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## Water, sediment and vegetation: mutual interactions within dynamic river corridors

E. Tabacchi (1), D. Corenblit (1) and J. Steiger (2)

(1) LAboratoire DYnamique de la BIOdiversite, CNRS/University of Toulouse, (2) Geodynamique des Milieux Naturels et Anthropises, CNRS/University of Angers, France (etabacch@cict.fr / +33 5 62 26 99 99).

Until recently, only unidirectional relationships between flow dynamics, geomorphology and plant ecology were taken into account studying the functioning of river systems. However, in order to fully appreciate river dynamics, progress is needed in understanding mutual interactions and feedback loops between the major driving variables, i.e. (i) water, (ii) sediment and, (iii) vegetation.

In the present paper, the advances made in understanding fluvial dynamics of temperate river systems in the fields of fluvial hydraulics, fluvial geomorphology and hydro-ecology are reviewed for the last decade. Based on the literature review, a conceptual model synthezising the mutual interactions of (i) river flow, (ii) sediment erosion, transport and deposition and, (iii) riparian vegetation dynamics is proposed. This model is built on twelve sub-models, considering three key vegetational states at four distinct levels of exposure to hydrological disturbance. For each case, we analyzed the levels of internal model complexity based on the nature, the intensity and the importance of physical and ecological processes.

Results obtained from investigations on the River Tech, a gravel bed river in the Eastern Pyrenees draining into the Mediterranean Sea, France, are compared to the conceptual model. These findings confirm the key interactions and feedback loops proposed by the conceptual model.