

U-Pb dating of carbonates: Towards a chronostratigraphic framework for the Digne-Valensole basin (France).

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The infilling of the Digne-Valensole basin provides excellent records of sedimentary dynamics, climate and tectonics during the Miocene. As a first step towards a chronostratigraphic framework for these sediments, we have conducted a paleomagnetic study of the Saint-Symphorien gully, located about fifteen kilometres west of the famous Velodrome. However, the resulting magnetostratigraphy needs to be anchored with radio-isotopic ages to be correlated to the global timescale. In the absence of intercalated volcanic ashes, we resorted to the U-Pb dating of carbonates, a relatively new but promising method. Various types of carbonates including calcretes, lacustrine and palustrine limestones, rhizoconcretions and fossils were tested. The analysis were performed with the LA-ICP-MS of the IMAP platform at ISTerre.

Preliminary results show 1) a trend where fossils, and especially oyster fossils, are the more suitable samples to be dated, and 2) that most samples contained quantities of uranium that are well within the measurement capacity of LA-ICP-MS. However, the presence of common lead in many of the samples posed a problem for accurate dating. Nevertheless, some of the sampled carbonates had sufficiently high and variable U/Pb ratios to constrain an isochron and we can provide the first radio-isotopic ages for the Digne-Valensole Basin, thereby effectively anchoring the magnetostratigraphy to the timescale. Further analysis will therefore focus on oyster fossils, other kind of fossils and carbonates which show a potential ability of datation and we will continue to explore the potential of U-Pb dating of carbonates.