Geophysical Research Abstracts, Vol. 9, 01514, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01514

Solute transport in rivers affected by diffusive transfer in the hyporheic zone

F. De Smedt

Department of Hydrology and Water Resources Engineering, Vrije Universiteit Brussel, Belgium

A model is presented for solute transport in rivers including transient storage in the hyporheic zone. The model consists of an advection-dispersion equation for transport in the main channel with diffusive solute transfer to the hyporheic zone. The model is solved for instantaneous injection of a conservative tracer in an infinite uniform river reach with steady flow, which enables to estimate the temporal and spatial evolution of tracer concentrations downstream of the injection point. The solution is linked to a non-linear least squares optimisation algorithm to analyse breakthrough curves and estimate solute transport parameters. The model is applied to tracer experiments conducted in the Chillán River, Chile. The fit between observations and model results is good. Estimated values of the diffusion coefficient in the hyporheic zone agree with values cited in literature and with the magnitude of chemical diffusion coefficients in porous media.