Petrology and Medieval Indian Ocean Trade: Studying Amphibole-bearing Softstone Vessels and Quarries in North Eastern Madagascar

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During the Medieval Period, the North Eastern Coast of Madagascar was settled by the Islamised Rasikajy Population, who established several small towns along the coast. The archaeological record of this period yields abundant findings of local and imported ceramics, iron smelting slags and turned softstone pots, many of which were discovered in the famous cemetery site of Vohémar.

Extraction and first brute shaping of these pots was carried out in quarries in the hinterland, while the finishing most likely took place in coastal manufacturing centres. Up to now, around 20 of these quarries are known for Northern Madagascar and are being sampled systematically for this study. The aim of this study is a petrographic and geochemical characterisation of the quarries to allow subsequent provenance applications.

In the literature, the raw material used for the vessel production in Madagascar is referred to as chloriteschist, an ambiguous term considering its mineralogy and general lack of deformation. It is a mafic to ultramafic meta-cumulate, that was metasomatically metamorphosed under greenschist to amphibolite conditions and should be called Talc-Chlorite-Amphibole-Granofels by modern petrographic standards. It crops out in small 10 to 100 m scale lenses throughout the northern part of the island, seemingly independent of the respective geological units.

This rock type can be compared to an occurrence in Southern Germany, where it was first mentioned, described and named *Hoesbachite* after its location in the Spessart Mountains. Likewise, the softstone used in Madagascar comprises a complex assemblage of up to three generations of amphibole in a matrix of chlorite+talc+magnetite±anthophyllite±ilmenite±rutile. Due to the textural complexity and heterogeneous nature of this rock, we use a combined approach of texturally controlled microanalytics, bulk rock chemistry and optical parameters for the characterisation of the quarried localities.

Establishing a petrographical and taxonomical database of quarries and artefacts will allow the tracing of shipping routes both in Madagascar and along the Indian Ocean Trade network, as the occurrence of amphibole distinguishes this material from conventional soapstones described e.g. in Egypt and Southern Iran.