Geophysical Research Abstracts
Vol. 17, EGU2015-5427-1, 2015
EGU General Assembly 2015

Recent morphodynamic evolution of coastline of Mekong river Delta, towards an increased vulnerability

Manon Besset (1), Guillaume Brunier (2), and Edward Anthony (3)

(1) CEREGE UM 34, Europôle de l'Arbois, Aix-Marseille Université, Aix-en-Provence, France (besset@cerege.fr), (2) CEREGE UM 34, Europôle de l'Arbois, Aix-Marseille Université, Aix-en-Provence, France (gbrunier@cerege.fr), (3) CEREGE UM 34, Europôle de l'Arbois, Aix-Marseille Université, IUF, Aix-en-Provence, France (anthony@cerege.fr)

Key words: Mekong river delta – Coastal deltaic morphodynamic – Deltaic vulnerability

The complexity of coastal river deltas lies in part in aspects of sediment supply and redistribution, trapping and readjustment. The sediment supply and involved processes are governed by river-marine forcing, weather and climate, increasingly affected by humans, all within a frame of interactivity and morphodynamic equilibrium/disequilibrium that determine the evolution of the delta.
The Mekong river delta is the third largest delta in the world. It is subject to important tidal influence, alluvial contribution from the fourth largest Asian river, seasonal monsoons and associated swell and other high-energy events.
After a strong advance of over 200 km from 6.0 ka to near present (Tamura et al., 2012), the delta shoreline is rapidly and irregularly retreating, constraining the 20 million people living off the delta to suffer or adapt.
This study documents changes over the last 50 years affecting the 700 km-long shoreline of the delta based on analysis of USGS topographic maps (1965), low-resolution Landsat (1973-2014) and very high-resolution SPOT 5 (2003-2011) satellite imagery.
The results show widespread erosion of nearly 10 m/year over the period corresponding to the Second Indochinese conflict (1962-1972). Then followed a multi-decadal phase of accretion of about 8 m/yr, with spatial fluctuations of up to nearly -20 m/yr. This variability could reflect alternation of periods of resilience and self-organization in coastal sediment cells. A deceleration of accretion in the 2000s (+0.63 m/yr) and even a shift to erosion since 2011 (-1 m/s) are observed in parallel with the intensification of land-use changes, exploitation of the river-bed by sand mining, and hydropower dams (Brunier et al., 2014), and deforestation of deltaic wetlands for agriculture and fisheries(Thu et al., 2007).
These erosion trends and their spatiotemporal disparities exacerbate the vulnerability of the river delta and generate considerable risks to residents. Thus, nearly 12,000 people were evacuated from the Giang region in 2014 (Vietnam News, 2014) as a result of coastal erosion. This growing vulnerability related to erosion is combined with the problems of subsidence and susceptibility to flooding which are already rendering the Mekong river delta one of the most vulnerable and threatened deltas (Syvitski et al., 2009).