



Dynamical downscaling of ERA-40 data for the estimation of high-resolution wind climatology over Hungary

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The fine scale wind climate investigation of the last few decades was mainly focused on the surface parameters disregarding the upper level or planetary boundary layer parameters. This was the straight consequence of the fact, that observations of high spatial and temporal resolution were only available at the surface level. Nevertheless, PBL level climate information has great importance for better understanding the climate and climate change, there are several economical aspects, as well.

At the Hungarian Meteorological Service several methods were developed for estimation wind climatology in PBL, one of these solutions was the dynamical downscaling of the global ERA-40 data with the use of the ALADIN mesoscale numerical weather prediction model. The necessity of the downscaling of the global data was explained by the fact, that the spatial resolution of ERA-40 data is rather coarse (grid distance is nearly 125 km) describing only the large scale features and providing little information of the small scales highly affected by the orography. As the difference between our target 5 km resolution and the ERA-40 resolution was quite significant, the downscaling was carried out in a hierarchical structure with refining integration domains in each stage and in the final step a special dynamical adaptation configuration of the ALADIN model developed purposely for wind was applied to reach the desired wind climatology over a Hungarian domain.

The resulted 5 km resolution wind climatology covers the 1992-2001 period for the lowest 150 m layer of the PBL. The results were validated with Hungarian observations: on the one hand the model outputs were compared with surface measurements

in single locations and on the other hand the results were evaluated with a gridded Hungarian observational dataset of 0,1 degree resolution. The presentation is going to briefly introduce the characteristics of the experiment and summarize the validation results.