Geophysical Research Abstracts
Vol. 13, EGU2011-9595, 2011
EGU General Assembly 2011

Uncertainties in River Routing Simulations Related to the concentration time of runoff and baseflow in the Amazon basin

Augusto Getirana (1,2,4), Aaron Boone (2), Bertrand Decharme (2), Dai Yamazaki (3), and Nelly Mognard (1)
(1) LEGOS/CNES, Toulouse, France, (2) CNRM/Météo-France, Toulouse, France, (3) University of Tokyo, Tokyo, Japan, (4) acvg11@msn.com

Recent studies have demonstrated that river reservoir simulated by global scale flow routing schemes is one of the main sources of total water storage and discharge errors. Indeed, ignoring and/or simplifying particular physical processes may be compensated with the under or overestimation of others. The concentration time (or time delay factor) is a physically-based process representing the time that water takes to flow from the farthest point of a catchment to its outlet and is ignored in most large scale flow routing schemes. Values can vary from a few hours to several days, depending on hydrological and geological characteristics of the catchment.
In this paper, two linear reservoirs, representing the runoff and baseflow time delays within computational cells, are introduced into the Catchment-based Macroscale Floodplain model (CaMa-Flood) and a sensitivity analysis is performed. CaMa-Flood is a distributed river routing model, which receives runoff and baseflow from a land surface model and predicts water storage and stream [U+FB02]ow at each computational cell. Total water storage in each cell is divided into a river channel reservoir and a [U+FB02]oodplain reservoir so as to balance the water surface elevation in the two reservoirs. Geometry of the river channel and [U+FB02]oodplain reservoirs is objectively parameterized from digital elevation models. River flow is simulated with a kinematic (KINE) model and a sensitivity analysis of the linear reservoirs is performed comparing model outputs with discharge observations at gauge stations and ENVISAT altimetry data at virtual stations located within the Amazon basin. Several values of time delay factors for both runoff and baseflow are tested with the KINE model, including a case without floodplains. Preliminary results shows that the original form of CaMa-Flood tends to compensate the concentration time with floodplains and the effects of the model improvements are more clearly perceived in watersheds where the occurrence of floodplains are low or null. This shows that CaMa-Flood might need a new parameterization is necessary taking into account runoff and baseflow time delays.