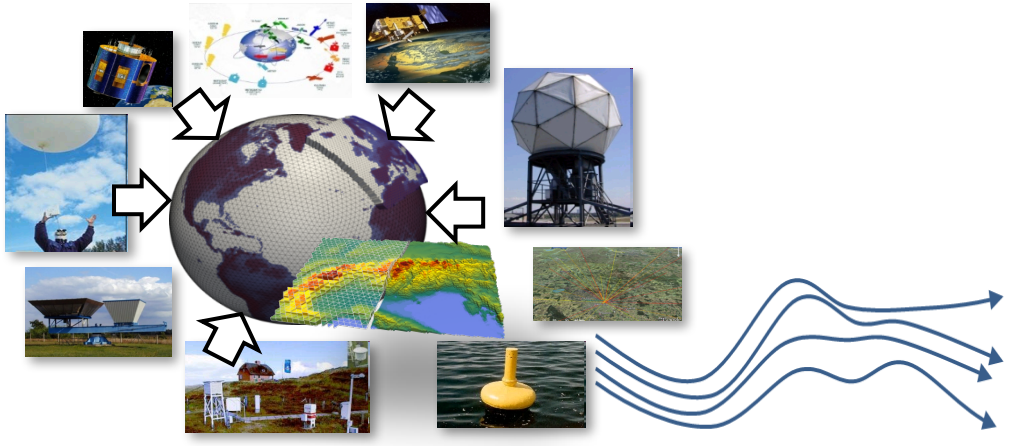
TOPROF: Towards Operational ground based PROFiling with ceilometers, Doppler lidars and microwave radiometers for improving weather forecasts



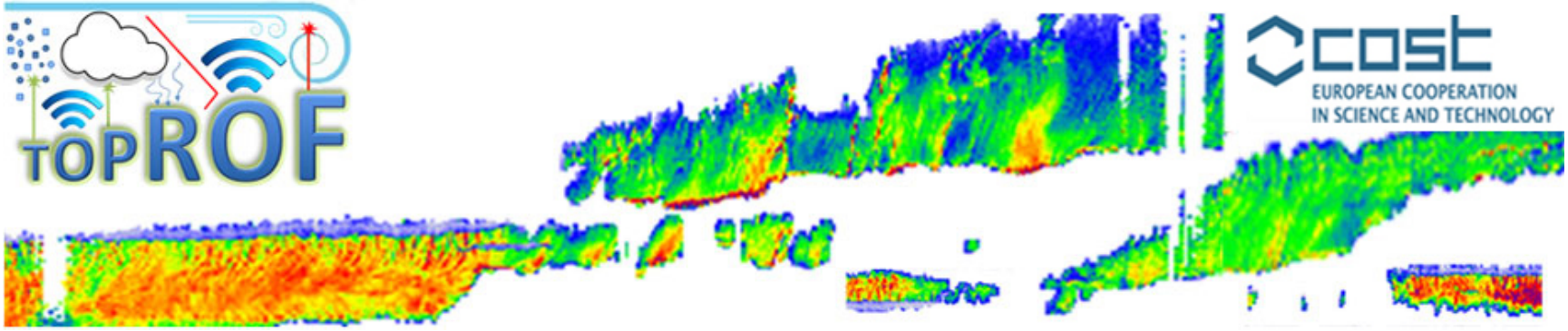
COST Action 1303

22 October 2013 - 21 October 2017

Roland Potthast
NWP @ DWD

TOPROF

cost
EUROPEAN COOPERATION
IN SCIENCE AND TECHNOLOGY



TOPROF NWP Summary 1

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

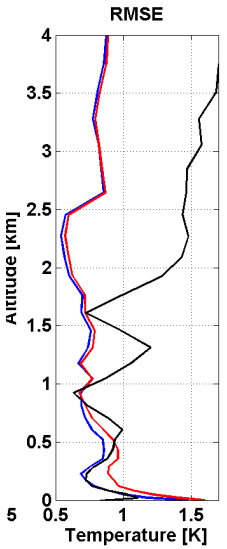
Original Basic Goals: (ALC, MWR)

1) Improve on Data and Formats ☺
2) Timeliness, Availability, Quality Control ☺
3) O-B Statistics ☺
4) Users to Explore Data Characteristics ☺
5) Forward Operators ☺, Monitoring
6) Assimilation Testing / Impact ☺
7) Perspectives for further Development ☺

TOPROF NWP Summary 2

Lessons Learned *Ceilometers, Doppler-Lidars, MWR*

1. Learned a lot about the **instruments** and the **data**, intensive exchange between researchers
2. All parts of our plans have been worked on
3. Made a lot of progress on all the layers!
4. But we are not yet fully where we want to be!
5. **Different type of maturity** of the different instruments and observation processing and obs employment

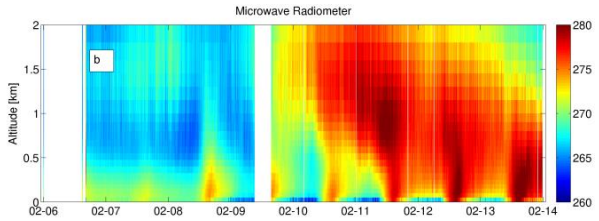


TOPROF NWP Summary 3

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Lessons Learned *Ceilometers, Doppler-Lidars, MWR*

6. **Further Progress is needed** on all levels of NWP, in particular
   a) **Boundary layer** physics,
   b) **Clouds** microphysics and parametrizations
   c) Observation operator modeling
   d) Data assimilation (**Basic Algorithms + Application**)
7. We see **a lot of potential in the data**, in combination with other dense observations

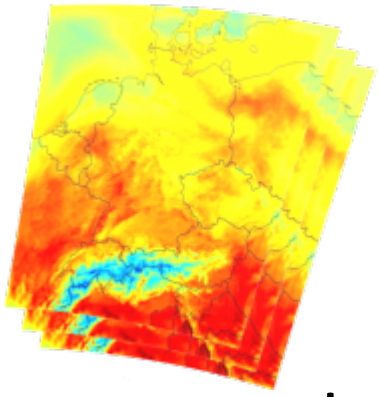


TOPROF NWP Summary 4

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

Lessons Learned *Ceilometers, Doppler-Lidars, MWR*

8. We did not have the **resources** we wanted or would need to carry out all necessary developments (at all NMHS).



9. But we *were able to acquire* more resources and to include the further profiling into **national plans** for the next 10 years.
10. **COST TOPROF** has been very <u>good and successful</u>.

TOPROF NWP Summary 5

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Networks are working quite well (Selection):

- E-profile
- NWP-SAF and RTTOV-gb
- Observatories
- MeteoFrance/MetOffice/DWD/MeteoSwiss/Italy and many more …
- Private Manufacturers
- HD(CP)^2 research project
- Aaron, IAFE, Sinfony research projects
- WG *Measurement Network Development* (DWD)

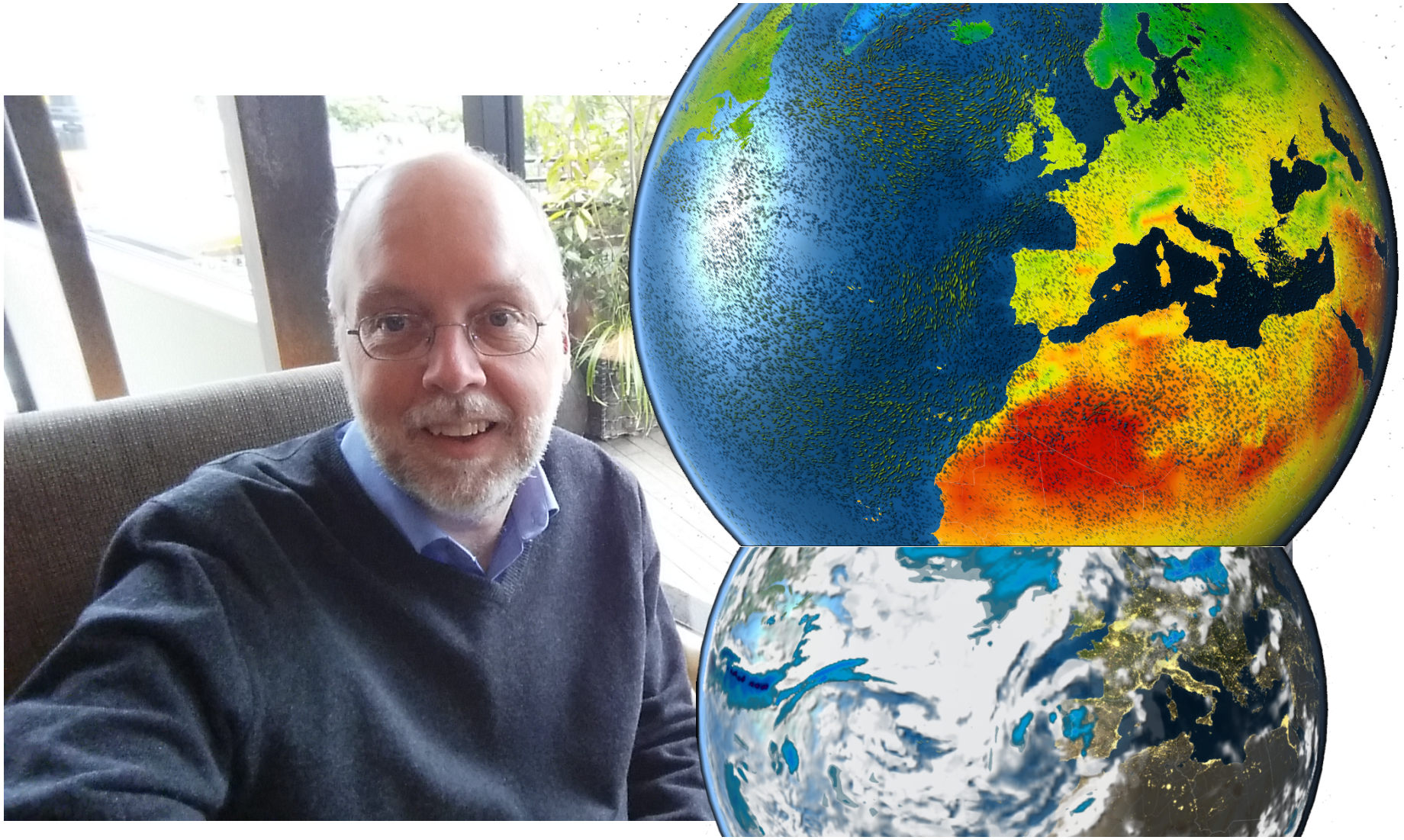
TOPROF what next?

Continue the good development …

- Move data streams further into **standard processes** (EUMENTET, WMO)
- Work on **timeliness** and **homogenization** of quality
- Carry out and complete **assimilation projects**
- Work on the **interaction of models and data**
- Take full advantage of **complementarity** with dense data (satellites)
- Explore the data within **new applications**

TOPROF Thank You!

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



Roland Potthast, Dublin, Sept 2017