

## **Post-storm evolution a high-energy remote sandy beach backed by a high and wide coastal dune**

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During the winter 2013/2014, the high-energy meso-macrotidal remote beach of Truc Vert (SW France) was exposed to the most energetic wave conditions over at least the last 65 years with, for instance, the 2-month averaged significant wave height at the coast exceeding 3.6 m. Unprecedented beach and dune erosion was observed with the notable presence of a 700-m long localized megacusp embayment with the erosion scarp height exceeding 6 m in its centre where the dune retreat reached 30 m. Both the beach and the coastal dune eroded by about 90 m<sup>3</sup>/m within 3 months of severe storm activity, that is, a total beach-dune system sediment loss reaching 180m<sup>3</sup>/m. Beach and dune evolution after the winter 2013/2014 was inspected from March 2014 to November 2015 using bi-monthly topographic surveys covering 1500+ m alongshore. 1.5 years after the winter 2014/2015, the beach-dune system did not fully recover to its pre-winter 2014/2015 level. The dune accreted by only a few m<sup>3</sup>/m while the beach accreted by an impressive amount of approximately 150m<sup>3</sup>/m, to reach a total volume that was only exceeded in 2012 within our full 10-year time series. Despite little volumetric changes, the dune showed significant morphological change through slumping and onshore wave- and wind-driven sediment transport. Seasonal natural revegetation was observed with large dune grass growth into the summer berm and within the erosion scarp with slumped clots of dune grass re-establishing their growth during the winter 2014/2015. In late 2015, the onset of morphological foredune development was observed. It is anticipated that, if Truc Vert is not exposed to a cluster of severe storms during the winter 2015/2016, the coastal dune will increase in volume within 2016 at a much higher rate than during 2015. Last but not least, starting in late 2015, the coastal dune of Truc Vert is now intensively monitored through regular 4-km long UAV photogrammetric surveys. Given that, nowadays, some scientists advocate that dunes maintained as dynamic systems retaining diversity and complexity not only provide more ecosystem services but can even be more resistant to marine erosion and more resilient than actively managed dunes, it is the objective to test different dune management strategies at Truc Vert, including no dune maintenance.