EGU2020-19111, updated on 19 Jan 2022
https://doi.org/10.5194/egusphere-egu2020-19111
EGU General Assembly 2020

WiSED: A Quality-Controlled Surface Wind European Database

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Surface wind is a fundamental meteorological variable that is relevant for a wide array of topics (e.g., crop growth, extreme events, power generation). Yet, for many regions, there is still a scarcity of good quality observational datasets and the uncertainties within data sources like reanalysis products and between those and observational databases are large, limiting the understanding of this variable and hampering the accuracy of subsequent analyses.

In order to address this need and within the frame of the NEWA's (New European Wind Atlas) project, a quality-controlled Wind Surface European Database (WiSED) is created. WiSED feeds from eight different datasets, provided by different institutions and with varying levels of quality control. This initial version is then submitted to a Quality Control (QC) process structured into six phases that deal with the detection of various issues in data quality: 1) compilation; 2) duplication errors; 3) physical consistency in the ranges of recorded values; 4) temporal consistency, regarding abnormally high/low variability in the time series; 5) detection of medium-term biases; and 6) removal of isolated records. The first three phases deal with issues often related to data storage and management, whereas the last three phases deal with measurement errors related to problems in the instruments, calibration procedures or siting.

The improved quality of the data and the high temporal and spatial resolution, as well as its spatial coverage, represents an added value over previous products available for the same region.

This work summarises the application of the quality control, showing the results of different steps throughout it. Additionally, a preliminary analysis of the surface wind behaviour over Europe is presented.

With a maximum timespan of about 100 years, the creation of such database will allow for analyzing different aspects of both wind speed and direction variability over Europe from intra-daily to multidecadal timescales. Within the potentially relevant applications, it is worth to mention: the identification of subregions in Europe with homogeneous wind behaviour (regionalization), statistical downscaling exercises, analyses of wind extremes, wind power assessment and evaluation of climate model, both global and regional, simulations.