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Application of OGC standards in meteorology: interpolation of meteo-station measurements with R and OGC services.

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The Royal Netherlands Meteorological Institute (KNMI) is responsible for a wide range of climatological products including interpolated maps of meteo-station measurements like temperature, precipitation and relative humidity. The interpolations are performed using the statistical programming environment R. Additional functionality in the form of libraries can be added to R. For spatial functionality we made use of the libraries sp, gstat and automap.

We built a geospatial interpolation environment which manages databases, R-scripts, data storage and data distribution. The environment uses OGC web services for its data distribution in addition to standard HTTP and FTP services. Results of completed interpolation runs are visualized through a Web Mapping Service (WMS) and can be obtained through a Web Coverage Service (WCS).

The power of combining R with OGC web services is revealed when analysis requires combination of datasets from different data sources. This is illustrated by the verification of different interpolation results covering the Netherlands by two external datasets: (1) data from the KNMI precipitation radar and (2), interpolated precipitation data for the entire Rhine catchment generated by Deutscher Wetterdienst. All datasets have different data formats, projections and resolutions. Both interpolation results and verification data are made available through OGC web services. The OGC web services handle the file format, sub setting, reprojection and regridding of the data. Therefore results can be easily compared visually through WMS and can be easily imported into R for quantitative analysis through WCS. At the conference we will demonstrate the results and the efficient web service based workflow in the geospatial interpolation environment.