

ERA40-Data for Range Tests in Marine-Meteorological Data Quality Check Programs

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At the Marine Climatological Monitoring Centre of the German Meteorological Service (DWD) in Hamburg, marine-meteorological data, measured by ships, buoys or other platforms from all parts of the world's oceans are routinely quality checked.

An important tool for the error diagnostics is the climate comparison test. This is done by comparing the recorded values with the climatology basing on ship's and buoy's measurements. Each incoming data value is e.g. automatically checked whether it lies within a given range for the parameter. Up to now, these ranges are defined by the maximum and minimum values of all data in the archives, observed in a 5° x 5° grid area around the position of the ship (MARDAB: maritime data bank). Especially in areas with poor data amount this method is limited. The data base is unevenly distributed as to density in space and time.

To enable quality checks in a standardized traceable way, a defined climatology is a basic prerequisite. However, for lack of observations in many sea areas, this is not achievable. This gap can be filled by data of reanalysis models. Therefore tests have been made with the ECMWF 40 Year Reanalysis (ERA-40). ERA-40 data cover all oceans and have a spatial resolution of about one degree with 6-hourly data.

To define the test ranges monthly extreme values for each meteorological parameter and region of the oceans are evaluated. These ranges are defined by the absolute minimum and maximum values of the parameter in every ERA-40 grid box between 1961 and 2000, enlarged by the values of respective standard deviation.

Checks of measured air temperature values in the data base with ERA-40 ranges show good results. However, extremes of measured sea surface pressure data are not very well reproducible by the ranges derived from ERA-40 data for different reasons. Therefore, new ranges are calculated using ERA-Interim data for the period 1981 to 2010 with higher spatial and temporal resolution.

The results of the comparison of observations and ER-40 as well as ERA-Interim ranges are presented.

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