Geophysical Research Abstracts
Vol. 14, EGU2012-13630, 2012
EGU General Assembly 2012

ENKI - An Open Source environmental modelling platfom

S. Kolberg (1) and O. Bruland (2)

(1) SINTEF Energy Research, Energy Systems, Trondheim, Norway (Sjur.Kolberg@sintef.no, 47 73947250), (2) Statkraft Energi, Trondheim, Norway

The ENKI software framework for implementing spatio-temporal models is now released under the LGPL license. Originally developed for evaluation and comparison of distributed hydrological model compositions, ENKI can be used for simulating any time-evolving process over a spatial domain. The core approach is to connect a set of user specified subroutines into a complete simulation model, and provide all administrative services needed to calibrate and run that model. This includes functionality for geographical region setup, all file I/O, calibration and uncertainty estimation etc. The approach makes it easy for students, researchers and other model developers to implement, exchange, and test single routines and various model compositions in a fixed framework. The open-source license and modular design of ENKI will also facilitate rapid dissemination of new methods to institutions engaged in operational water resource management.

ENKI uses a plug-in structure to invoke separately compiled subroutines, separately built as dynamic-link libraries (dlls). The source code of an ENKI routine is highly compact, with a narrow framework-routine interface allowing the main program to recognise the number, types, and names of the routine's variables. The framework then exposes these variables to the user within the proper context, ensuring that distributed maps coincide spatially, time series exist for input variables, states are initialised, GIS data sets exist for static map data, manually or automatically calibrated values for parameters etc.

By using function calls and memory data structures to invoke routines and facilitate information flow, ENKI provides good performance. For a typical distributed hydrological model setup in a spatial domain of 25000 grid cells, 3-4 time steps simulated per second should be expected. Future adaptation to parallel processing may further increase this speed. New modifications to ENKI include a full separation of API and user interface, making it possible to run ENKI from GIS programs and other software environments. ENKI currently compiles under Windows and Visual Studio only, but ambitions exist to remove the platform and compiler dependencies.