

The Wrangellia Large Igneous Province

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The aim of the project is to define the age, duration and origin of the Wrangellia Large Igneous Province (LIP) as well as to further constrain age and duration of the Carnian Pluvial Event.

Wrangellia is thought to have a volume of > 1 million cubic km and is preserved as basaltic lava piles up to > 2 km thick in British Columbia, Yukon (Canada) and in Alaska (USA). Wrangellia is suggested as possible cause of the Carnian Pluvial Episode, an interval of global climate change and significant biologic turnover during the early Late Triassic (Dal Corso et al., 2012; Bernardi et al., 2018). However, the age of Wrangellia is very poorly known and based mainly on biostratigraphic constraints and on sparse and quite low-quality Argon ages. These would suggest an emplacement of Wrangellia between about 230 and 227 Ma, while the age of the Carnian Pluvial Episode is estimated at ca. 234-232 Ma.

Wrangellia rocks were accreted onto North America and are therefore generally altered, which makes Argon geochronology quite difficult. Therefore, we propose to date Wrangellia by the U-Pb method on zircons, a technique that has been shown to be successful on other LIP (e.g., Davies et al., 2017; Burgess et al., 2017). Zircons could be potentially found in intrusive or sub-intrusive gabbroic rocks (dykes, sills) as well as in thick and slowly cooled basaltic lava flows. The project includes one or two sampling campaigns in British Columbia (Vancouver Island) and in Yukon, and then U-Pb geochronology and Hf-O isotopic analyses on zircons. As the first field-work will be done in summer 2020, during the winter 2019-2020, the PhD candidate will start working on already collected samples provided by Canadian colleagues. Meanwhile, tuff samples interlayered with Carnian sediments will be collected from the Southern Alps and will be dated in 2019-20.

The project will be conducted in collaboration with the University of Quebec at Montreal (Prof. J. Davies), the University of British Columbia (Prof. Scoates), the Canadian Geological Survey, the University of Leeds (Dr. J. Dal Corso), and the University of Ferrara (Prof. P. Gianolla).

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References: Bernardi M. et al., Nature Comm, 2018; Burgess S. et al. Sc. Rep., 2017; Dal Corso J. et al., Geology, 2012; Davies et al., Nature Comm, 2017.