



3D visualization of ultra-fine ICON climate simulation data

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Advances in high performance computing and model development allow the simulation of finer and more detailed climate experiments. The new ICON model is based on an unstructured triangular grid and can be used for a wide range of applications, ranging from global coupled climate simulations down to very detailed and high resolution regional experiments. It consists of an atmospheric and an oceanic component and scales very well for high numbers of cores. This allows us to conduct very detailed climate experiments with ultra-fine resolutions. ICON is jointly developed in partnership with DKRZ by the Max Planck Institute for Meteorology and the German Weather Service.

This presentation discusses our current workflow for analyzing and visualizing this high resolution data. The ICON model has been used for eddy resolving (<10km) ocean simulations, as well as for ultra-fine cloud resolving (120m) atmospheric simulations. This results in very large 3D time dependent multi-variate data that need to be displayed and analyzed. We have developed specific plugins for the free available visualization software ParaView and Vapor, which allows us to read and handle that much data. Within ParaView, we can additionally compare prognostic variables with performance data side by side to investigate the performance and scalability of the model. With the simulation running in parallel on several hundred nodes, an equal load balance is imperative.

In our presentation we show visualizations of high-resolution ICON oceanographic and HDCP2 atmospheric simulations that were created using ParaView and Vapor. Furthermore we discuss our current efforts to improve our visualization capabilities, thereby exploring the potential of regular in-situ visualization, as well as of in-situ compression / post visualization.