

Suspended sediment, carbon and nitrogen transport in two impounded mountainous rivers

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Impoundment alters rivers' characteristics, transforming parts of them into lakes, and affecting their hydrological, physical, chemical, and biological characteristics and dynamics. Reservoirs are very effective retaining particulate materials, thereby avoiding the downstream transport of suspended sediment and the chemical substances associated with it (e.g. Carbon, *C*, or Nitrogen, *N*) so they have proven to be the most important sinks for organic carbon among inland waters and have a potential significance as nitrogen sinks. Therefore, the study of *C* and *N* transport by rivers is of great interest since river load represents a major link to the global *C* and *N* cycles. Present work investigates the effects of the Barasona reservoir on the runoff, suspended sediment, *C* and *N* derived from the highly active mountainous Ésera and Isábena rivers. Main results indicate that the reservoir reduces the Ésera–Isábena river fluxes dramatically as almost all the inputs are retained within the reservoir. 300,000 t of suspended sediment were deposited into the Barasona Reservoir, from which more than 16,000 were *C* (i.e. 2,200 t as organic *C*) and 222 t were *N*, despite that the study year (2011–2012) can be considered as very dry. These values may not be seen as remarkable in a wider global context but figures would increase up to ca. 2.6×10^6 t of *C* (i.e. 360,000 t of organic *C*) and 35,000 t of *N* if it is assumed that around 30 hm³ of sediment are currently stored in the reservoir. Nevertheless, these values are indicative and should be treated with caution as there is incomplete understanding of all the processes which affect *C* and *N*, hence further investigation to establish a more complete picture of *C* and *N* yields and budgets by monitoring the different processes involved is essential.