Coastal morphodynamics in subsiding areas

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The coastline evolution for 3 sites along the Northern Adriatic was simulated by numerical modeling of the sediment transport mechanisms. The effects of relative sea level changes and external sediment sources such as fluvial sediment input and nourishments are included in the analysis. Prior to the coastline evolution studies, a baseline study was performed where the different process parameters of the coastal sediment balance have been identified and quantified. The calibrated coastline evolution model was used to study the coastline development for different land subsidence scenarios which were supplied by other CENAS partners. The present work has shown that land subsidence is a main factor in the coastal sediment balance. Its importance is of the same order of magnitude as the littoral transport and the sediment input from rivers. The simulations of the coastline evolution have shown that the coastal erosion, which is observed at almost all investigated sites, can be reduced considerably, or even disappear completely if no subsidence occurred. The problems associated with subsidence are mainly of local character. The general pattern of coastal erosion in the region must be subscribed to the reduced sediment supply from the rivers. The establishment of schemes of detached offshore breakwaters has reduced the coastline retreat locally. However, in the lee side of these structures, the problems have become worse due to the lack of sediment supply from the littoral currents. This type of coastal protection will not lead to a sustainable coastal protection.