



First results from the OPERA user requirements survey

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1 Introduction

Weather radar networks provide data to many different user groups. What a certain user expects from weather radar data will always depend on the application. An air traffic controller will prefer detailed volume scans to frequently repeated measurements of lowest elevations. Radar data providers, however, have to generate datasets for a variety of users from the same original dataset. An important basis for the proper use and design of radar networks is therefore a good understanding of the user needs. Their requirements can direct decisions of radar data providers, such as radar configuration issues.

In the EUMETNET OPERA programme, one work package is dedicated to a survey on user requirements. The survey was carried out by interviewing users, mainly in Finland and Norway, but also with input from Spain, France and Germany. The users are from hydrology, meteorology, aviation, agriculture, the railway authorities, hydropower, and the road authorities.

2 Methods

This work builds on the achievements of COST 717 and CARPE DIEM, where the user requirements from hydrological and NWP communities were reviewed (Bruen, 2004; Rossa et al., 2005). While the focus of this project was on the use of radar in NWP assimilation, verification and in hydrology, the users interviewed for this work are also from operational communities such as civil aviation authorities, road authorities, agriculture, and hydropower companies.

Many of these users receive radar products with a high level of processing, including background map etc. Many

of these users are not aware of all possibilities and limitations of radar measurements. They could use radar data more efficiently than they do today if they were aware of the strengths and weaknesses of radar data. Being aware of this gap between the data providers and the users, this survey was carried out in direct contact with the users. The interviews were based on a questionnaire containing both real examples of radar products and general level and the customer-related points were then covered in the discussions. It was seen as an important element in this user survey that the "radar experts" visited the users at their institution. Usually this meant that a group of several people from the institution participated in the meetings and that all aspects of use of radar data could be covered. The radar users appreciated this approach, since it is often difficult for them to reply to a written survey or it may take extra resources to travel to a workshop.

3 Results

The results are based on the replies from 26 users from Finland, Norway, France, Spain and Sweden. Number of interviews in different user groups and countries are shown in Table 1. Most of the users in Finland and Norway were visited at their institutions and their demands were discussed in a group. Where this was not possible, the questionnaire was sent out.

All users require high accuracy and high availability. Some use radar data in an integrated system with gauge data or other information as backup when radar data is missing. International radar composites are required by most user groups. Especially the NWP users require composites since many limited area NWP model systems operate at continental scales. For road weather, composites are important for monitoring the situation and increase the time for planning actions. Also for hydrology, and civil aviation, international composites are required. The interviews with the users

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Table 1. Number of interviews in different user groups and countries.

	Finland	France	Norway	Spain	Sweden	
Aviation	3	1	1			5
Hydrology	1	1	1	3		6
Meteorology	2		1			3
Road maintenance	1		3			4
Agriculture	1		1			2
Railway authorities			1			1
Hydro power			3			3
NWP modellers	2				1	2
	10	2	10	3	1	26

showed also that there should be increased focus on user training. For many user groups, the current use of radar data can be improved with better knowledge about the strengths and weaknesses of the data.

The majority of users (17) are currently using radar images, more or less integrated in their own system. Only 4 users visualize the radar data with their own background maps.

Many users prefer to receive the data processed for their specific application. They are interested in a dialogue with the data providers on how to present the data for their specific application. Questions of interest are for example user selectable zoom, interactive overlay of other data (gauges, river catchments, railway lines etc).

In hydrology, hydropower production and meteorology, there is an increasing demand for numerical data, 6 users use both images and numbers, while only 2 users receive numerical data only (NWP assimilation and leaf wetness modeling). Both dBZ values and quantitative precipitation information are used. Many users receive both types of data (14), 6 users use only dBZ while 5 use only mm/h. Most users have PseudoCAPPI data either as single site or as composites or both. Accumulated precipitation is used by 14 users and for these applications, the quantitative accuracy and quality information is crucial.

Not all users require quality information, but all require good quality control. Some users prefer to get the "best possible data" without additional information on the quality. An overall quality estimate is enough, when pixel-wise quality flags may be difficult to deal with. This is especially an issue for road and railway maintenance.

Radar-based forecasts are most interesting for road maintenance, railway operation, and hydrology. The temporal resolution available today is usually 15 minutes (except for the French National Hydrometeorological Service and Finnish Meteorological Institute, where 5 minute-intervals are available). The users would prefer 5-minute intervals since this would improve the accuracy of precipitation accumulations.

None of the users is currently receiving data from a dual polarization system. Wind data is only used for aviation and NWP assimilation.

4 Summary and conclusion

It is obvious that anything very specific statement on user requirements can't be made on this basis. More detailed results will be published in OPERA final report until the end of the year 2006. However, in the future this work will be extended and updated when more information becomes available. We hope that the user dialogue will continue also in the next phase of OPERA and that we will get a better understanding for the requirements to radar data.

References

- Bruen, M. 2004: 2nd CARPE DIEM End-users Workshop, Extended summary report
- Rossa, A., M. Bruen, D. Frhwald, B. Macpherson, I. Holleman, D. Michelson, S. Michaelides, (ed.) 2005: COST 717 Final Report. working document WDD_200505_1 on <http://www.shmi.se/COST717/>