



Present-day changes of Sf. Gheorghe (Danube) arm mouth long-term evolution pattern

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St. George arm is one of the three main distributaries of the Danube, whose mouth evolved in natural conditions, being free of direct engineering works. New radiocarbon dates show that the modern wave-influenced St. George lobe of Danube delta started to build ~ 2100 yr ago. Due to the wave asymmetry and to the strong southward longshore current, St. George deltaic lobe presents a consolidated updrift wing, composed by a succession of juxtaposed beach ridges, and a downdrift wing formed by subparallel sandy ridges encased in delta plain muds which are originated from barrier islands developed at the river mouth. An evaluation of the rich cartographic database (1856-Present) supports a three-phase conceptual model for the mouth's evolution: (1) an estuary phase; (2) a secondary delta phase, and (3) a barrier island phase when the bar mouth emerges after extreme river floods. Through all phases two key characteristics have been maintained: the progradation of the updrift coast and an intense subaqueous deposition.

To quantify the role of extreme floods on the river mouth evolution we monitored the morphological response of the St. George mouth to the 2005-2006 extreme floods. Despite a major positive change in the sediment budget at the mouth, the post-flood evolution shows a rapid return towards the pre-flood state suggesting that, in the present conditions, the 50-years and 100-years return period floods have an impact at a multiannual scale only, and do not considerably affect the long term river mouth evolution, which remains erosive in nature. Instead, the long term depocenter migrated far from the river mouth, at the downdrift side of the Sacalin Island. As a result, the three-phase cyclic evolution of the river mouth has probably stopped; a new regime has emerged instead, characterized by a more stable position of the river mouth, which has become an important sediment source for far-downdrift deposition processes, but does not favours the emergence of new barrier islands near the mouth.