in Munich**

Please send your plans and ideas ahead of time to
crewell@meteo.physik.uni-muenchen.de

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