



## Short term erosion patterns constrained by downstream changes of detrital zircon U-Pb ages (Po River Basin)

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Provenance studies based on detrital geochronological techniques are useful to investigate the present-day pattern of erosion in mountain belts (e.g. Carter and Bristow, 2000). In particular, LA-ICPMS U-Pb geochronology allows rapid generation of large datasets, and laser offers high spatial resolution for grains with complex age structure.

The aim of this work is to investigate the downstream changes of detrital zircon U-Pb ages in the Po drainage, in order to constrain the short-term ( $10^2$ - $10^4$  a) erosion pattern in the Alps-Appennines orogenic couple. We collected samples of modern sands in selected tributaries draining the major tectonic units exposed in the orogen, as well as along the Po River main trunk and in different sites of the Po River Delta. Zircon concentrates were separated according to a specific quantitative procedure coupled with grain-size and grain-density analyses, which allows an evaluation of zircon content in source rocks, of hydraulic sorting effects, and related inter-sample/intrasample zircon variability. Such analyses are crucial to perform sediment budgets and erosion-rate calculations based on single-mineral budgets.

Preliminary results show that all samples from the Po Delta yield similar grain-age distributions, and include grain-age populations that are rather constant both in age and size. Peaks in the distribution can be traced upstream up to their source. Major peaks are found at ca. 30 Ma, ca. 280 Ma, and 400-500 Ma. Ages defining minor peaks cluster at 100-200 Ma and 500-700 Ma. The geochronological signature of the Po delta sands is essentially displayed already upstream of the confluence of the Northern Appennine rivers, suggesting lower short-term erosion rates in the Northern Appennine than in the Western and Central Alps. Age peaks typical of the eastern Lepontine dome characterize Apenninic tributaries, reflecting Oligo-Miocene sedimentary transfer from the Central Alps to the Adriatic foredeep, and next tectonic accretion of turbidite wedges to the Apennine belt.

U-Pb analyses were complemented by zircon typology for the whole dataset, integrated by SEM observation on selected samples. Major typological groups can be traced from entry points in the plain down to the delta. Euhedral zircons are largely shed from the External Massifs and Periadriatic plutons. Zircon grains showing chemical abrasion, possibly acquired under high-grade metamorphic conditions, were detected in tributaries draining the Lepontine area.

Carter A., and Bristow C., 2000. Detrital zircon geochronology: enhancing the quality of sedimentary source information through improved methodology and combined U-Pb and fission-track techniques. *Basin Research*, v. 12, 47-57.