

# **OPERA – status on European radar data**

COSMO-GM 2016

Klaus Stephan



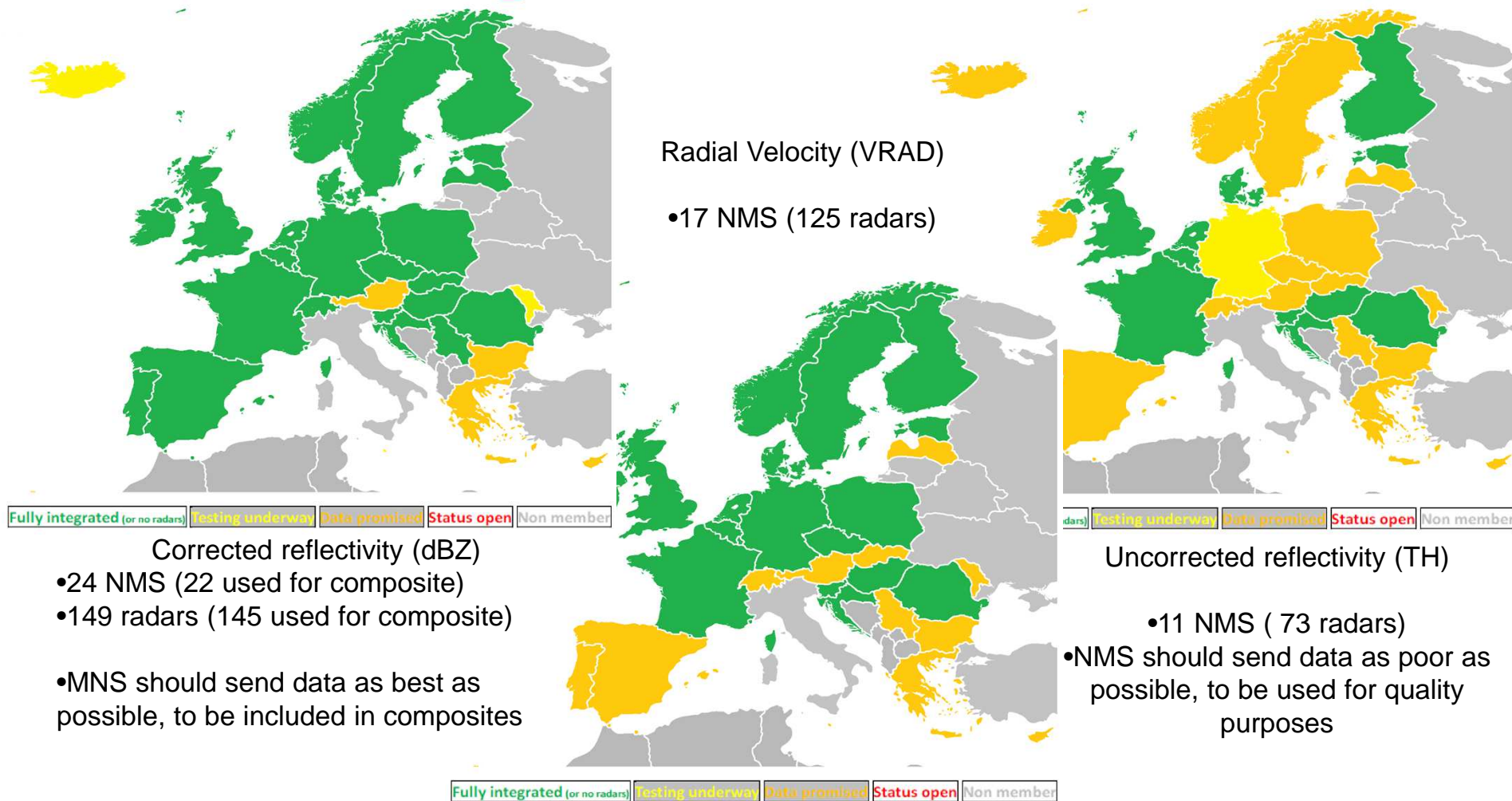
## Outline

- OPERA
  - Members
  - Objectives
  - Achievements
  - Deliverables
- OPERA Users
  - Who is using what
  - Status of European Radar DA

# OPERA

- 29 NMS with about 180 operational radar sites
  - Mostly C-Band Doppler radar, renewal underway
- Objectives:
  - European platform for operationally-oriented weather radar issues.
  - Operational high-quality pan-European weather radar composite products
- Achievements:
  - Operational data center (ODC)
  - Standardized data format (ODIM)

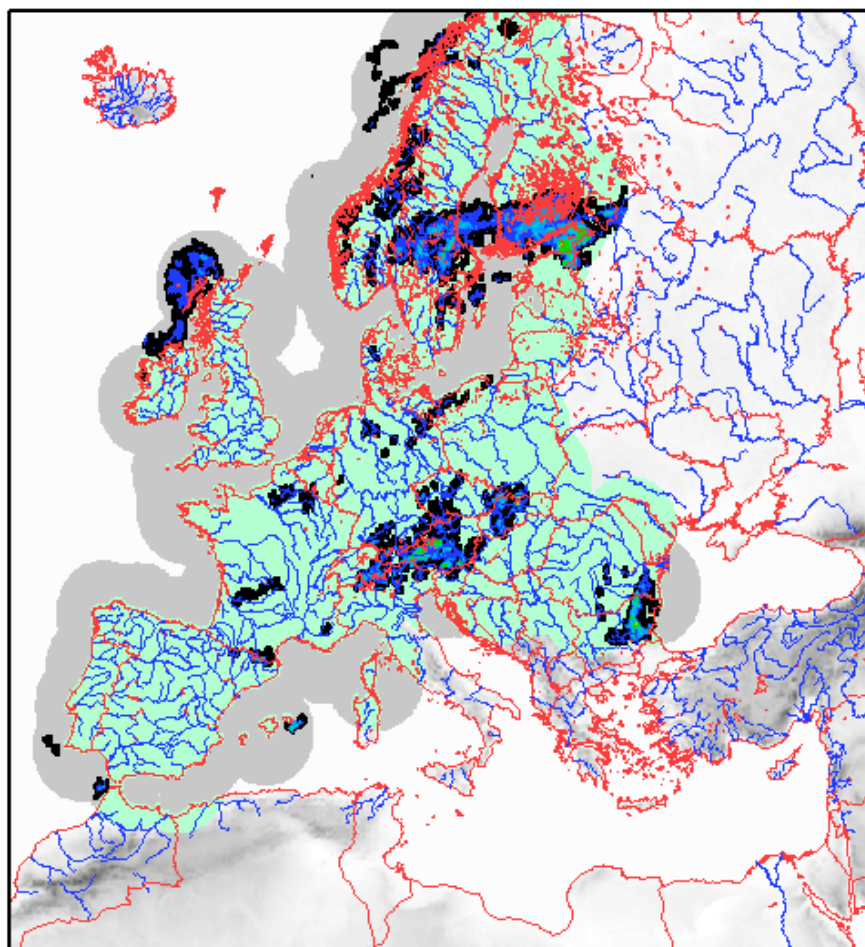
# Who's sending which data set



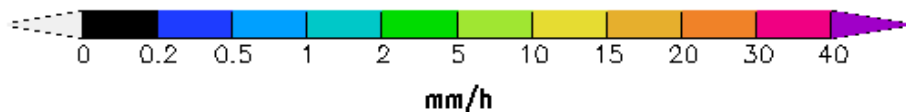
## Odyssey Output: 3 composites (every 15 min)

- 1. Surface rain rate composite**
  - 2. Hourly rainfall accumulation**
  - 3. Maximum reflectivity composite**
- Quality of composites improved since December 2015, but some quality issues still remain.
  - Improving timeliness and output frequency is a question of heterogeneous scan strategies and data delivering issues.

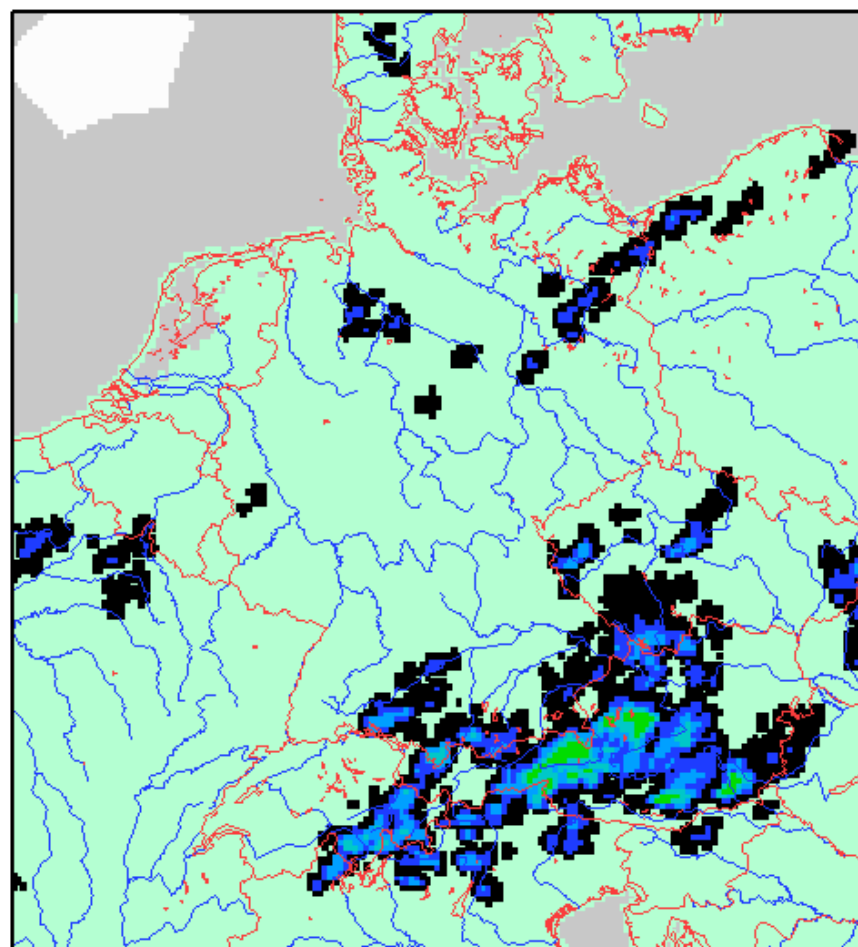
29. AUG 2016 13:00 UTC



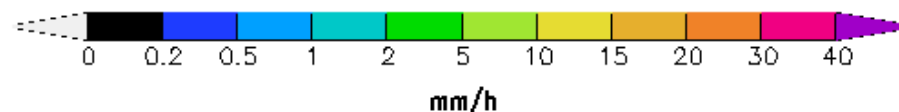
Mean: 0.0325678 Min: 0 Max: 8.22581



29. AUG 2016 13:00 UTC



Mean: 0.298626 Min: 0.0100145 Max: 4.53568



## Odyssey Output: single site volume data

- 1. Reflectivity (data owned by NMS)**
  - 2. Radial velocity (data owned by NMS)**
  - 3. Quality flags (produced and owned by OPERA)**
  - (4. Dual polarization moments)**
- Automatic Redistribution is still under construction, but data are available on request via Internet portal since June this year**
  - Heterogeneity among NMS is a big issue when using volume data**

## Issues of volume data

- Missing or wrong meta data in ODIM HDF5
- Meaning of missing data unclear (undetected, filtered, no echo)?
- Measuring radial wind in some countries by separate scan
- Level of data quality:
  - Who should filter the data (NMS or OPERA)?
  - Which quality flags should be set?
- ...



# Who is interested in OPERA data?

	Timeliness	Products Composite/ Volume data Z: reflectivity, RR: rain rate, Vrad: radial velocity	Quality
NWP	near real time	C of Z and Vrad	filtered with quality flags
Nowcasting	real time	C of Z, Vrad (Vrad, DualPol)	filtered (QF)
Hydrology	near real time	C of Z or RR	filtered
ENRAM (animal movement)	near real time	V/(C) of Z (DualPol)	As raw as possible
Flight security	real time	C/V of Z(RR) and VRad	filtered
Others	???	???	???

**OPERA USER GROUP**

## Who is currently using OPERA data?

- NWP:
  - Hirlam is assimilating volume data operationally but still passively
  - COSMO (DWD) is assimilating rain rate composite operationally (LHN)
  - Lots of experimental tests on data assimilation are ongoing
- Nowcasting:
  - EDHIT (Demonstration project) is using rain rate composite to detect hazards
- Forecasters at several NMS are looking at composites

# NWP: Radar data assimilation

NWP Center	2d Rain rate	3d Reflectivity	3d Radial Wind	WRWP
ECMWF	4d-Var (NCEP)			4d-Var
ALADIN		1d+3dVar	3d-Var	passively
COSMO	LHN (OPERA)	LETKF in development	LETKF in development	passively
HIRLAM	Some	1d+3dVar	3d-Var	passively
UKMO	LHN		3d-Var	4d-Var
LACE				

Workshop on Radar DA at 6.+7. October in Rome

Most of them are using national volume data only, but HIRLAM ...

## NWP, HIRLAM:

- MetCoOp (Sweden and Norway) Z for the Swedish OPERA is used operationally, including Denmark and Finland in operational runs very soon
- At DMI Z from around 10 countries in their preoperational suit - will rather soon go into operational runs.
  
- still difficulties using DOW, because of quality
- problems with dealiasing algorithm (introduces errors to the data)
- very low Nyquist velocities
  
- collocation of reflectivity and winds would be very useful
  
- still problems with "inhomogeneities" throughout:
  - whole volume data versus individual PPIs
  - missing or wrong meta data
  - Makes preprocessing much more complicated
  
- level of local quality control still unknown.

# Thank you for your attention