



The effect of intertidal ice in the shore platform evolution. Results from South Shetland Islands (Antarctica).

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The genesis and the evolution of shore platforms on sub-polar regions, in areas sheltered from wave action, has been mainly imputed to ice erosion caused by the movement of floating ice forced by tide levels variation. Nevertheless, this process has never been accurately studied.

This research aims to clearly identify shore platforms that evolve by floating ice erosion process and assess the downwearing rate of those platforms. To achieve this purpose, we used a TMEM (Traversing Micro-Erosion Meter), which is one of the few field equipments that can supply very precise (accuracy of 0.001 mm) erosion data of rock surfaces for periods of one month to several years.

Two experimental areas were chosen in Deception and Livingston islands (South Shetland Group – Maritime Antarctica) at places where sea wave's action is meaningless. Deception Island is an active shield volcano with 109 km² located between latitudes 62° 54' - 63° 01' S and longitudes 60° 29' - 60° 45' W. This island has a horseshoe shape that almost totally encloses a 7-10 km in diameter bay known as Port Foster with a narrow (500m wide) and thin (less than 20m deep) connection to the open sea. A TMEM station was installed in 30 January 2007, at 1.3m above chart data, in the inner part of the bay, near Punta Murature. Cut in the Pendulum Cove Formation, mainly composed of tuff cone and maar deposits, locally the shore platform shows a well consolidated stratified lapilli tuffs with abundant accessory clasts forming an almost flat, but very irregular in the detail, rock surface. Livingstone Island has 845 km² and is located between latitudes 62° 27' – 62°48' S and longitudes 59° 45' – 61° 15' W, around 25 km north of Deception Island. A TMEM station was installed in the NW sector of the Hurd Peninsula in 5 February 2007 at Punta Polaca, at 1.4m above chart datum, on a very smooth rock surface with an inclination of 5.5°, cut in quartzites of the Miers Bluff formation.

The 2008 campaign achieved the first comparative data. Both areas registered downwearing rates that can be imputed to floating ice erosion. The TMEM Deception station presents very high downwearing rates (average of 6,528mm year⁻¹), a result that is consistent with the minor resistance of the outcrops of Punta Murature. At Livingston, although the quartzite has a very high resistance, we obtain a downwearing rate of 0,053mm year⁻¹. The results achieved justified the installation in the rock surface of temperature sensors, a more detailed shore platform study and the satellite monitoring of the sea ice cover along the Antarctic winter. Those aims will be completed in the January/February Antarctic campaign. The results obtained in this campaign will be presented and discussed.