Characteristics and evolution of ebb-dominated creeks
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1. Introduction
Estuaries and bays are usually fed by the small rivers, streams and tidal creeks. These tidal creeks convey the bulk of the freshwater runoff and the associated terrestrial sediments eroded from surrounding catchments. The shallow-water systems in which these creeks evolve are mainly dominated by tidal asymmetries, generated by nonlinear processes of interaction that promote a net flow of sediment in the direction of such asymmetries (Aubrey and Speer, 1985).

In this contribution, we present the hydrodynamics behaviour of the Sancti-Petri and Carracas creeks (Fig. 1), which are influenced by the tidal hydrodynamics of Cádiz Bay (Southern Spain). We have focused on the tidal harmonics and currents levels as well as in the effects of the tidal dynamics on sediment transport. The analysis is based on water elevations, currents, and suspended sediment concentrations measurements recorded during a 40-days field survey, and also on the simulation scenarios performed with a sand-mud transport model (Carniello et al., 2012).

2. Methodology
The field survey consisted on 7 moorings stations deployed from December 22, 2011 to April 18, 2012. They were 4 current meters and 3 tidal gauges, denoted by I1-I4 and T1-T3, respectively (Fig 1a). On the other hand, the sand-mud transport numerical model has a tidal module coupled to a wind-wave and a sediment transport and bed evolution modules. The model was calibrated and tested not only at the usual intratidal scale, but also at subtidal time scale ($R^2 \approx 0.99 – 0.78$).

3. Results and final remarks
To enhance the understanding of tidal creek networks, tidal dynamics in the Carraca and the Sancti-Petri creeks and its implication in the sediment evolution have been studied in this work. A field survey was carried out to validate the implementation of a numerical model. An analysis of the numerical results shows that the importance of the Sancti-Petri and the Carraca creeks lies on the double connection at the open sea where the ride wave penetrates from both ends with different amplitudes, phases and flow velocity.

The results show that tidal currents continually entrain and rework sediment with an enhancement during spring tides (Zarzuelo et al., 2015). Furthermore, the tidal currents in the Sanct-Petri creek and the Carraca creek are distorted from the sinusoidal form of their astronomical forcing, what implies a transfer of energy from M2 to M4. The main consequence of the overtide generation is the strengthening (weakening) of flood (ebb) currents in the case of the Carraca (Sancti-petri) creek. Sediment is redistributed within the tidal creek on a regular basis by tidal currents.

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