Geophysical Research Abstracts
Vol. 19, EGU2017-14259, 2017
EGU General Assembly 2017

Ambient seismic noise as an interesting indirect cue for the Cerithidea decollata migrations

Veronica Pazzi and Alessia Lotti
Department of Earth Sciences, University of Firenze, Firenze, Italy (veronica.pazzi@unifi.it)

Presence or absence of water, food availability, capability of avoiding predation, and body temperature are constantly changing according to the tidal excursion. In fact, more than the diurnal light-dark variation, tide is shaping the whole intertidal animal life. Therefore, physiological and behavioural systems exist to reduce the stress that the intertidal fauna may face during the unsuitable tidal phase. Cerithidea decollata is a common western Indian Ocean mangrove gastropod. It feeds on the ground at low tide, and climbs the trees two/three hours before the water arrival to avoid submersion. In spite of the irregular East African tidal pattern, it also regularly settles on trunks roughly 40 cm above the maximum level of the incoming tide. Migrations usually take place about twice a day unless at Neap Tide, when snails may remain on the dry ground. Past experiments showed that a biological clock cannot account for water level foreseeing, nor direct visual cues or chemical information from the water itself or from previous migrations have been detected. On the other hand, tidal gravity variations can be felt by the snails. Moreover, other indirect cues could be hypothesize related to a) the oceanic waves reaching the coast and the barrier reef (seismic noise), or b) the changes in ground resistivity (self potential) caused by the sea water moving close. To verify these hypotheses, an integrated geophysical survey (single-station seismic noise and self potential survey) was carried out at Mida Creek (Kenya) to characterize the local seismic wavefield in terms of its amplitude and to measure the temporal variations of the electric potential field. Final goal was to verify whether a correlation exists between the time evolution of these phenomena and the snail movements. Here we present the first results of the seismic noise measurements. Data were acquired by means of a single station all-in-one 3-directional 24-bit digital tromometer equipped with 4.5 Hz geophones. The acquisition run for 11 days (29th June, 2013 - 9th July, 2013). We assumed that the tide transgressions/regressions generate pressure fluctuations on the ground, that are locally transformed into microseismic waves at seafloor propagating inland. Therefore, we evaluated a possible correlation, in terms of decision to climb up or not, between the seismic signals amplitude fluctuations and the snails' movements. To do so we performed: a) the analysis of the trend of the LF (0.1-2 Hz) and HF (2-60 Hz) seismic noise amplitudes, and b) the comparison of the seismic signals with the height of tide, the number of animals that climbed to the safety level, and the height that they reached during each tide cycle. The study showed an interesting similarity between the time evolution (mean value) of the LF amplitude trend and the animals' movements. Even thought additional data should be collected to improve the results, it is the first time that a consistent physical cue other than the obvious but discarded ones (visual and chemical), has been identified that could potentially be detected by the snails as well as by other intertidal organisms.