KAGLVis - On-line 3D Visualisation of Earth-observing-satellite Data

Marek Szuba (1), Parinaz Ameri (1), Udo Grabowski (2), Ahmad Maatouki (1), and Jörg Meyer (1)

(1) Steinbuch Centre for Computing, Karlsruhe Institute of Technology, Germany, (2) Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Germany

One of the goals of the Large-Scale Data Management and Analysis project is to provide a high-performance framework facilitating management of data acquired by Earth-observing satellites such as Envisat. On the client-facing facet of this framework, we strive to provide visualisation and basic analysis tool which could be used by scientists with minimal to no knowledge of the underlying infrastructure.

Our tool, KAGLVis, is a JavaScript client-server Web application which leverages modern Web technologies to provide three-dimensional visualisation of satellite observables on a wide range of client systems. It takes advantage of the WebGL API to employ locally available GPU power for 3D rendering; this approach has been demonstrated to perform well even on relatively weak hardware such as integrated graphics chipsets found in modern laptop computers and with some user-interface tuning could even be usable on embedded devices such as smartphones or tablets. Data is fetched from the database back-end using a ReST API and cached locally, both in memory and using HTML5 Web Storage, to minimise network use. Computations, calculation of cloud altitude from cloud-index measurements for instance, can depending on configuration be performed on either the client or the server side.

Keywords: satellite data, Envisat, visualisation, 3D graphics, Web application, WebGL, MEAN stack.