

VARGEÃO'S CRATER: SHOCK METAMORPHISM EVIDENCES IN IMPACT BRECCIAS AND PEPPERITES

Briske, D.R.¹; Waichel, B.L.¹; Del Mouro, L.¹; Tratz, E.B.²

1 Federal University of Santa Catarina; 2 Faculdades Guarapuava

ABSTRACT: The Vargeão's Crater is one of the largest and well preserved impact craters in Brazil. Developed above the rocks of Serra Geral Group, the crater is one of the few examples of impact craters developed over volcanic rocks known in the Earth. In addition, in its uplifted central peak outcrops sandstones that is normally arranged stratigraphically under these volcanic rocks, make the crater unique. Known as an unusual geological agent on our planet, the cratering process is one of the largest surface modifiers in celestial bodies such as Moon and Mars, being possible to correlate its development from the studies of the structures developed on Earth. As a result, the main objectives of the current work were to develop the petrographic and geochemical characterization of samples collected in the crater and region nearby to its board, which comprises mainly volcanic rocks, volcanoclastic rocks and impact breccias, in order to trace differences in the mineralogical and geochemical patterns of the target rocks and also to verify the development of typical features related to the shock metamorphism. Data obtained during fieldwork and laboratory through the petrographic analysis allowed the verification of these unique features, such as the development of shatter cones, planar fractures that were developed in both impact breccias and peperitic breccias, and fracturing of target rocks, which are inherent products of shock metamorphism and the complex cratering process. Furthermore, with the analysis of the geochemistry it was verified that the impact breccia, generated by the collision of the cosmic projectile, has a similar geochemical configuration to the basaltic rocks and it did not acquire chemical characteristics of the projectile, with respect to major, minor and traces elements. Furthermore, the results acquired with this work corroborate the affirmative that the Vargeão crater is definitely product of a great collision of a cosmic projectile against the volcanic rocks of Serra Geral Group, and contributes directly to the small number of studies related to impact craters developed over this type of rock, as well as the main features of the crater formation process and the effects produced by shock metamorphism on the target rocks.

KEYWORDS: IMPACT BRECCIAS; PLANAR FRACTURES; VARGEÃO'S CRATER.