



Editorial

# Geochronology, Thermochronology and Time Scale Research—A Platform for Time Scale Research

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## 1. Introduction

Time scales research is one of the most fundamental and interdisciplinary of the natural sciences disciplines. Earth processes can be understood only in the fullest sense using the three spatial dimensions *plus time*, addressing questions as:

- **when** did events occur?
- **how fast** did and do processes occur?
- **How precise and how accurate** can we determine the timing of events in the past, and sequences of events, leading to questions about causalities in the Earth Sciences and also in the adjacent fields of lunar and planetary sciences or evolution biology and paleoanthropology.

Progress in many branches of geochronology is to a large technology-driven: for example increased sensitivity in detection led from bulk sample techniques to single grain and spot dating techniques. Similarly, the advent of inductively coupled plasma (ICP-) ionization allowed the detection of isotopes that couldn't easily be ionized with more conventional techniques. Double dating techniques, dating plus elemental analysis lead to a deepened understanding of Earth processes. Geochronology based on astronomical solutions of the Earth orbit has become the standard in sedimentary systems. In short, over the past decades, geochronology grew from just a couple of 'absolute' dating techniques to a mature and broad science.

While this last observation is undoubtedly true, geochronologists so far often struggled with a perception problem: frequently geochronology is tagged onto a broader research proposal seemingly as an afterthought: "Oh yes, and we also need some new dates!..." which easily leads to publication of dating results scattered over the entire range of Earth Science publications. And not uncommonly triggering the advice of the editor that dating studies cannot stand alone.

## 2. Aim and Scope

### 2.1. Aims

It is true to say that at this point in time even though the total number of Earth Sciences journals is large, journals dedicated to the study of events and processes in the context of time are rare. More commonly one needs to turn to journals dedicated to integrating geochemistry, geophysics and Earth Systems Science, and the question can be asked whether these journals address the right forum for geochronological research.

With our new journal *Geochronology, Thermochronology and Time Scale Research (GTTSR)* we hope to create a forum for research coming from the whole spectrum of chronology techniques, encouraging authors to publish their work focused on time scale problems in the Earth Sciences.



## 2.2. Scope

Specifically, and I want to emphasize not exclusively, we aim to receive and publish manuscripts dealing with time in the fields of:

- **Classic Geochronology:** studies focusing on deep time.
- **Thermochronology:** the studies or rates of processes during active tectonics by e.g. fission track, U-Th/He,  $^{40}\text{Ar}/^{39}\text{Ar}$ , and double dating techniques.
- **Petrochronology:** the studies of rock-forming processes, by **isotopic dating** (e.g. U-Pb, Rb-Sr, Sm-Nd, Lu-Hf dating).
- **Quaternary Geochronology:** e.g. optically stimulated luminescence (OSL), archaeomagnetic dating, loess chronology
- **Astrochronology:** Time scale solutions based on the astronomically determined insolation curve.
- **Archeochronology:** dating archeological records in the recent past, with for example  $^{14}\text{C}$ , U-Th dating, varve and dendrochronological techniques.
- **Exposure Dating:** dating of (near-)surface processes using cosmogenic nuclides.
- **Isotope Provenance Dating:** using dating techniques to shed light on the origin of sediments.
- **Planetary Chronology:** focusing on materials originating from extraterrestrial sources.

Novel technical advances, descriptions of novel approaches and applications bringing out the strengths of individual or combined dating techniques all would be prime subject matter for our journal.

We would welcome the whole range of article types: research reports, letters to the editor intended for rapid communications of observations with a high new impact value, and review articles synthesizing broader themes of interest.

## 3. Outlook

Looking ahead to the future of the journal, envisioning what the journal will ultimately develop into, anticipating the transformative changes it will bring to the field, and encouraging scholars to support the journal.

I am confident, that with our new journal *Geochronology, Thermochronology and Time Scale Research (GTTSR)*, with the combined team of a board of editors that is representative of our community, assisted by our associate editors worldwide, the Scilight Press team, and of course with our community, the authors contributing manuscripts, and our referees evaluating these, we will service the geochronology community in its widest sense with a forum to present and discuss the latest advances in our field of research.

**Conflicts of Interest:** The author declares no conflict of interest.