Thematic Session 13

Clay geochronology

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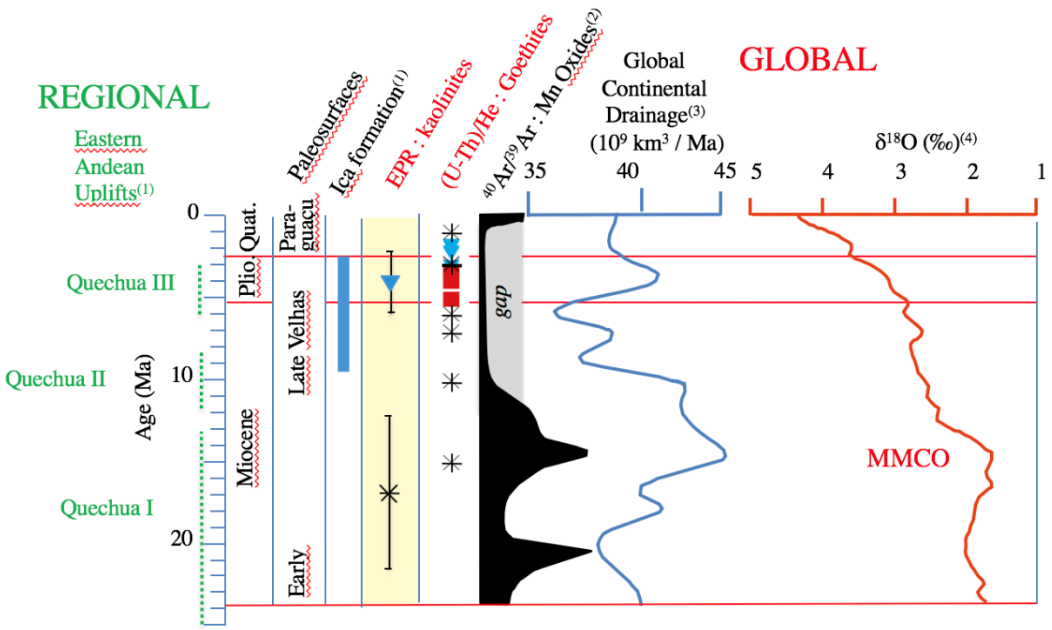
Recent decades have seen the implementation of promising dating methodologies to determine the ages of clays and clay minerals—finely divided phases occurring in various domains of the geosphere such as the critical zone (weathering covers), sediments, and hydrothermal alterations. The ages of these minerals represent key data to understand the geochemical processes responsible for element cycling at Earth's surface and to constrain the modeling of natural geosystems evolution through time. An increasing number of studies focus on the geochronology of clays and clay minerals and aim for overcoming the natural complexity of these solids. The related dating approaches include measurement of $^{40}Ar/^{39}Ar$ and ^{40}K-^{40}Ar on K-containing secondary minerals (e.g., some Mn oxides, illite, alunite), (U-Th)/He on iron oxides and oxyhydroxides, and electron paramagnetic resonance of radiation-induced defects in kaolinite and illite. This session will gather contributions on methodology improvements and applications to laboratory or natural systems dealing with clay geochronology.

Keywords: Dating, Clays, Clay minerals, $^{40}K/^{40}Ar$, $^{40}Ar/^{39}Ar$, (U-Th)/He, EPR.

Potential Journals: Chemical Geology, Clays and Clay Minerals, Clay Minerals.



Dating kaolinite, goethite and Mn oxide generations from the Amazon Basin. Comparison with paleoclimate and intensification of the Andes orogenesis (modified from Allard et al., 2018, Chem. Geol. 479, 136-150). Some major weathering episodes are related to global or regional events such as, e.g., at Pliocene or mid Miocene. (1) Campbell et al. (2006). Palaeogeogr. Palaeoclimatol. Palaeoecol. 239, 166–219; (2) Vasconcelos et al. (1994). Geochim. Cosmochim. Acta 58 (6), 1635–1665; (3) Tardy, Y., Roquin, C., (1998). Dérive des continents, Paléoclimats et alterations tropicales. BRGM, Orléans; (4) Zachos et al. (2001) Science 292, 686–693.