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# Source-to-sink sediment transfer in the Piave River system (North-Eastern Italy) since the Last Glacial Maximum

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Aim of this study is the definition of sediment production, transfer and deposition in the Piave River system from the Last Glacial Maximum to the Present, through a basin-scale approach. The Piave River flows from North to South in the eastern sector of the Italian Alps and reaches the Adriatic Sea. Its length is 220 km and the catchment is 3899 km2. The fluvial system consists of a mountainous portion, with maximum elevation of 3343 m a.s.l., and a lower part where the river flows in the Venetian alluvial plain. Average precipitation is 1350 mm/a; the runoff coefficient is 0.63 and the mean discharge at the mouth is 60 m3/s.
The highest sediment delivery to the plain was at the peak of LGM, when the Piave glacier had its maximum expansion and reached the Alpine piedmont. In this period the Piave megafan received large volumes of sediments through glaciofluvial streams and achieved its maximum expansion. LGM alluvial sediments in the distal portion of the megafan are 20-30 m thick. The last glacial advance in the Vittorio Veneto terminal moraines, at the debouch of the valley in the Venetian Plain, dates 17.6 ka 14C BP. Deglaciation started immediately afterwards and the retreat of the glacial front was rather fast, considering that at around 15.0 ka 14C BP the Prealpine tract of valley was already ice-free. Following the onset of deglaciation until about 8.0 ka 14C BP, alluvial sediments were mostly trapped in the terminal valley tracts, while the whole alluvial plain experienced a severe erosive phase, comprising the whole Lateglacial and early Holocene. At ca. 8.0 ka 14C BP, the Piave River started to downcut its Prealpine valley fill, an event which re-mobilized the alluvial sediments and contributed to delta formation on the Adriatic coast since 6.0 ka 14C BP. Post-glacial aggradation in the distal tract of the Nervesa megafan started only at about 4.0 – 3.0 ka 14C BP. In Roman times the fluvial system was rather stable, while between the 5th and 10th century AD there were several major avulsions in the distal Nervesa megafan. The last 100 years are characterized by a dramatic decrease of sediment transport due to a range of human activities (e.g. sediment mining and dams).
Climate change was the main external driving factor in this fluvial system at the LGM termination, controlling both sediment production in the catchment and sea-level position. Local factors, such as the occurrence of large landslides, lake formation, post-glacial reforestation and valley topography had a major impact on sediment transfer from source to sink. Holocene millennial- and centennial-scale climatic fluctuations were able to modulate the sediment flux, increasingly intermingling with human impact during the last 6 millennia.