Widespread later stage subduction-related intrusions in the southern Semail Ophiolite, Oman

S. J. DE GRAAFF[1]*, K. M. GOODENOUGH[2], C. J. LISSENBERG[3], M. KLAVER[1], M. N. JANSEN[1] AND G. R. DAVIES[1]

[1]VU University Amsterdam, De Boelelaan 1085, 1081HV Amsterdam, The Netherlands (*correspondence: s.j.de.graaff@student.vu.nl)
[2]British Geological Survey, Edinburgh
[3]School of Earth & Ocean Sciences, Cardiff University, UK

The geodynamic setting of the Semail ophiolite in Oman and the United Arab Emirates is debated, with recent work suggesting that the MORB-like Geotimes axial sequence records subduction-related hydrous conditions rather than a true mid-oceanic ridge origin [1]. Voluminous intrusions related to SSZ magmatism that postdate the main ophiolite sequence by less than 1 Myr have been documented in the northern part of the ophiolite [2], but widespread occurrence of similar intrusions has yet to be described in the southern part. We present new field and geochemical data of widespread intrusions found in the Haylayn, Semail and Wadi Tayin blocks in the southeastern, Omani part of the ophiolite, which are comparable to the SSZ magmatism in the north. These intrusions, ranging from wehrlite to gabbro and tonalite, crosscut the Geotimes axial sequence, and occur from just below the Moho Transition Zone up to the sheeted dyke complex. Most exhibit clearly defined chilled margins suggesting the intrusions postdate the Geotimes axial sequence. The occurrence of primary hornblende, low TiO_2 (<0.8 wt. % at Mg# = 45-60) and subchondritic La/Yb indicate hydrous melting of a depleted source. The contribution of a slab input is suggested by elevated Th/Yb compared to the MORB-OIB array and Geotimes axial sequence, which strongly supports an SSZ origin for these later stage intrusions. The similarity in field relations and geochemical characteristics of the later stage intrusions throughout the ophiolite indicates that SSZ magmatism was not restricted to the northern part. Given the timing of SSZ magmatism, postdating the Geotimes axial sequence by less than 1 Myr [2, 3], this provides firm support for the formation of the Semail ophiolite in an SSZ setting.

[1] MacLeod *et al*. (2013) *Geology* **41-4** 459-462. [2] Goodenough *et al*. (2010) *Arab J Geosci*. **3** 439-458. [3] Rioux *et al*. (2012) *J Geophys Res* **117** (B7)