CHARACTERIZATION OF A SMALL CRATER-LIKE STRUCTURE IN SE BAVARIA, GERMANY V. Hoffmann[1], W. Rösler[1], A. Patzelt[2], B. Raeymaekers[3], P. Van Espen[4] [1]Institute for Geosciences, University of Tübingen, Sigwartstr. 10, D-72076 Tübingen, Germany. wolfgang.roesler @uni-tuebingen.de. [2]Terrana Geophysik, Zeppelinstr. 15 D-72116 Mössingen, Germany. [3]Infraserv Gendorf, D-84504 Burgkirchen, Germany. [4]Department of Chemistry, University of Antwerp, Universiteitsplein 1, B-2610 Antwerp, Belgium.

Introduction: In SE Bavaria, many small scale (5 m to ca. 100 m diameter), circular, bowl shaped structures have been previously interpreted as archaeological objects or geologic structures with ambiguous description of their origin. In and around many of these structures, fractured rocks are frequent, some possess a well developed crater rim, and in a few structures melt rocks can be found. This paper focuses on the macroscopic, microscopic, and geophysical characterization of a 11 m diameter, bowl shaped, crater-like structure in Holocene till beds, showing extreme thermal effects in a 20 m diameter area.

Analytical methods: Optical microscopy, SEM/EDX, and XRD were used to characterize material from thermally altered bed rocks and from particles extracted from surrounding soil. The area of the crater-like structure was mapped using a magnetic susceptibility meter, a fluxgate magnetometer, and a ground penetrating radar (GPR) system.

Results: The investigated structure is a bowl-shaped, circular depression of 11 m rim-to-rim diameter in Holocene, glacial till beds. It has a pronounced rim wall of ca. 0.5 m height and a bottom ca. 0.5 m deeper than the surrounding. The crater wall consists of thermo-plastically deformed bed rocks indicating temperatures exceeding 1500°C throughout the whole crater wall of ca. 20 m diameter. XRD spectra indicate high temperature phases of quartz but no indication for shock metamorphism could be confirmed by microscopic observation. The GPR survey shows that the morphology of the crater walls continues into depths of several meters with strong reflections from the crater floor. Both magnetic surveys show strong magnetic anomalies associated with the thermally altered crater wall material. The magnetic susceptibility of the wall material is significantly higher than that of the surrounding. Magnetic mapping shows a strong magnetic anomaly, consisting of a large number of individual small-scale dipole-structures, probably representing strongly re-magnetized boulders from the glacial till beds. In the surrounding soil and in melt crusts of thermally altered bed rocks, spherules and inclusions of iron silicon [3] and carbon [4] materials could be found.

Interpretation: In contrast to previous interpretations, we have to conclude that the thermal effects and depth structure of the investigated object cannot be explained by glacial geology, by archaeology, by bombing, or by primitive industrial processes. The occurrence of FeSi materials indicates a high-energy, reducing environment [5]. Despite a positive proof at present, an impact-related origin of the investigated structure should be considered.

References: [1] F. Weber 1909. Die vorgeschichtlichen Denkmale des Königreiches Bayern, 1. Munich. [2] G. Doppler 1980. PhD thesis Univ. Munich. [3] D. Schryvers, B. Raeymaekers, 2004, Abstract #MS16.P13 13th European Microscopy Congress, Antwerp, Belgium. [4] W. Rösler et al. 2005. this issue. [5] A. A. Sheffer et al. 2003. Abstract #1467 Lunar and Planetary Science Conference.