EMS Annual Meeting Abstracts
Vol. 16, EMS2019-516, 2019
© Author(s) 2019. CC Attribution 4.0 License.

Wind forecasts in complex topography – a comparative verification for Switzerland

Jonas Bhend, Daniel Cattani, Christoph Spirig, Lionel Moret, and Mark A. Liniger

Federal Office of Meteorology and Climatology MeteoSwiss, Development of Forecasting, Zürich-Flughafen, Switzerland (mark.liniger@meteoswiss.ch)

Wind forecasts in the Alps are challenging due to the modulation of large-scale wind by local topography and due to local wind systems such as mountain and valley breezes and Foehn. Such wind forecasts, however, are relevant for numerous applications in various sectors such as in energy production, aviation, tourism, insurance and emergency management.

Here, we evaluate wind forecasts against station observations in Switzerland. We compare the past three years of forecasts from the high-resolution numerical weather prediction (NWP) systems COSMO-1 and COSMO-E run at 1 and 2km horizontal resolution respectively with global NWP from ECMWF ENS run at approximately 18km resolution. In addition, we contrast the performance of the ensemble and deterministic NWP with various postprocessed forecasts including Kalman-filtered wind speeds from COSMO-1 and COSMO-E and DWD MOSMIX. We assess forecasts of wind speed, wind direction and their combination using a range of objective verification measures such as the continuous ranked probability score and the energy score. We also assess the quality using the MeteoSwiss internal score developed to measure the performance of the human weather forecasters. To assess performance in conditions with extreme winds such as during the windstorm Eleanor / Burglind in January 2018 we specifically verify forecasts of strong winds and look to this specific case. Higher resolution of the models provide a clear benefit in the quality of wind predictions, both for speed and direction. In general, postprocessing is providing substantial added value, also compared to high resolution NWP, in particular in complex topography.