

The Andrew Whitham CASP Fieldwork Award – 2019 Winner

Applicant: SMERAGLIA, Luca

Project title: Timing of thrusting and strike slip faulting in the evolution of fold-and-thrust belts

Award: £2,000

Specific objectives and deliverables: The main goal of the project is to unravel the timing of the regional tectonic evolution of the hydrocarbon-bearing Jura fold-and-thrust belt, southeast France. In the last decades oil reservoirs located in fold-and-thrust belts have been targets for hydrocarbon exploration and exploitation (e.g. Zagros mountains). Within fold-and-thrust belts, thrust-related anticlines can become potential hydrocarbon traps, whereas tear faults cutting through anticlines can create preferential pathways for hydrocarbon migration. Therefore, understanding the exact timing for the development of such tectonic structures is necessary to unravel the timing of hydrocarbon trapping and/or migration along preferential pathways (i.e. thrust and tear faults). However, at the regional scale, the absolute dating of faults is always a challenge. The Jura Mountains provide an accessible analogue to observe the complex interaction between thrust and associated tear faults and to address the outstanding question on the timing of faulting during the evolution of a hydrocarbon-bearing fold-and-thrust belt at the regional scale. In particular, in this region, the absolute timing of tectonic activity and fold-and-thrust belt evolution is still unclear.

Proposed work plan for the 2019 spring/summer fieldwork:

- Review of the available geological maps at 1:50,000 scale for the identification and selection of major thrusts and associated tear faults where detailed mapping, structural analyses, and sampling of fault-related calcite mineralization will be carried out.
- 4 weeks of fieldwork (mapping, structural analyses, and sampling for U-Pb calcite dating).
- Calcite dating (U-Pb) in the framework of a collaborative scientific project at the University of Frankfurt (Prof. Axel Gerdes).
- Review and interpretation of structural data integrated with the results of U-Pb dating of faults.
- Elaboration of regional scale geological cross sections based also on published seismic reflection data and borehole stratigraphies
- Elaboration of a 4D tectonic evolutionary model of the Jura fold and thrust belt with emphasis on the timing and relationship between thrusts and tear faults
- Present data in international scientific conference and publication in international peer reviewed journal

Proposed expenditure, including details of any other sources of funding:

Car hire (lowest car price from AVIS for 4 weeks): 350 £

Gasoline: 250 £

Accommodation and daily allowance for 4 weeks 1400 £

(50 £ each day including room, breakfast, lunch, and dinner. Average price from Booking.com considering that I will sleep in different villages in the Jura for the fieldwork)

Total: 2000 £