Interactive 3D Visualization of High-Resolution Numerical Weather Forecasts

In collaboration between the Computer Graphics and Visualization Group at TU Munich and the Meteorological Institute at LMU Munich this interdisciplinary thesis project aims at visualizing numerical weather prediction data from the high-resolution COSMO model (http://www.cosmo-model.org/) in an interactive 3D system.

The Computer Graphics and Visualization Group develops “Met.3D”, a 3D visualization system until now targeted at the visualization of weather predictions from the European Centre of Medium Range Weather Forecasts (ECMWF, http://www.ecmwf.int/). Your task will be the integration of COSMO forecasts into the system and the visualization and analysis of a case study. This will require the adaptation of the Met.3D visualization pipeline (data management, visualization algorithms) to the COSMO grid. Challenges will include the adaptation of visualization algorithms (e.g. raycaster) to the special vertical grid structure of COSMO, handling data fields larger than the available GPU memory, and handling the rotated coordinate system of the COSMO grid. Due to the high resolution of the COSMO model, you will create visualizations that will allow fascinating insights into the atmospheric structure over Europe.

The thesis is suited for computer science students interested in meteorology as well as meteorology students interested in computer graphics. However, requirements for the thesis are good programming skills in C++, good knowledge of a graphics API (preferably OpenGL), and interest in the meteorological application. Knowledge of Linux and meteorological data formats (NetCDF and GRIB) would be a plus. In return, we offer an interesting thesis that will enable you to gain insight into the exciting world of computer science meeting atmospheric research.

If you are interested, please contact:

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