Andrew Whitham CASP Fieldwork Award 2022-23 - Winner

Applicant: Simone Seminara
Project title: Tectonic coupling between the Yukon-Koyukuk and the Canada basins.
Award: £1,000

Scientific question and rationale:
By investigating the Yukon Koyukuk sedimentary basin (YKB) in Alaska, a complex successor basin, I hope to constrain the age of the inaccessible Canada Basin (CB). The early YKB is thought to be the forearc basin of an oceanic arc that collided with Arctic Alaska during the rotation of the Arctic Alaska terrane (AAT) from the Canadian margin in the Cretaceous. We infer that this collision actually stopped rotation of the AAT and thus sea floor spreading in the CB. We seek to understand the age and evolution of the YKB in order to determine whether or not there is a connection between the development of these two basins.

Specific objectives and deliverables:
The specific objective of the project is to the fully constrain the age and evolution the YKB. To do this, I will pursue stratigraphic investigations for facies analysis, map contact relationships to determine the nature of sedimentary unconformities, and sample basin units for age control and provenance analysis. The latter will focus on zircon U-Pb ages from tuff horizons, maximum depositional ages from sediment horizons, as well as heavy mineral analysis. These data play a crucial role in determining basin evolution from source to sink. These goals will be achieved via international scientific collaboration during a joint field champagne between US and Swedish scientists, and form the principle target of my PhD project.

Proposed work plan:
A six-week field season is planned for July-August 2022. I will collect samples and perform mapping to achieve the objectives and deliverables defined above. The work plan as two parts: 1) compilation and synthesis of field data, followed by 2) sample analysis. The samples will be shipped from the US to Sweden and our experience indicates that they will arrive at the University by end- November 2022 (latest).

Part 1. The compilation and synthesis of field data will begin following our return to Stockholm:
Sept. 2022: Facies analysis and compilation of paleocurrent data
Nov. 2022: Structural analysis, including cross-sections to better constrain basin geometry and contact relationships

Part 2. Once the samples are on-site, the sample work plan is as follows:
Dec. 2022: Thin-section preparation and manufacture
Jan. 2023: Petrography
Feb. 2023: Heavy mineral separation
Apr. 2023: HM analysis (RockType, Oxford)

I intend to start writing my first scientific paper on the HM results in May 2023.

Proposed expenditure, including details of any other sources of funding:
I am applying for 1000£, which will fund my round-trip ticket from Stockholm-Anchorage-Ruby planned for the 2022 summer field work. All other costs will be paid by my supervisor (see below).