Mesoscale modeling for the Wind Atlas of South Africa (WASA) project - DTU Orbit
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This document reports on the methods used to create and the results of the two numerical wind atlases developed for the Wind Atlas for South Africa (WASA) project. The wind atlases were created using the KAMM-WAsP method and from the output of climate-type simulations of the Weather, Research and Forecasting (WRF) model, respectively. The report is divided into three main parts. In the first part, we document the method used to run the mesoscale simulations and to generalize the WRF model wind climatologies, which was used for the first time in a wind atlas project. The second part compares the results from the numerical wind atlases (NWA) produced by the KAMM-WAsP with that produced with the WRF method, and verifies the two wind atlases from the two methods against the observed wind atlas (OWA) generated from wind observations from the 10 WASA masts. The KAMM-WAsP method was found to underestimate the generalized mean wind speeds at the sites (mean bias of -8.2% and mean absolute bias of 9.3%). In the WRF-based method there is, on average, a difference of 4.7% (either positive or negative) between the WRF-based NWA results and the corresponding observed values. The combined average across all the sites is an over-estimate of 2.5%. The report also documents the variability of the 62 m AGL wind speed at the 10 sites in the seasonal and diurnal time scale and compares it with the WRF-simulated winds.

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