A POSSIBLE NEW IMPACT SITE NEAR NALBACH (SAARLAND, GERMANY)

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Introduction: The two impact craters Nördlinger Ries and the Steinheim Basin (S Germany) represent the only confirmed impact structures in Germany. Although a great number of possible impact structures in many parts of Germany were proposed in the past, none of them was confirmed. We suggest a new possible impact site in the German state of the Saarland (W Germany) on the base of possible impact glasses and potential traces of an iron meteorite in melt particles that are distributed within an area of some square kilometers in the surroundings of the village of Nalbach. The possible impact melt particles were recently discovered by one of the authors (W. Müller).

Petrographic and geochemical analyses: Externally**,** the melt particles exhibit a bluish to black color and are often aerodynamically deformed (tear- or spindle-shaped). The particles contain a homogenous, schlieren- and vesicle-textured glassy melt groundmass; roundish sandstone particles are incorporated into the melt matrix. Geochemically, the melt matrix yielded a Si-, Al-, and K-rich mixed silicatic composition. We have not detected shocked quartz grains with PDFs so far, however, some of the melt particles show conspicuous ballen-textured α-cristobalite (Fig. 1A) and contain spherule-shaped iron droplets (Fig. 1B). Preliminary geochemical SEM-EDX analyses showed that the Fe droplets commonly contain higher amounts of Ni (up to ~10 wt%), together with variable amounts of S, P, Ni, and Co. We also detected metallic fragments that exhibit a composition close to taenite, troilite, and schreibersite as known from meteorites. Further analyses are in progress.

Conclusions: Ballen α-cristobalite, detected in some melt particles, was recently suggested as an impact-diagnostic feature [1]. Externally and internally, the Nalbach melt particles closely resemble impact glasses from Wabar [2,3] and other terrestrial impact sites by their color, texture, composition, and content of metallic particles. The metallic droplets and fragments in the melt particles may be interpreted as the molten and fragmented remnants of an iron meteorite. The melt particles are distributed over some km² that could represent an (eroded or covered) impact crater or an area affected by a larger meteoritic airburst.

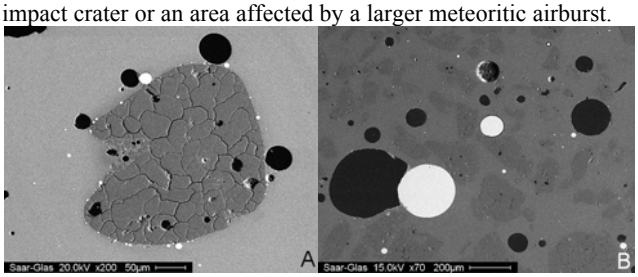

Fig. 1: Nalbach glass. **A:** Ballen α-cristobalite and **B:** Fe-Ni droplets (white) in a vesicular glassy melt matrix (backscattered electron images).

References: [1] Ferrière L. et al. 2009. Eur. J. Min. 21:203-217. [2] Schmieder M. and Buchner E. 2009. Abstract volume of the 1st AICAC Conference, Amman, Jordan, CD-ROM. [3] Schmieder M. et al. 2011. This volume.