

FENNOSCANDIAN IMPACTITE ERRATICS IN NORTHERN GERMANY – TRACERS OF PLEISTOCENE LONG-DISTANCE GLACIAL REWORKING

L. Förster¹, M. Schmieder², R. Bartoschewitz³ and E. Buchner^{2,4}.
¹Eichkamp 35, D-23714 Bad Malente. ²Institut für Planetologie, Universität Stuttgart, Herdweg 51, D-70174 Stuttgart, martin.schmieder@geologie.uni-stuttgart.de. ³Lehmweg 53, D-38518 Gifhorn. ⁴HNU Neu Ulm, Wileystr. 1, D-89231 Neu-Ulm.

Introduction: A number of impact structures on Earth, especially those in the northern latitudes, have lost parts of their ejecta deposits due to Pleistocene glacial erosion. In most cases, reworked pebbles and boulders of impactites are today found as ‘proximal’ glacial drift close to the source crater (e.g., at Paasikallio, Finland) [1-2]. Earlier studies [3] suggested the occurrence of Fennoscandian impactites in glacial till of Northern Germany, although some of these rocks have remained rather enigmatic. We here report the finding of an impact melt rock pebble in Pleistocene till near the village of Braak (~20 km NE Hamburg), as well as a granitic ‘melt breccia’ pebble at the gravelly Baltic Sea coast near Heiligenhafen (Schleswig-Holstein).



Fig. 1: Impact melt rock found in glacial till, Braak. **A:** ‘checkerboard feldspar’; **B:** PDF in quartz; **C:** ‘ballen quartz’ (cross-polarized light).

Petrographic Observations: The dark melt rock found at Braak exhibits a porphyritic texture and is mainly composed of feldspar and pyroxene together with some opaques that build up the fine-grained crystalline groundmass. Larger feldspar crystals commonly show the conspicuous ‘checkerboard’ pattern (Fig. 1A). Quartz occurs as shocked grains with single and multiple sets of planar deformation features (PDF) (Fig. 1B) and partially fluidal aggregates of ‘ballen quartz’ (Fig. 1C). The Heiligenhafen melt breccia is composed of angular lithic clasts of red granite floating in a black, fluidal, cryptocrystalline matrix but lacks convincing evidence for shock metamorphism in thin section.

Discussion and Results: Whereas the Heiligenhafen (Siljan granite?) melt breccia might represent an impact-related pseudotachylitic breccia, the impact melt rock pebble recovered from the Braak till confirms the earlier suggestions that Fennoscandian impactites made the way from their source craters to Northern Germany. The petrographic characteristics of the Braak melt rock suggest that this pebble represents a ‘distal’ erratic that originates from the ~9 km and ~121 Ma Mien impact structure, Sweden, which is located ~430 km to the NE. Like other Fennoscandian index erratics found in Northern Germany, the Mien impactite at Braak reflects long-distance (and possibly multi-step) southward glacial transport of Fennoscandian impactites during Pleistocene (Elsterian, Saalian, and Weichselian) phases of glaciation [4].

References: [1] Schmieder M. et al. 2008. *Meteoritics & Planetary Science* 43:1189-1200. [2] Buchner E. and Schmieder M. 2009. *Meteoritics & Planetary Science* 44:1051-1060. [3] Meyer K.-D. 1987. *Der Geschiebesammler* 20:125-146. [4] Ehlers J. et al. 2004. In Ehlers J. and Gibbard P. L. (eds.) *Quaternary glaciations: extent and chronology I*, Elsevier, p. 135-146.