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Towards a unified software tool for generation of geospatial datasets applied in global and limited-area numerical weather prediction and climate models

Jürgen Helmert (1), Katherine Silverthorne Osterried (2), Luis Kornblueh (3), Jean-Marie Bettems (4), Dmitrii Mironov (1), and Axel Seifert (1)

(1) Deutscher Wetterdienst, Research & Development, Germany (juergen.helmert@dwd.de), (2) Center for Climate Systems Modeling, Switzerland, (3) Max-Planck-Institut für Meteorologie, Germany, (4) Federal Office of Meteorology and Climatology MeteoSwiss, Switzerland

External databases containing geospatial datasets are an important component in operational numerical weather prediction (NWP) and climate model setups. These datasets provide information about orography, land use, soil and surface properties as well as vegetation parameters and determining factors of the models radiation scheme, such as aerosols.
The required data are retrieved from high-resolution satellite information (e.g., ASTER, GLOBE, MODIS) or land registers (e.g. FAO, HWSD for soil properties) and are aggregated to the model's global or limited-area grid. In a final processing step all available data are cross-checked for consistency (e.g., to exclude vegetation on glaciers). However, the used data sources and the applied tools vary between different models and this leads to a different mapping of geospatial information (Onvlee et al, 2014).
For the COSMO and ICON model in NWP and climate mode, the EXTPAR software (Smiatek et al., 2008) is used to generate the required geospatial data. However, since several years the development route of EXTPAR diverged in its different variants. There are only limited resources to maintain and develop EXTPAR for addressing the challenges in increasing resolutions of satellite input data sets and model grids as well as to add new input data. To this end, in a cooperation of Center for Climate Systems Modeling Zürich, Max-Planck-Institut für Meteorologie, and Deutscher Wetterdienst a common code base of EXTPAR for the COSMO and ICON model was developed. The main goals of the project are (i) to merge the development routes within a Git version-control system, and (ii) to perform continuous integration strategies by using different compilers and model grids. We will show the characteristics, outcomes and benefits of this approach for the project partners in NWP and climate modeling and address future development priorities.

Onvlee J., Rontu L., Kourzeneva, E. (2014) Geospatial datasets for use in NWP (and climate) models, available at https://www.umr-cnrm.fr/surfex/IMG/pdf/geospatial_data_HIRLAM.pdf
Smiatek G., Rockel B., Schaettler U. (2008) Time invariant data preprocessor for the climate version of the COSMO model (COSMO-CLM). Meteorol Z 17(4, Sp. Iss. SI):395–405. doi: 10.1127/0941-2948/2008/0302