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A multiscale approach for precipitation verification applied to the FORALPS case studies

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Meteorological model grid step is often incorrectly referred as model resolution. Indeed, the ability to distinguish separate features on a gridded field (properly called resolution) is coarser and depends on the considered feature (and the model structure) in a nontrivial way. Multiscale methods, as for instance the power spectrum, are suitable diagnostic tools for studying the second order statistics of a gridded field, which is needed to be accurately known for interpolation and downscaling purposes. Moreover, they give an insight into the real resolution of Numerical Weather Prediction (NWP) grids. A drop in the power spectrum for a given scale indicates the inability of the model in reproducing the variance of the phenomenon below the correspondent spatial scale. So the usefulness of extending verification studies to these methods is apparent.

In this work, performed in the framework of the EU FORALPS project - INTERREG IIIB Alpine Space programme, the power spectrum of the precipitation fields for two intense rain events, which occurred over the north-eastern alpine space, have been studied in detail. The first events took place on 17-19 November, 2001; whilst the second one occurred on 9 September, 2005. Namely, a model intercomparison has been performed considering the precipitation forecasts from the Quadrics BOlogna Limited Area Model (QBOLAM) operational at APAT, the Weather Research and Forecast (WRF) which run in a research configuration at the Regional Meteorological Observatory (OSMER) of Friuli-Venezia Giulia region (Italy), and the Aire Limitée Adaptation dynamique Développement InterNational (ALADIN) model operational

at the Environmental Agency of the Republic of Slovenia (EARS). Forecasts from the ECMWF global model have been considered as well. The spectra of these forecasts have also been compared with the observations' spectra obtained from rain gauge data covering northern Italy (from APAT and Regional Agencies-ARPAs), Austria (from the Austrian Central Institute for Meteorology and Geodynamics-ZAMG) and Slovenia (from EARS). Besides, how the former spectra are affected by different interpolation techniques (that is, bilinear interpolation and remapping) is investigated.

Finally, an attempt to give a physical interpretation to the achieved findings, for instance in terms of the orography, has been made.