



Research Networking Programmes

Short Visit Grant or Exchange Visit Grant

(please tick the relevant box)

Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

Proposal Title: Short Visit Application to attend the IsoAstro Geochronology Workshop on the integration and intercalibration of radioisotopic and astrochronologic time scales.

Application Reference N°: 6722

1) Purpose of the visit

The IsoAstro Geochronology Workshop held at the University of Wisconsin (Madison) in August 2014 was an integrated short course and workshop, which combined lectures and practicals to provide attendees with a basic understanding of radioisotopic dating ($^{40}\text{Ar}/^{39}\text{Ar}$; U-Pb) and astrochronology techniques. The workshop aimed to train attendees in critically assessing and interpreting chronology data and provide them with some understanding of the inherent uncertainties associated with both radioisotopic dating and astrochronology.

My main reason for attending the IsoAstro workshop was to greatly expand my knowledge of radioisotopic dating techniques and to reinforce my astrochronology background. This will help me with my current project aiming to reconcile conflicting chronologies of the late Miocene by generating a astro-magnetostratigraphy from Pacific deep-sea sediments.

2) Description of the work carried out during the visit

The bulk of the workshop consisted of lectures covering a range of topics, including the stratigraphic framework, Milankovitch theory, astrochronology/cyclostratigraphy, U-Pb dating, $^{40}\text{Ar}/^{39}\text{Ar}$ dating, and the integration of different chronological tools towards the development of the current Geological Time Scale (GTS-2012).

Particular attention was paid to the role of analytical developments in improving accuracy and precision of radiogenic isotope measurements. The different uncertainties that arise in both radioisotopic dating and astrochronology were also discussed in detail. The importance of integrating different chronological tools to help define, constrain and reduce uncertainties and issues inherent to individual techniques was a prominent discussion throughout the workshop.

The workshop included the opportunity to visit the wide range of labs at UW-Madison. This was an excellent opportunity to gain an idea of the research scope that is possible in collaboration with this institute.

Towards the end of the workshop, there were practicals covering data collection and analysis of both U-Pb and $^{40}\text{Ar}/^{39}\text{Ar}$ datasets, as well as the R-package *Astrochron*, which is a tool aimed at facilitating astrochronology and time series analysis on geological datasets.

The final component of the IsoAstro workshop was a symposium of attendee talks, covering a wide array of topics relating to both the development of chronologies and how chronologies help approach important geological questions. This symposium gave me the opportunity to present work from my PhD entitled "Age model influences on spectral analyses - Does correlating to an orbitally-tuned target artificially induce cyclicity?".

3) 4) 5) Description of the main results obtained / Future collaboration with host institution (if applicable) / Projected publications / articles resulting or to result from the grant (*ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant*)

The lectures and practicals have helped me greatly improved my knowledge of radioisotopic dating techniques and solidified my knowledge of astrochronology and time series analysis. I am more familiar with the uncertainties of each chronological technique. In

addition, the workshop gave me some ideas of how radioisotopic dating in particular could add another dimension to my current project. The *Astrochron* practicals were also useful, as the R-package could benefit my current research.

The workshop was a great environment to establish contacts for potential future work in this field. The opportunity to present research from my PhD has led also to possible collaborations. The ESF grant that made this possible will be acknowledged in any publications relating from any collaborations resulting from attending this workshop.

6) Other comments (if any)

The 2014 IsoAstro workshop was a fantastic opportunity to meet up with a range of colleagues from different disciplines and to establish fruitful new contacts for future research. In addition, it was a fantastic learning environment in which to discover the cutting-edge developments in the fields of U-Pb and $^{40}\text{Ar}/^{39}\text{Ar}$ radiogenic dating and astrochronology.