VOS observations vs. ERA40 Reanalysis in the North Sea area: Limits and challenges

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KLIWAS is a research program of the German Federal Ministry of Transport, Building and Urban Development (BMVBS) to investigate the potential consequences of climate change for navigation on inland and coastal waterways and to formulate appropriate strategies for adaptation to the changed environmental conditions in the future. The objective of project 1.03 is the evaluation and assessment of climate model results by means of a comprehensive reference database and to make this data available for subsequent projects. Like the ICOADS, the archive of the National Meteorological Service (DWD) is a regularly updated, guality controlled, world-wide data set of synoptic observations over the oceans, including VOS (Voluntary Observing ships), drifting and moored buoy, lightvessel, platform, and gts data. In addition to the automated set of programs applied for high quality control, erroneous data are also manually corrected. In the following, the corrected data are gridded to a resolution of 2.25 degree, so each grid box includes 4 ERA40 Reanalysis grid points, to assure reliable statistics. The temporal coverage of grid boxes depends on shipping routes and the positions of automated systems, as well as on the resolution of the grid. Therefore, no area-wide climatology is possible. Observed Air Temperatures (AT), covering a period of 40 years (1961-2000), show noticeable differences to the reanalysis data for all land influenced boxes, specifically in the winter months. Here, even the median value of ERA40 AT is about 0.7 K below the median of the observations. This difference is increasing in the 1981-2000 period, compared to the 1961-1980 period. Further investigations show, that largest differences appear in the land-side half of these grid boxes, whereas in the sea-side half, observations and ERA40 AT are in fair agreement. This leads to the conclusion, that the resolution of the ERA40 reanalysis should be improved for regional analyses to reduce the land-effect. Similar problems do not occur for the Sea Level Pressure (SLP). It seems, that the above described land effect does not interfere with larger scale parameters. This, and other variables, like wind speed and -direction, are under further investigation.