Geophysical Research Abstracts
Vol. 15, EGU2013-8821-1, 2013
EGU General Assembly 2013

OpenFLUID: an open-source software environment for modelling fluxes in landscapes

Jean-Christophe Fabre (1), Michaël Rabotin (1), David Crevoisier (1), Aline Libres (1), Cécile Dagès (1), Roger Moussa (1), Philippe Lagacherie (1), Damien Raclot (2), and Marc Voltz (1)

(1) INRA, UMR LISAH (INRA-IRD-Montpellier SupAgro), F-34060 Montpellier, France, (2) IRD, UMR LISAH (INRA-IRD-Montpellier SupAgro), F-34060 Montpellier, France

Integrative landscape functioning has become a common concept in environmental management. Landscapes are complex systems where many processes interact in time and space. In agro-ecosystems, these processes are mainly physical processes, including hydrological-processes, biological processes and human activities. Modelling such systems requires an interdisciplinary approach, coupling models coming from different disciplines, developed by different teams.
In order to support collaborative works, involving many models coupled in time and space for integrative simulations, an open software modelling platform is a relevant answer.

OpenFLUID is an open source software platform for modelling landscape functioning, mainly focused on spatial fluxes. It provides an advanced object-oriented architecture allowing to i) couple models developed de novo or from existing source code, and which are dynamically plugged to the platform, ii) represent landscapes as hierarchical graphs, taking into account multi-scale, spatial heterogeneities and landscape objects connectivity, iii) run and explore simulations in many ways : using the OpenFLUID software interfaces for users (command line interface, graphical user interface), or using external applications such as GNU R through the provided ROpenFLUID package.
OpenFLUID is developed in C++ and relies on open source libraries only (Boost, libXML2, GLib/GTK, OGR/GDAL, ...). For modelers and developers, OpenFLUID provides a dedicated environment for model development, which is based on an open source toolchain, including the Eclipse editor, the GCC compiler and the CMake build system.
OpenFLUID is distributed under the GPLv3 open source license, with a special exception allowing to plug existing models licensed under any license. It is clearly in the spirit of sharing knowledge and favouring collaboration in a community of modelers.

OpenFLUID has been involved in many research applications, such as modelling of hydrological network transfer, diagnosis and prediction of water quality taking into account human activities, study of the effect of spatial organization on hydrological fluxes, modelling of surface-subsurface water exchanges, ...
At LISAH research unit, OpenFLUID is the supporting development platform of the MHYDAS model, which is a distributed model for agrosystems (Moussa et al., 2002, Hydrological Processes, 16, 393-412).

OpenFLUID web site : http://www.openfluid-project.org