

Runup Dynamic and Beach Response under Extreme Energetic Conditions: Video Applications

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Runup is the time-varying vertical position of the water's edge on the foreshore of the beach. It is usually decomposed into a (quasi) steady component above the still water level (the wave set-up) and a time-varying, fluctuating, component termed as "swash". Runup is the main driver of beachface hydro- and morphodynamics (Elfrink and Baldock, 2002) and so is of great relevance when studying the sediment exchanges between the subaerial and subaqueous zones of the beach (Puleo et al., 2000; Masselink and Hughes, 1998). Runup also plays a critical role in dune erosion during storm conditions (Ruggiero et al., 2001) and structure overtopping (Van der Meer and Stam, 1992). Thus runup is key to successful coastal planning and management and a critical parameter in assessing the effect of sea-level rise on coastal inundation. As one might expect, interest is primarily focused on the estimation of extreme run-up during storm conditions, essential for accurate predictions of the impact on and damage to the coast.

Long-term recession of shorelines has been measured at worldwide locations, but the causes for such recession remain a topic of debate. Anthropogenic effects are sometimes the cause of short-term erosion (e.g. Frihy and Komar, 1993), while climate change or variations in sediment supply are potentially the main driver of long-term erosion (Zhang et al., 2004; Stive, 2004). Studies have shown that shorelines can partially recover from storm-induced erosion and that the initial recovery can be extremely fast (e.g. Birkemeier, 1979; Wang et al. 2006). On the other hand, a full recovery from major storms can extend up to years especially if erosion of the dunes backing the beach has occurred (e.g. Thom and Hall, 1991). In fact, the 'vulnerability' of a beach, intended as the potential of a beach to be affected by a major storm, depends on the balance between storm frequency and recovery rates. The difficulty of collecting adequate datasets make the role of storms on long-term beach change challenging to study (e.g. Zhang et al., 2002; Anderson et al., 2010) and especially the effect of "clusters" of storms on beach response.

Here we will present results on runup dynamic and beach response derived from video images. Data were collected at two field sites situated on the Southern French Atlantic coast: Biscarrosse Beach and Truc Vert Beach. Biscarrosse Beach has been equipped with a video system in 2007. The main focus of this system is to collect a long term data set with a high temporal resolution to allow further insight into beach responses to storm events and evaluating the impact on seasonal and long term (several years). Truc Vert Beach has been equipped during the ECORS field experiment (winter 2008) and allowed continuous daylight

2Hz image sampling. The data set offers a great opportunity to look at runup dynamic under energetic conditions (Hs up to 8.0m in 20m water depth).