Geophysical Research Abstracts
Vol. 13, EGU2011-6794, 2011
EGU General Assembly 2011

Natural and far-field anthropogenic effects on the evolution of Sf. Gheorghe mouth

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Sf. Gheorghe arm is one of the three main distributaries of the Danube, forming a delta in the Black Sea. The mouth of Sf. Gheorghe is among the few large European river mouths that have been free of direct large-scale engineering works. However, channel cutting in the Danube delta since the 19th Century as well as intensive damming of the Danube after the 1970's are likely to have had far-field effects on the evolution of the mouth. We take advantage of a rich cartographic database to compare bathymetric surveys since 1856 till 2004 for analyzing volumetric changes and erosion-accretion patterns in the nearshore (delta front) zone of the Sf. George mouth. Intense floods at the beginning of the 20th Century lead to the emergence of a barrier island (Sacalin) at the mouth that transformed in a spit in the 1980's. The barrier modified drastically and continues to affect the longshore sediment transport system. The Sf. George mouth region was characterized by a generalized accretionary regime prior to 1927, while a progressively increasing erosive regime established in the 1927-1960 time interval. Intense floods between 1960 and 1975 have brought large amounts of sediment that restored the sediment budget of the mouth into positive values. However, the erosive regime quickly reestablished at the mouth after 1975, when extensive damming within Danube's hydrographic basin have started to drastically reduce the sediment discharge at the Danube mouths.