

## Short-lived U- and Th-series isotopes: Tracers and chronometers of Earth surface processes through Anthropocene to global change time frame

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A large array of short-lived natural U and Th-series isotopes are useful tools for the documenting of on-going geochemical and sedimentological processes as well as for the calculation of geochemical fluxes between reservoirs (e.g., <sup>226</sup>Ra, <sup>210</sup>Pb, <sup>210</sup>Po, <sup>228</sup>Ra, <sup>228</sup>Th, <sup>234</sup>Th, with time scales ranging from ~ 10<sup>3</sup> to ~10<sup>1</sup> years). In combination with nuclear fallout isotopes (e.g., <sup>137</sup>Cs, <sup>241</sup>Pu...), they may be used for estimating the behavior and fluxes of aerosols, soil evolution and weathering processes (across all time scales above), particulate and colloidal transport in continental and marine waters, as well as for the documenting of extreme events (floods, storminess, etc.) and more generally, the fate of sediments in rivers, lakes and the marine realm (from accumulation rates to on-going sedimentological processes). Applications in the domains of hydrothermal systems and of volcanology are also of importance. Examples illustrating the use of a few of the above isotopes for the documenting of Earth surface processes from the Anthropocene (sensu lato) through the present global change frame, will be discussed, with a focus on short-lived isotopes of the U and Th-series. They include (i) downscaling through time-dependent processes in carbonate-rich Mediterranean soils, (ii) the monitoring of geochemical properties of recent basaltic lava flows (Hawaii & Bali), (iii) evolution of hydrothermal systems (Denizli area, Anatolia) (iv) the recording of extreme events in estuarine and coastal areas from the Sinaloa coast (Mexico)

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