



Erosion and sedimentation patterns in andean and alpine mountain river basins: prediction through numerical modeling

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The dynamics of erosion and sediment storage in mountain rivers have been examined in several mountain basins of the Argentinian Andes and Italian Alps. An original numerical modeling platform named ERSE was applied both to predict the location of erosion and sedimentation focuses and to get an estimation of denudation rate on short to very short timescales (in the 100-10000 years range).

Several monolithologic mountain basins were selected to compare river dynamics and sediment flux in catchments with similar bedrock geology. They are located in strongly different morphologic and climatic contexts, as the one characterizing the Andean Cordillera between 24° and 30° S latitude and the Italian side of the European Alps.

A detailed sedimentologic and geomorphologic field survey was in addition performed in the years 2007-2008 for the Alpine basins, according to the methodology proposed by Hooke (2003). It supplied both additional input data for the model and a detailed picture of the real world to be compared with the output results provided by the model. Following this iterative method, several simulations were made to investigate different erosional scenarios and to forecast the evolution in the future of the erosional-depositional dynamics of the investigated basins, eventually related to the effects of possible climate changes in the future.

This multidisciplinary approach aims also to give a frame to the interpretation of sediment flux measurements and field mapping of erosion-deposition patterns in mountain river basins, targeting to fill the gap between the real world and the virtual one.

Reference: J. Hooke, Coarse sediment connectivity in river channel systems: a conceptual framework and methodology, *Geomorphology* 56 (2003), pp. 79–94.