

## How hot do the ocean's warm pools get?

### Clumped isotope based temperature reconstructions of the Pacific warm pool during the Miocene climatic optimum

Department: Earth Sciences

Research group: Paleoclimate & Biogeology

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#### Project description

During this assistantship the student will be trained in clumped isotope analysis. The major goal of the clumped isotope group at Utrecht is to accurately reconstruct past changes in temperature and paleoclimate variability. We measure the ordering (or 'clumping') of  $^{13}\text{C}$  and  $^{18}\text{O}$  isotopes in the carbonate molecule. This solely depends on the formation temperature of the carbonate and is based on thermodynamic principles. This makes clumped isotopes potentially the ideal method for deep-time paleoclimate research and to pin down accurate paleo-seawater temperatures, but also for many other geoscientific problems. The specific goal of this project is to reconstruct warm pool temperatures during the globally warm period of the Mid-Miocene. Until now large uncertainty exist with regards to the warmest ocean temperatures during hothouse periods. However, it is important to have these datasets in order to understand climate sensitivity and polar amplification in a warming world.

The bright-mind student will be a fully integrated member of the clumped isotope group and will work with a new and recently installed state of the art mass-spectrometer. The labwork will include preparation of samples for clumped isotope measurements (e.g. foraminifera) and the analysis on the instrument. The student will further work on data processing and the interpretation of the clumped isotope measurements and join our efforts to further improve the methodology.

#### Job requirements

An affinity to work in the lab and with a microscope is useful.