

A new 3-hourly precipitation dataset for NWP model verification and data assimilation studies

Franz Rubel, Paul Skomorowski and Katharina Brugger

Working Group Biometeorology, Department of Natural Sciences, Veterinärplatz 1, 1210 Vienna, Austria
franz.rubel@vu-wien.ac.at

1. Introduction

Within the framework of ELDAS, a project on the development of a European Land Data Assimilation System to predict floods and droughts, the BALTEX/PIDCAP initiative on the collection and analysis of precipitation observations has been continued. Goal is to provide precipitation fields on a regular 0.2-degree latitude/longitude grid (Rubel, 2004). These fields serve as ground truth for NWP model verification; NWP centres involved are KNMI, DWD, ECMWF, INM and Meteo France, respectively. Further these daily precipitation fields are used to generate 3-hourly fields by disaggregating them with additional information from weather radars. The latter will be used as forcing data for the ELDAS soil moisture assimilation.

2. Data and Method

For the ELDAS precipitation dataset with daily resolution about 1,000 synoptic and 19,000 climate precipitation gauges from 15 countries of the European Union and forthcoming member states have been collected. Thus, this dataset is one of the most extensive archives of European precipitation data. For the analysis the Precipitation Correction and Analysis (PCA) model (Rubel and Hantel, 2001), developed during the NEWBALTIC I and II, has been applied. Over France gridded data from MeteoFrance have been blended.

The PCA model consists of two components: (1) a module for the reduction of the systematic measurement error of the rain gauges (Rubel and Hantel, 1999) and (2) a geostatistical module for the analysis of areal precipitation estimates (including the interpolation error).

For the ELDAS precipitation dataset with 3-hourly resolution accumulated radar fields from the Baltic radar network (BALTRAD) and the Central European radar network (CERAD) have been used. In particular for the CERAD data it was necessary to develop and apply a clutter removal algorithm to reduce artefacts. Finally, the radar estimates have been calibrated on a daily basis with the ground truth fields analysed from precipitation gauges.

To provide precipitation fields without missing values, ERA-40 re-analyses fields have been blended over data sparse regions.

3. Results

The 3-hourly precipitation fields are available for the ELDAS reference period Oct. 1999 to Dec. 2000 and designed to NWP community specifications, that is maximum spatial coverage and high temporal resolution. It is planned to store the files in GRIB format and make the dataset available via the ECMWF Mars archive. Additionally, the dataset will be archived at the Global Precipitation Climatology Centre (GPCC).

References

- Rubel, F., A New European Precipitation Dataset for NWP Model Verification and Data Assimilation Studies, *Research Activities in Atmospheric and Oceanic Modelling*, Report No. 34, submitted, 2004
- Rubel, F., and M. Hantel, Correction of daily rain gauge measurements in the Baltic Sea drainage basin, *Nord. Hydrol.*, 30, pp. 191-208, 1999
- Rubel, F., and M. Hantel, BALTEX 1/6-degree daily precipitation climatology 1996-1998, *Meteorol. Atm. Phys.*, 77, pp. 155-166, 2001

Acknowledgments

C. Graute (BMDC), B. vd Hurk (KNMI), P. Le Moigne and J. Noilhan (Meteo France), A. Menochet (BADG), U. Gjertsen and E. Forland (DNMI), B. Navasques and E. Rodriguez Camino (INM), P. Viterbo (ECMWF), L. Haimberger (IMGW), B. Rudolf and P. Otto (GPCC), T. Sheridan and A. Murphy (Met Eireann) contributed to the gauge data collection. D. Michelson (BRDC) and K. Köck (TU-Graz) provided the weather radar data.

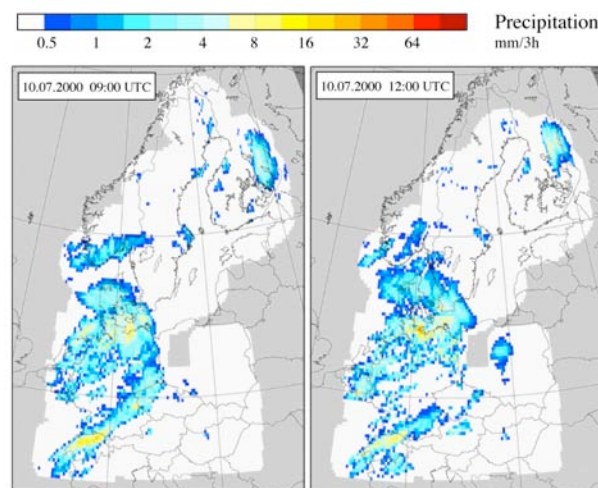


Figure 1. Merged BALTRAD-CERAD precipitation fields, calibrated with the daily precipitation gauge analysis for 10 July 2000, 9:00 UTC (left) and 12:00 UTC (right). Units mm/3hours.