Proponents: Andrea D'Alpaos and Massimiliano Ghinassi

Title: Tidal vs. tidally-influenced fluvial point bars: facies distribution and implications for reservoirs production development

Project summary – The proposed project aims at providing high-resolution facies models, which can be used to predict grain-size distribution in tidal and tidally-influenced fluvial point bars, thus allowing to improve the efficiency of oil production processes.
Preliminary sedimentological and geophysical data collected by the proponents in the Venice lagoon (Northern Italy), the largest Mediterranean brackish water body, provided the bases for the present project, whose key components are (a) the acquisition of high-resolution geomorphological, geophysical, sedimentological, stratigraphic, and chronological data, and (b) the development and testing of numerical models, at the local and large scale, on the short and long term, to simulate the hydrodynamics and the morphodynamic evolution of tidal and tidally-influenced point bars.
This project will therefore involve observational ad modelling activities which will be essential to reach the scientific goals of the project, that can summarized as follows: (1) to link the morphological features and the morphodynamic evolution of tidally-influenced fluvial meander bends and of tidal meander bends with the distribution of sedimentary facies within corresponding point bars; (2) to compare facies distribution of tidal point bars with that of their fluvial counterparts and define specific depositional models; (3) to integrate and test these models with the results provided by full-fledged morphodynamic models such as Delft3D.
Coupling of high-resolution sedimentological (core logging), chronological (210Pb and 137Cs chronometers) and geophysical (sub-bottom profiler surveys) data, to be collected on modern tidal and fluvial pointbars in the Northern part of the Venice lagoon, and numerical modeling of channel bend morphodynamics, will allow us to use the conventional information on sedimentary facies from well cores to recognize specific changes in the meander development and to predict their consequences for the point bar architecture, geometry and heterogeneity, as well as to improve current understanding of the governing processes and possible stratigraphic implications.

Grants: the PhD scholarship is part of a research project sponsored by Shell and the related costs are fully covered by Shell.