On Earth, meteorite impact craters in volcanic settings are underrepresented but obviously feature prominently on other planetary bodies. The study of such crater structures could possibly give new insights into the impact-related processes (shock, structural deformation) on planetary bodies with volcanic surfaces, the behavior of volcanic materials under shock loading, and the formation and evolution of impact structures in general.

Two structures in Brazil were targeted for a first field campaign. The Cerro do Jarau structure is ~13.5 km in diameter and situated at 30°12'S/56°32'W in Rio Grande do Sul. The structure is formed in sandstones and basalts of the Jurassic-Cretaceous São Bento Group of the Paraná Basin [1]. A possible impact origin is still controversial today. Apart from the investigation of the obvious circular arrangement of sedimentary strata in the outer ring structure, detailed structural observations were made on various scales. Different stages of folding and faulting were observed. Folding at mm, dm, and decameter scales could be discriminated, in places within one outcrop. From these initial results it can already be stated that the observed structural deformation makes it difficult to explain the degree of folding and faulting with purely tectonic deformation. In particular, the observed radial and concentric folding and faulting would rather be consistent with impact deformation [2]. Locally, millimeter-spaced intense micro-faulting with mm-scale displacements was observed; this phenomenon strongly resembles the multiply striated joint sets related by [3] to the shatter cone impact deformation phenomenon. Proper shatter cones, or even those "probable" ones reported in the past, have so far not been observed. Different types of breccia are present that are currently being investigated for shock metamorphic effects.

The Vargeão Dome (26°50'S/52°07'W, SC) 12-km-wide, complex impact structure is also situated in the São Bento Group of the Paraná flood basalt province [4]. Various types of breccia are present in this well exposed but deeply eroded crater structure. At a location in the eastern part of the crater, inside the structural rim, a well exposed and not too severely weathered road-cut (~ 60 x 5 m) exhibits volcanic rock and an adjacent breccia dyke. Breccia clasts of angular to well-rounded shapes were observed, with some of these showing fitting patterns. Our working hypothesis is that this locality shows the occurrence of a pseudotachylitic breccia. Structural findings at Vargeão include large-scale concentric and radial lineaments, and intense faulting.

At the congress, further structural and petrographic results will be discussed.

References: [1] Crósta et al. 2010. *Geol. Soc. Amer. Spec. Pap.* 465: 173-190. [2] Kenkmann et al. 2012. *J. Struct. Geol.* 62: 156-182. [3] Nicolaysen and Reimold 1999. *J. Geophys. Res.* 104: 4911-4930. [4] Crósta et al. 2012. *Meteorit. Planet. Sci.* 47: 1945-5100.