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Migration Rate Of Tidal Meanders: Inferences From The Venice Lagoon

Alvise Finotello (1), Andrea D'Alpaos (1), Massimiliano Ghinassi (1), Stefano Lanzoni (2), Marco Marani (2,3), Andrea Rinaldo (2,4)

(1) University of Padova, Dept. of Earth Sciences, Dept. of Earth Sciences, Padova, Italy (alvise.finotello@studenti.unipd.it), (2) University of Padova, Dept. ICEA, Padova, Italy, (3) Nicholas School of the Environment and Earth Sciences, Duke University, Durham, NC, USA, (4) Laboratory of Ecohydrology, ECHO/IEE/ENAC, Ecole Polytechnique Fèdèrale de Lausanne, Lausanne, Switzerland

Meandering channels are ubiquitous features of tidal landscapes. However, despite their fundamental role on the ecomorphodynamic evolution of these landscapes, tidal meanders have received less attention when compared to their fluvial counterparts. Improving current understanding of tidal meander migration, a largely examined topic in fluvial landscapes, is a key step to highlight analogies and differences between tidal and fluvial cases. The migration of about 400 meander bends, belonging to 40 saltmarsh channels in the Northern Venice Lagoon (Italy), from 1968 to nowadays, has been investigated by means of both a classical method in fluvial frameworks and new procedure. Similarities with fluvial meanders occur, although important difference also emerge. Meanders cutting through the San Felice marsh follow the relationship between cartesian length and channel width, typical of meanders developed within different settings. However, meander migration rates proved to be smaller than those characterizing fluvial meanders. Indeed, the analysis of meander migration suggests a mean migration rate of about 0.10 m/year, consistent with the few data available in the literature. As for the fluvial case, the maximum potential migration rate (i.e. the envelope curve of the relationship between migration rate and bend radius, both divided by channel width) reaches a maximum for radius over width ratio included between 2 and 3, regardless of the considered method. Nevertheless, the newproposed method allows us to provide a more objective and continuous characterization. By using this new procedure, the channel curvature has finally been Fourier analyzed, confirming the importance of even harmonics along the curvature spectrum. A correlation between migration rates and dominant harmonics seems to drive the evolution of tidal meanders and might represent a keyfeature to distinguish them from their fluvial counterparts.