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A New European Precipitation Dataset for NWP Model Verification and Data Assimilation Studies

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Within the framework of ELDAS¹ (van den Hurk, 2002) an initiative was launched to collect and analyse daily precipitation measurements. Goal is to analyse precipitation fields on a regular 0.2 degree latitude/longitude grid. These fields serve as ground truth for NWP model verification; NWP centres involved are KNMI, DWD, ECMWF, INM and MeteoFrance, 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.

Here we present the ELDAS precipitation dataset with daily resolution. It consists of about 1000 synoptic and 19000 climate precipitation gauges from 15 countries of the European Union and forthcoming member states (Fig. 1). Thus, this dataset is one of the most extensive collections of European precipitation data. It is 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. The gridded data are stored in GRIB format and made available by the ECMWF MARS archive.

For the analysis the Precipitation Correction and Analysis (PCA) model (Rubel and Hantel, 2001), developed during the Baltic Sea Experiment (Raschke et al., 2001), 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 and (2) a geostatistical module for the analysis of areal precipitation estimates (including the interpolation error). The application of PCA fields to verify meso-scale NWP models has been demonstrated by Jacob et al. (2001). A more comprehensive study has been performed over the European Alps to compare the performance of daily precipitation estimates predicted by the ECMWF model (t+6 to t+30) and estimated by satellites from the Global Precipitation Climatology Project (GPCP-1DD). Both precipitation products have been compared to each other using scores from verification against ground truth (Rubel and Rudolf, 2001; Rubel et al., 2002).

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¹Development of a European Land Data Assimilation System to predict floods and droughts, project financed by the European Commission (EVG1-CT-2001-00050), see <http://www.knmi.nl/samenw/eldas/>

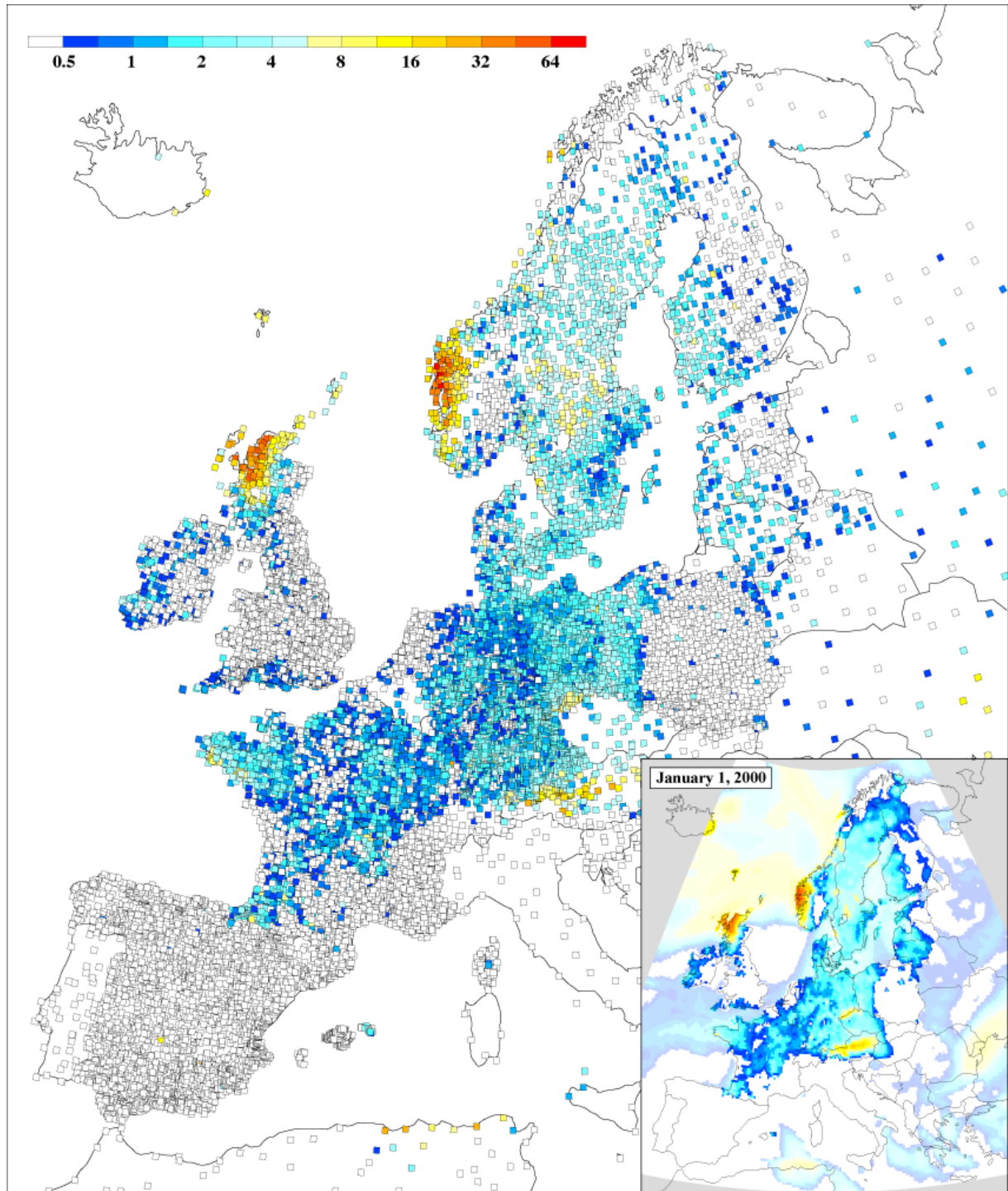


Fig. 1 ELDAS precipitation gauge dataset for January 1, 2000, 6 UTC. Units mm/day. Lower right corner: Appropriate gridded precipitation data analysed from 20 049 bias corrected gauge observations. ECMWF background field in bright colors.

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