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Hydrological Scenario Using Tools and Applications Available in enviroGRIDS Portal

V. Bacu (1), D. Mihon (1), T. Stefanut (1), D. Rodila (1), P. Cau (2), S. Manca (2), C. Soru (2), and D. Gorgan (1)

(1) Technical University of Cluj-Napoca, Cluj-Napoca, Romania (victor.bacu@cs.utcluj.ro, vasile.mihon@cs.utcluj.ro, teodor.stefanut@cs.utcluj.ro, denisa.rodila@cs.utcluj.ro, dorian.gorgan@cs.utcluj.ro), (2) Center for Advanced Studies, Research and Development in Sardinia, Italy (pierluigi.cau@gmail.com, simone.manca@gmail.com, dino.soru@gmail.com)

Nowadays the decision makers but also citizens are concerning with the sustainability and vulnerability of land management practices on various aspects and in particular on water quality and quantity in complex watersheds. The Black Sea Catchment is an important watershed in the Central and East Europe. In the FP7 project enviroGRIDS [1] was developed a Web Portal that incorporates different tools and applications focused on geospatial data management, hydrologic model calibration, execution and visualization and training activities.

This presentation highlights, from the end-user point of view, the scenario related with hydrological models using the tools and applications available in the enviroGRIDS Web Portal [2]. The development of SWAT (Soil Water Assessment Tool) hydrological models is a well known procedure for the hydrological specialists [3]. Starting from the primary data (information related to weather, soil properties, topography, vegetation, and land management practices of the particular watershed) that are used to develop SWAT hydrological models, to specific reports, about the water quality in the studied watershed, the hydrological specialist will use different applications available in the enviroGRIDS portal. The tools and applications available through the enviroGRIDS portal are not dealing with the building up of the SWAT hydrological models. They are mainly focused on:

- calibration procedure (gSWAT [4]) - uses the GRID computational infrastructure to speed-up the calibration process;
- development of specific scenarios (BASHYT [5]) – starts from an already calibrated SWAT hydrological model and defines new scenarios;
- execution of scenarios (gSWATSim [6]) – executes the scenarios exported from BASHYT;
- visualization (BASHYT) – displays charts, tables and maps.

Each application is built-up as a stack of functional layers. We combine different layers of applications by vertical interoperability in order to build the desired complex functionality. On the other hand, the applications can collaborate at the same architectural levels, which represent the horizontal interoperability. Both the horizontal and vertical interoperability is accomplished by services and by exchanging data. The calibration procedure requires huge computational resources, which are provided by the Grid infrastructure. On the other hand the scenario development through BASHYT requires a flexible way of interaction with the SWAT model in order to easily change the input model.

The large user community of SWAT from the enviroGRIDS consortium or outside may greatly benefit from tools and applications related with the calibration process, scenario development and execution from the enviroGRIDS portal.

[1]. enviroGRIDS project, http://envirogrids.net/

[2]. Gorgan D., Abbaspour K., Cau P., Bacu V., Mihon D., Giuliani G., Ray N., Lehmann A., Grid Based Data Processing Tools and Applications for Black Sea Catchment Basin. IDAACS 2011 - The 6th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications 15-17 September 2011, Prague. IEEE Computer Press, pp. 223 - 228 (2011).

[3]. Soil and Water Assessment Tool, http://www.brc.tamus.edu/swat/index.html

[4]. Bacu V., Mihon D., Rodila D., Stefanut T., Gorgan D., Grid Based Architectural Components for SWAT

Model Calibration. HPCS 2011 - International Conference on High Performance Computing and Simulation, 4-8 July, Istanbul, Turkey, ISBN 978-1-61284-381-0, doi: 10.1109/HPCSim.2011.5999824, pp. 193-198 (2011).

[5]. Manca S., Soru C., Cau P., Meloni G., Fiori M., A multi model and multiscale, GIS oriented Web framework based on the SWAT model to face issues of water and soil resource vulnerability. Presentation at the 5th International SWAT Conference, August 3-7, 2009, http://www.brc.tamus.edu/swat/4thswatconf/docs/rooma/session5/Cau-Bashyt.pdf

[6]. Bacu V., Mihon D., Stefanut T., Rodila D., Gorgan D., Cau P., Manca S., Grid Based Services and Tools for Hydrological Model Processing and Visualization. SYNASC 2011 – 13 International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (in press).