



ICG2022-679, updated on 28 May 2023

<https://doi.org/10.5194/icg2022-679>

10th International Conference on Geomorphology

© Author(s) 2023. This work is distributed under the Creative Commons Attribution 4.0 License.



Cosmogenic Surface Exposure (^{10}Be) Dating of Raised Beach Ridges in Marguerite Bay, Antarctic Peninsula: Implications for Relative Sea Level Curve

Cengiz Yildirim, Attila Ciner, Mehmet Akif Sarikaya, Adil Enis Aslan, Hakan Yavasoglu, and Alan Joseph Hidy

Istanbul Technical University, Eurasia Institute of Earth Sciences, Solid Earth, Istanbul, Turkey (cyildirim@itu.edu.tr)

Marguerite Bay is located in the South-central part of the Antarctic Peninsula. The archipelago of the bay is rich in terms of coastal geomorphological features such as raised beach ridges as geomorphic markers of relative sea-level change. In this study, we focussed on Horseshoe Island and Calmette Bay where raised beach ridge levels were already identified. We employed a topographical survey to define the elevation and cosmogenic ^{10}Be surface exposure dating method to define the age of major paleo shoreline levels. In the Gaul Cove located eastern coast of the Horseshoe Island we identified three major topographical levels and in the Calmette Bay four major topographical levels that raised beach ridges cluster. Paleoshoreline levels at 1, 7, 12, and 16 m asl yield 0.3 ka, 1.59, 3.31, and 3.33 kyr BP, respectively, in the Gaul Cove when we remove 2.9 ka inheritance that we obtained from the modern shoreline samples. However, shoreline levels are higher and ages are older on the Calmette Bay coast. Major levels are at 5, 8, 17, 27 and 35 m asl, and their cosmogenic ^{10}Be ages yield 3.46, 3.19, 5.3, 5.9, and 7.2 kyr BP, respectively, in the Calmette Bay when we remove 1.94 ka inheritance that we obtained from the modern shoreline samples. Since the present sea level was eustatically stabilized at approximately 7 kyr BP we estimated uplift rates according to modern sea level. The uplift rate in the Horseshoe Island yields 5.53 ± 0.88 mm/yr in the last 3.3 kyr, and in the Calmette Bay, it yields 4.52 ± 0.40 mm/yr in the last 7.2 kyr. This study was carried under the auspices of Turkish Republic Presidency, supported by the Ministry of Science, Industry, and Technology, and coordinated by Istanbul Technical University (ITU) Polar Research Center (PolReC) and Turkish Academy of Science.