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

Jürgen Helmert¹, Katherine Silverthorne Osterricht², Luis Kornbluh³, Jean-Marie Bettems⁴, Dimitri Mironov⁵, and Axel Seifert⁶

Data sources
Geospatial data allow numerical simulation beyond the equilibrium. They are retrieved from high-resolution satellite information on land registers 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). The used data sources and the applied tools vary between different models – i.e., different mapping of geospatial information (Driessens et al. 2014).

Project
Center for Climate Systems Modeling, Max-Planck-Institut für Meteorologie, and Deutscher Wetterdienst are jointly developing a common code base of geospatial data processing software (EXTRAP) for the COSMO and ICON models. The main goals of the project are (i) to merge the development routes within a C++ version-control system, and (ii) to perform continuous integration strategies by using different compilers and model grids.

EXTRAP development
Since several years the development mode of EXTRAP described in its initial version (COSMO-NWP, COSMO-CLM, ICON). There are ongoing efforts to maintain and extend EXTRAP for addressing the challenges in developing and maintaining complex data sets and model grids as well as to add new input data into the processing workflow. Given the major goals of the project the extended version of EXTRAP allows:
- Consistent management for new and high-resolution data sources and higher-model grid (e.g., 12km concept, Optimum shock)
- Usage of existing tools and libraries for data processing, including tools for atmospheric and land models
- Community development approach ( accessed via git)
- Automatic build system and nightly complete builds against the versions
- Consistent API
- Possible code development in the EXTRAP Software Engineering and Application Development (SWAD) project

EXTRAP workflow
The current code of EXTRAP is hosted at GitLab, which provides access control and version management. Pull requests, task management, and issues are used in the project. Furthermore, the integration of EXTRAP into the COSMO-CLM is done via a python script.

Driessens J. et al. (2014) Geospatial data sources for use in NWP (and climate) models

We are looking forward to your comments and suggestions: aextrap_project