



Analyses of succession-retrogression for dynamic modelling of riparian vegetation in the RIPFLOW project

Virginia Garófano-Gómez (1), Francisco Martínez-Capel (1), Patricia Rodríguez-González (2), Rui Rivaes (2), Antonio Albuquerque (2), Teresa Ferreira (2), Gregory Egger (3), Emilio Politti (3), Francisco Vallés (4), and Ignacio Andrés (4)

(1) Instituto de Investigación para la Gestión Integrada de Zonas Costeras, Universidad Politécnica de Valencia-Campus de Gandia, Grao de Gandia, Valencia, Spain (virgarm@upvnet.upv.es), (2) Forest Research Centre, Instituto Superior de Agronomia, Universidade Técnica de Lisboa, Lisboa, Portugal, (3) Environmental Consulting Klagenfurt, Klagenfurt, Austria, (4) Instituto de Ingeniería del Agua y Medio Ambiente, Universidad Politécnica de Valencia-Campus de Vera, Valencia, Spain

River vegetation patches are functional units resulting from a dynamic interaction between vegetation succession and other driving factors such as hydraulics and flow regime. However, flow regimes differ between regions; for example, in Mediterranean basins intra-annual flow variability increases together with the frequency of extreme events. In this study we compared riparian succession phases in rivers with temperate and Mediterranean flow regime. Vegetation patches were characterized in study sites of Portugal, Spain and Austria. Surveys included vegetation mapping, community composition, core samples for dendrochronology, soil characterization and hydrometry. Although the vegetation composition differ among countries, it was possible to propose a scheme of the succession and retrogression pathways (from the initial stage to well developed stands of mature forests), based on the assumption of “time by space”.

Two main elements were obtained from the field data and compared among countries: 1) upon the aforementioned scheme of vegetation dynamics in each country, the range of age for each succession phase was estimated; and 2) based on hydraulic simulations, the range of elevation above water surface by phases was calculated. In elevation above water surface, different criteria were considered in each country; in the Iberian rivers the base flow was considered, and the average flow in the Alpine river of Austria, because in temperate conditions the low-flow periods are not as remarkable as in Mediterranean ones and the mean discharge is more representative of the hydraulic conditions and more important for the vegetation dynamics. The field methods and the quantitative analysis of the vegetation and hydraulic data are explained in this communication, together with the comparison of succession-retrogression schemes. This information has been implemented into the RIPFLOW model, in the submodel that creates the starting condition, and also during the model calibration by comparing the observed and simulated vegetation. After the model calibration, the RIPFLOW model was run to simulate riparian habitats under different scenarios of climatic change and environmental flows, as it is detailed in other communication of this special session.