

Abstract HydroEco conference Vienna (2009 April 20-23<sup>th</sup>) – **oral presentation**

Title:

**An integrated model study on the role of lateral connections and process interactions in retention of matter in streams**

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The quantity and quality of water transferred to the coastal zone is determined within the river basin. Events and heterogeneity play an important role in the retention of matter in river ecosystems, the so called “hot moments” and “hot spots” (McClain et al. 2003), times or places with higher activity. Lateral connections of subsystems are also very important for retention of matter in river ecosystems and their resilience (Fisher et al. 1998).

Therefore, multidisciplinary research and integrated modeling of groundwater, hydraulic, biogeochemical and ecological processes is required. The coupling of different models and model descriptions forms a methodological challenge. We are developing a STream-RIVER-Ecosystem package (STRIVE), that enables the construction of integrated river ecosystems to capture cascade effects and feed backs, along with their effect on retention. This is performed within the FEMME software environment (Soetaert et al. 2002). Subsystems of different complexity can be linked to study the dynamic behavior of water, dissolved and/or particulate matter. The core modules are:

- Stream/river geometry module
- Hydraulic module, from constant up to fully dynamic 1D Saint-Venant equations
- Modules for transport and reaction formulations of dissolved and particular matter
- Hyporheic zone module, based upon the diagenetic model of Soetaert et al. (1996)
- 2D-margin model for horizontal groundwater flows
- Growth and nutrient uptake model for macrophytes
- Output formulation modules tailored for the specific for the questions.

We will illustrate the role of upstream discharge and composition forcing dynamics on the retention of matter for increasing linkage of subsystems and transformation processes.

**References**

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