



## Exhumation of the Shackleton Range, Antarctica

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The Shackleton Range is situated between 80° – 81°S and 19° – 31°W, where it forms the continuation of the Transantarctic Mountains in the Weddell Sea sector of Antarctica. There, Precambrian igneous and metamorphic basement is overlain by (meta-) sedimentary rocks of an Early Paleozoic nappe stack and post-orogenic red beds. Nappe stacking resulted from the collision of East and West Gondwana due to the closure of the Mozambique Ocean in pan-African times.

The uplift and exhumation history of the Shackleton Range has been analysed earlier based on a series of vertical fission track profiles (Schäfer, 1998; Lisker et al., 1999). Zircon ages range from ~160 to 210 Ma while apatite ages between ~95 and ~170 Ma comprise a break in slope of the altitude regression at ~110 Ma, and are accompanied by mean track lengths of 12.7 – 14.1  $\mu\text{m}$  (standard deviation 1.0 – 1.4  $\mu\text{m}$ ). These data have been interpreted qualitatively in terms of two cooling/ exhumation stages during Jurassic and mid-Cretaceous times.

However, the recognition of Jurassic volcaniclastic rocks associated with the ~180 Ma Ferrar event in the vicinity of the sample locations (Buggisch et al., 1994) challenges this exhumation concept. Moreover, new fission track proxy data (Dpar) and apatite (U-Th-Sm)/He ages between 88 and 171 Ma allow thermal history modelling of the combined thermochronological data. First tentative thermal history models suggest early Mesozoic cooling followed by (post-) Jurassic heating and final cooling since the Late Cretaceous. This scenario requires burial of the Shackleton Range region, and therefore the existence of a sedimentary basin at least during the Jurassic–Early Cretaceous, and subsequent basin inversion. The thickness of the now vanished sedimentary strata did unlikely exceed 2 – 3 km. Future work including additional apatite fission track analyses will help to quantifying geometry, depth and timing of this depocentre and evaluating potential links with the coeval basin (system) along the Transantarctic Mountains and/ or similar settings in Dronning Maud Land (e.g., the Heimefrontfjella).

### References:

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