# Where do tidal channels begin (or end)?

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**Summary**: In this project we aim at unraveling the processes leading to tidal channel initiation and the dynamics of their evolution through field observations and modelling. The goal is to answer critical questions such as "**Where do tidal channels begin (or end)?" and "How do they evolve in space and time?**" Addressing these questions, echoing landmarks in fluvial geomorphology (Montgomery & Dietrich, 1988), is of the utmost importance, both from a theoretical and practical point of view, for the key role exerted by tidal channels on the ecomorphodynamic evolution of tidal landscapes.

Despite their importance in landscape evolution, tidal channels have received less attention than their fluvial counterparts, particularly in terms of the chief processes governing their initiation and evolution. Our understanding of these processes is still incomplete and the study of tidal channel dynamics has so far evolved within separate disciplines, like e.g. those concerned with the morphometric analysis of channel features based on remote sensing, ancillary field surveys and modelling, or those related to the analysis of tidal channel stratal architecture. Studies on tidal channels carried out through a multidisciplinary approach are still in their infancy and we lack a comprehensive and predictive theory of tidal channel dynamics.

**The project aims at analyzing the origins and evolution of tidal channels**, together with their morphological characteristics, and the sedimentary structures emerging from their evolution. Towards this goal the PhD candidate will combine morphometric and sedimentological analyses, together with mathematical modeling. The planimetric configurations of tidal networks (determined from temporal sequences of high resolution images) will be analyzed on the basis modelling tools allowing one to quantitatively define channel morphological characteristics and temporal evolution. Sedimentological analyses of cores collected across channel sections and along channel axes will be used to distinguish the main types of lagoonal deposits and will emphasize the presence erosive and/or depositional trends in proximity of the channel tips and in the portions of the channels towards the outlet sections. Lateral migrations of tidal meanders will also be determined from the sedimentological structures.

**Expected Results**. The results of this project will allow the PhD candidate to:

i) bring new insight into the processes driving the initiation and morphological evolution of tidal channels;

ii) highlight similarities and differences between fluvial and tidal channels, and possibly suggest how to develop specific theories and modeling frameworks for the study of tidal channels;

v) use the results to benchmark mathematical models which, to various degrees, conceptualize and simplify the actual governing processes.

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