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Multi-proxies approach of morphological sandy beach changes to energetic events

Mélanie Biausque and Nadia Senechal
University of Bordeaux, EPOC, France (melanie.biausque@u-bordeaux.fr)

Since the last decades, anthropogenic pressures caused by the development of marine activities and infrastructures constantly increased. In the context of climate change, the induced water level elevation associated to modification in wave climate (e.g. frequency and intensity of storms) will certainly threatencoastal ecosystems, economics and structures. Understanding storm impacts and sediment exchanges on coastlines are key components to predict their evolution, especially in presence of sandy coasts that are very dynamic systems continuously adjusting their shapes over very short (a few hours) to long timescales (several years). Many studies follow the morphological seasonal variations of beaches but only a few take into account the impact of each energetic event on beach/dune systems. Two years (from November 2015 to November 2017) of high frequency DGPS surveys (at least once per week and up to several time per week) on the Dynalit workshop-site Biscarrosse beach (south West of France) allowed us to access the short term evolution (at the event scale) of the beach. Focusing on energetic periods, preliminary results show significant differences between winter 2015/2016 and winter 2016/2017 in terms of wave energy, mean Hs, wave energy flux and number of storms and clusters. But, surprisingly, the volume rate is quite the same in both cases and the mean beach profile is more eroded in 2016/2017 than in 2015/2016. Looking to the cumulated energy flux, the winter 2015/2016 seems to undergo a net increase of energy flux at the beginning of winter (from January to February) while in 2016/2017 an increase is visible later in time (end of February to March). This could suggest a possible recovery at the end of the winter 2015/2016 explaining why, comparing both winters, the beach profile is lower in 2017 whereas the winter 2016/2017 has been less energetic. Moreover, a multi-proxies approach is essential when studying sediment exchanges on sandy beaches. Indeed, volumes of the different compartments composing Biscarrosse beach after energetic events (dune, intertidal and supratidal beach) highlight a major role of cross-shore exchanges between the intertidal and supratidal beach without necessarily a net loss of sediment. Thus, no change in the volume total of the beach is calculated but a displacement of sediment is visible. The work on the comparison and extraction of the different proxies currently used in beach morphology studies (volumes, isocontours, beach width) is still under development. For example, preliminary results show that during storms the intertidal and supratidal parts of the beach react in opposite ways (retreat vs. accretion).