Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.17556

Revisiting carbonate U-Th dating analytical strategies

ANNE TRINQUIER[1] AND GERMAIN BAYON[2]

[1]Univ Brest, CNRS, Ifremer, Geo-Ocean, F-29280 Plouzané, France
[2]IFREMER

Presenting Author: anne.trinquier@ifremer.fr

Marine carbonates such as coral skeletons or authigenic carbonates constitute high temporal resolution archives of (bio-)geochemical processes in seawater and sub-seafloor sediments, controlled by fluctuations in e.g. sea level, temperature, hydrostatic pressure. ^{238}U-^{234}U-^{230}Th dating can yield absolute chronological records of marine carbonates over the last 600 kyr, with uncertainties ranging from a few years for hundred year old samples to 1 kyr for 100 kyr old samples [1]. The application of $^{230}Th/U$ dating to authigenic carbonates can also help characterize fluid seepage at continental margins to investigate gas hydrates dissociation and contribution to the oceanic and atmospheric budgets of greenhouse gases (CO_2 and CH_4) [2]

However, sampling bias and complex correction schemes limit U-Th isotope precision and require thorough inspection prior to validating U-Th ages, due to (i) pristinity and purity of coralline aragonite (ii) initial detrital and/or hydrogenous ^{230}Th contamination (iii) limited counting statistics and ion counting-to-Faraday cup detector calibration (iv) peaktailing and hydride interference corrections (v) choice of well-constrained carbonate references.

We will report on-going methodological development that aims at improving protocols for optimizing detector intercalibration as well as peaktailing and instrumental mass bias corrections, while diminishing sample and acid consumption, blanks and analysis time.

[1] Edwards et al. (2003) *Reviews in Mineralogy and Geochemistry* 52, 363-405. [2] Bayon et al. (2015) *Marine Geology* 370, 87-98.