



Comparative Visualization of Climate Simulation Data

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Visualization is the process of transforming abstract (scientific) data into a graphical representation, to aid in the understanding of the information contained within the data. Climate data sets are typically quite large, time varying, and consist of many different variables that are sampled on an underlying grid. A variety of different climate models – and sub models – are developed to simulate the climate system and its components, such as the physics of the atmosphere and the ocean, marine biogeochemical processes and the land biosphere.

Visualization software is used to assist in the process of visualization and data analysis by transforming the abstract numerical information into a graphical illustration. Different approaches exist in the design of visualization software and for the process of visualization itself, depending on the type and nature of the data as well as on the visualization goal.

In addition to a large high performance compute cluster that is exclusively used for climate simulations, the German Climate Computing Centre (DKRZ) also hosts a dedicated visualization cluster for post-processing, data analysis and visualization. On this visualization server, a variety of software is installed to assist the user in the data visualization task. Amongst others, the software stack includes Avizo Green, CDO, NCL, Paraview and SimVis. Each tool has its own strengths and weaknesses, and is selected by the user with regard to the visualization goal. While Avizo Green is great for visualizing the data out of the box, SimVis and Paraview are better suited for an interactive and explorative data analysis.

This PICO presentation uses several different visualization solutions – among them Avizo Green, NCL, Paraview and SimVis – to analyze and visualize the same climate data set. We will thereby explicitly focus on each software's strengths, and not highlight its weaknesses. This PICO interactively shows that – depending on the visualization tool used – not only are different visualizations created, but also different visualization stories can be told.