Assessment of water quality changes in floodplains of the Ebro River (NE Spain)

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With 6 figures and 3 tables in the text

Abstract: Floodplains are supposed to play a key role to mitigate adverse flood effects. Two large floods occurred in the Ebro River in the periods 5–15 February and 27 February – 12 March 2003. During the rise and fall of the two floods and with the objective of identifying which site type could contribute most to water quality improvement, in situ measurements and micro- and macro-nutrient analyses of water samples were performed in different habitats of two floodplain sites: Ranillas (intensively used for agricultural purposes) and Alfranca (mostly managed for conservation purposes and for maintaining a mosaic of wetland and woodland). In both site types, suspended solids decreased remarkably after a few days of flood compared to river water. A decrease of oxidized dissolved inorganic nitrogen and ammonia took place as water passed through the floodplains. Total nitrogen did not show any significant change though a wider range of concentrations was observed in falling waters in comparison with rising flood waters, which indicates significant transformations of nitrogen related to organic matter in the study sites. A general trend of increasing phosphate concentration in water flow was observed in both zones, with higher concentrations in the agricultural site than in the site managed for conservation purposes. The conductivity of the outflow water was higher than in inflow water suggesting that salt re-dissolution from the soil is a major process in floodplains which were dry for long periods of time. The results indicate that natural floodplains with a mosaic of habitats and high landscape diversity have a higher potential for water and nutrient retention than floodplains with levelled terrain and a homogeneous agricultural landscape.

Key words: Key words: floodplains, suspended solids, nitrogen, phosphorus, landscape, floods.

Introduction

Floodplains have been claimed to be efficient zones to buffer floods and to meanwhile improve the water quality of rivers. Water retention, sedimentation of suspended solids, nutrient assimilation, and accumulation of organic matter are pro-

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