SIMVIS: AN INTERACTIVE VISUAL FIELD EXPLORATION TOOL APPLIED TO CLIMATE RESEARCH

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Climate research often deals with large multi-dimensional fields describing the state of the atmosphere. The usual approach to handle such data-sets consists of statistical methods to get a grip on the various features of the data, leading to more or less precise quantitative conclusions and to insights on the exploited features.

A novel approach to gain information about large data-sets has become feasible only recently using 4D visualization techniques. SimVis (Simulation Visualization), developed by the VRVis Research Center (Vienna, Austria), uses such techniques to provide access to the data interactively, and to explore and analyze large three-dimensional time-dependent fields.

SimVis was originally developed for the visualization of complex data in fluid dynamics simulations. This is a demanding task since the tool has to deal with millions of data points, several data attributes over possibly hundreds of time steps. Non-trivial visualization approaches are applied to provide a responsive and useful interactive experience for the user.

In this study we use the SimVis software tool for the investigation of climate research data sets. Through its real-time interactive data browsing capabilities new insights beyond classical statistical methods are expected.

We will systematically explore three representative multi-decadal climate model runs for the IPCC 4th Assessment Report and reanalysis data sets to find the most sensitive climate change indicators amongst pre-defined potentially useful atmospheric parameters such as temperature, geopotential height and refractivity. The focus lies on the UTLS (Upper Troposphere-Lower Stratosphere) region for its known sensitivity to climate change.

Our findings will be applied to RO (Radio Occultation) climatologies which are produced at Wegener Center, Univ. of Graz, and are known for their high accuracy in the examined region.

First results showing the capability of SimVis to deal with climate data, including trend time series and spatial distributions of selected parameters will be presented.