

Dating terrestrial sediments by *in situ* U-Pb dating of carbonates

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Carbonate precipitation occurs in various geological environments including marine, lacustrine, terrestrial, and hydrothermal systems. Their precipitation as vein filling, breccia cement and fault coating also accompanied tectonic processes. Traditional U-Pb bulk analyses are challenging, because such samples are often texturally complex at the sub-millimeter scale, with either slow-continues or multi-phase growth. The in-situ approach allows accurate analyses while avoiding possible mixing or averaging ages of different phases. New results of in-situ U-Pb dating of carbonate precipitates within terrestrial sediments such as cements, stromatolites, dolomites, and lake sediments demonstrate the applicability of this method to various types of carbonate samples. Absolute ages of these carbonates constrain the timing of >2000 m thick sediments deposition to the Early and Middle Miocene, and open new frontiers in dating terrestrial sediments.