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**(Second Session)**
AND
**CIMO EXPERT TEAM ON OPERATIONAL REMOTE SENSING**
**(First Session)**

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## AGENDA ITEM: 5. RADAR WIND PROFILERS

### *Sub-Agenda Item: 5.1.* International and regional network status

# The deployment principles of the European wind profiler network CWINDE

*(Submitted by Volker Lehmann)*

**SUMMARY AND PURPOSE OF DOCUMENT**

The paper provides some information about the European radar wind profiler network CWINDE, with an emphasis on deployment principles.

# The deployment principles of the European wind profiler network CWINDE

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**ABSTRACT**

This document is intended as an input to the Joint Meeting of the CIMO Expert Team on Operational Remote-Sensing (First Session) and CBS Expert Team on Surface-based Remotely-Sensed Observations (Second Session), Geneva 5-9 December, 2011. The paper provides some information about the European radar wind profiler network CWINDE, with an emphasis on deployment principles.

## 1. CWINDE

The networking of wind profiler radars in Europe was started during the COST*-76 Action and was successfully tested during two campaigns, CWINDE†-97 and CWINDE-99. During these experiments, the UK Met Office developed the necessary infrastructure for data exchange, in collaboration with European partners. As most European countries have only small expert groups working with radar wind profiler (RWP), it was concluded that an efficient and successful networking of such a complex instrument requires a continued European co-operation. EUMETNET‡, a network grouping 26 European National Meteorological Services therefore decided to establish an operational Programme on wind profilers (WINPROF), which was started in July 2002. During the first phase of the EUMETNET WINPROF Programme, the acronym CWINDE was redefined and stands now for *The Coordinated WIND profiler network in Europe*. The current phase E-WINPROF was agreed and initiated from January 2009 and the UK Met Office is currently the responsible member for the programme. The essential goals of E-WINPROF are:

- Maintaining European expertise on the installation and operation of wind profiler radars.
- Harmonization of the operational exchange of wind profiler radar data in Europe.
- Operation of a network hub for data processing and quality evaluation.
- Integration of new RWP which have been installed by national projects of the members in the operational data exchange and use.
- Provision of expertise for the further deployment of wind profilers, consistent with EUCOS§ requirements.
- Work on improvements of data quality.

In contrast to its US and Japanese counterparts, CWINDE has a heterogeneous structure and consists of a variety of types of instruments (50 MHz, 400 MHz and 1 GHz radars) from different manufacturers, which naturally leads to differences in radar hardware and operating software, signal processing and Quality Control (QC). Furthermore, the systems are operated by National Meteorological Services, universities, airport authorities and research institutes for different purposes, which additionally leads to different sampling strategies.

Most of the 30 RWP in CWINDE are providing good quality data which is suitable for assimilation in numerical models. This has been investigated by Numerical Weather Prediction Centers, e.g. ECMWF Bouttier (2001); Armstrup (2008). However, the percentage of data that is used in the various operational NWP centres in Europe differs significantly. For example, ECMWF is currently assimilating only a total of 16 RWP (53% of the all CWINDE network systems) whereas the UK Met Office is using 24 systems (80% of the all CWINDE network systems). This is mainly due to differences in the quality requirements for the various NWP models.

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*http://www.cost.esf.org/

†COST Wind Initiative for a Network Demonstration in Europe

‡http://www.eumetnet.eu/

§EUMETNET Composite Observing System

## 2. Deployment principles

There are no common deployment principles for the installation of RWP in CWINDE, as all installation decisions made by each EUMETNET member are solely based on national priorities. This is due to the fact that all costs regarding installation and operation of RWP are currently covered on a national basis only. As an example, the installation of the RWP network of MeteoSwiss was mainly motivated by the meteorological surveillance needs for the nuclear power plants in Switzerland (Calpini et al., 2011), and not by general networking requirements on a European scale. This has in particular led to a very high spatial density of RWP in the region of the Swiss plateau.

In general, the deployment of operational RWP systems must always consider the following points:

- Frequency licensing as well as sharing requirements and conditions
- Ambient RF environment (protection against RF interference)
- Potential clutter environment (e.g. wind turbine installations, sea clutter, ...)
- Infrastructure (power supply, communication infrastructure)
- Suitability of property

## References

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