



## MARINE POTHoles AS AN INDICATOR OF WAVE-CUT TERRACE ACTIVITY AT ILHA DA TRINDADE

Sielski, L. H.<sup>1</sup>, Angulo, R. J.<sup>1</sup>, Souza, M.C.<sup>1</sup>, Calliari, L. J.<sup>2</sup>, Müller, M. E. J.<sup>1</sup>

*Filiação dos Autores – <sup>1</sup>Laboratório de Estudos Costeiros – Departamento de Geologia – Universidade Federal do Paraná <sup>2</sup>Laboratório de Oceanografia Geológica – Instituto de Oceanografia - Universidade Federal do Rio Grande*

Potholes are depressions abraded by water and grinding tools subjected to the action of currents in a vortex motion. The formation of marine potholes is driven by wave abrasion. The water motion needs to have enough energy to swirl pebbles around in the depression. The rock type is suggested to be determinant in the type of pothole formed. Ilha da Trindade is a volcanic island located at the eastern end of Vitória-Trindade Ridge. A wave-cut terrace, 100 m maximum wide and around 3.0 m above mean sea level, is located at the Vulcão do Paredão. This terrace was probably formed during the Holocene with higher sea level. At present time the terrace is not permanently affected by waves but storm waves are able to wash the terrace and remove debris fallen from adjacent cliffs. Over this wave-cut terrace, between 1.5 and 3.3 m above mean sea level two major potholes were found and their dimensions were measured. The diameter-depth ratio was calculated. In addition, some samples of pebbles inside the holes were measured and identified. The major pothole is located 3.3 m above mean sea level with diameter of 2.3 m and 4 m depth, the other one is around 1.5 m above mean sea level with diameter of 1.7 m and 3 m depth. At the bottom of potholes we found rounded pebbles, derived from lava bombs and tuff, with diameters from 0.02 to 0.5 m and angular boulders of tuff with dimensions up to 1.0 x 0.5 m. Algae and a thin biologic film, less than 2 mm thick, cover the pebbles, which indicates that they are not in motion. However, this biologic film can grow rapidly, in days or weeks, and consolidated incrustations are absent. This suggests that pebbles are often in motion, probably due the action of storm waves, hindering the development of expressive biological incrustations. Diameter-depth ratio is 0.6 in both potholes, much lower than ratios at tuff rocks of Oahu, Hawaii. Depth and diameter are higher than Oahu potholes, these differences may be related to the time of exposure to water motion. Older holes are deeper and wider. It seems the potholes started to develop at almost the same time of wave-cut terrace and it still ongoing. Beyond lithology, the time of exposure and the intensity of water motion is also determinant to mold the shape of pothole.

Keywords: cavitation, marine abrasion terrace, Vulcão do Paredão, storm waves.

Acknowledgments: to Marinha do Brasil, Conselho Nacional de Pesquisa – CNPq e Comissão Interministerial para os Recursos do Mar– CIRM for their financial support trough project



number 557141/2009-5 and to CNPq for the Technology Development Fellowship (DTI) under project number 457714/2013-1