



Harmoni-CA

Water Quality in temporary waters of southern Europe

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Abstract

Recent experiences showed, that the importance of temporary rivers in the Mediterranean is often not recognised, especially in terms of their impact on water quality of receiving waters.

The widespread assumption to classify river networks depending on their mean water flow is not a proper method in semid-arid basins.

Policy makers, researchers as well as tool developers must be aware of the special dynamics, which are introduced by reoccurring severe flood events followed by intensive dry periods. In contrast to humid environments, accumulation of nutrients is much more favoured. This leads to strong nutrient pulses during floods with all the consequences for the usability of the water bodies.

One major reason for disregarding temporary rivers is the lack of proper modelling tools, which are designed for the use in this context.

The project TempQsim follows two ways to close this gap: i) testing and enhancement of existing and well-known tools and ii) the construction of a new "TempQsim-Model".

In close collaboration with developers from the Spatial Science Laboratory in the Texas A&M University, improvements will be implemented in the model SWAT of the US EPA by members of IRSA. A better representation of typical Mediterranean crops through an introduction of additional land-use types will be part of a coming release of SWAT.

A new river network model - the TempQsim-module – was developed. It can either function as part of the already existing model framework MOHID, which is under development by the Technical University of Lisbon, or as a standalone application. Aim was to avoid some of the structural problems of current modelling software right from the beginning and to include processes like transmission losses and in-stream pool formation which are important in terms of mass accumulation and pollutant retention during low flow conditions as well as extended features for particulate matter transport.

The TempQsim-module can use input data produced by SWAT via a provided interface and can replace the standard in-stream model if necessary.

An optional plugging, the RS-tempQ Model (developed by the Technical University of Crete), adds additional features to the TempQsim-module. Expansion-contraction of the inundated area of rivers as well as detailed interaction of hydrodynamic, sediment transport and biochemical processes can be described therein.

To not only address a regional scale, the in-stream part of the CASCADE model from CEH Wallingford was coupled with the PESERA model by the University of Leeds, which was successfully applied to compute the risk of soil loss on an European scale in the past. The result, called PESCAS, was enhanced further (e.g. with a fractioned sediment transport approach).

In order to support the implementation of the WFD in the Mediterranean, the strategy of the project was

- to use and test existing models in terms of their usability in drylands,
- add new modules to existing models where necessary on the basis of the identified key processes and
- develop a new model which is capable of simulating water quality and quantity effects under semi-arid conditions.