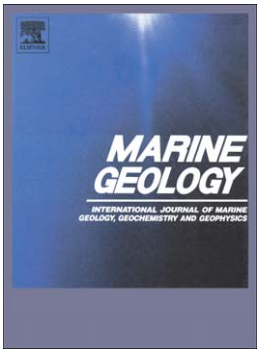

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Downwearing rates of vertical limestone surfaces in the intertidal zone (Gulf of Trieste, Italy)

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Abstract

In 2007, we installed seven micro-erosion meter stations on a vertical limestone slab located in the intertidal zone in the Gulf of Trieste (Italy) in order to observe rock surface changes at elevations ranging between -0.75 m and +0.75 m m.s.l. (Furlani et al., 2010). In this paper, we provide a description of the methods used to collect the measurements, their strengths and weaknesses, together with the first year of measurements. We then present the micro-erosion meter (MEM) data for most months between February 2008 and May 2013 and the traversing micro-erosion meter (TMEM) data collected twice a year since 2007. The MEM and TMEM data were consistent and indicated that the mean lowering rate ranged between 0.007 mm/yr and 0.205 mm/yr and -0.001 mm/yr and 0.260 mm/yr, according to the elevation of the stations. Maximum downwearing rates were observed in the mid-lower intertidal zone and decreased upward and downward. The natural trend of erosion started in 2010, after 2 years of exposure, when the slab, formerly smoothed and not colonized by marine organisms, started to be acclimated to the local environment. After 2010, the erosion rate increased to a maximum of 0.31 mm/yr. This value can be more representative for long-term studies and is similar to the downwearing rates locally collected on natural limestone surfaces.

This dataset represents the first collection of downwearing rates mainly measured using MEMs, but also TMEMs on vertical limestone surfaces in an intertidal zone and provides interesting new information for addressing the debate on notch genesis and development. The shape of a tidal notch has been found to be consistent with the distribution of erosion rates along the slab, even if the present-day notch was not surveyed in the Gulf of Trieste due to the local tectonic subsidence.