

## Human-induced changes in recent sedimentation rates in Bohai Bay, China: implications for coastal development

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In many countries, coastal planners strive to balance demands among civil, commercial strategy and environmental conservation interests for future development, particularly given the sea level rise in the 21<sup>st</sup> century. Achieving a sustainable balance is often a dilemma, especially in the low-lying coastal areas, where a large amount of fluvial sediment has been taken away by dams in the river basin. In recent years, we investigated the shore of Bohai Bay in northern China and found large-scale coastal reclamation by the sea, with a severe increase in sea level. To investigate this trend, we obtained sediment cores from near-shore in Bohai Bay, which were dated by  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$  radionuclides to determine the sedimentation rates for the last 50 years. The average sedimentation rates of Bohai Bay exceeded 10 mm/y before 1963, which was much higher than the rate of local sea-level rise. However, our results showed an overall decreasing sedimentation rate after 1963, which was not able to compensate for the increasing relative sea-level rise in that time period. In addition, our results revealed that erosion occurred after the 1980s in the shallow sea area of Bohai Bay. We suggest that this situation places the Bohai Bay coast at a much greater risk of inundation and erosion within the next few decades than previously thought, especially in the large new reclamation area. This study may be a case study for many other shallow sea areas of the muddy coast if the sea level continues to rise rapidly and the sediment delivered by rivers continues to decrease.

Keywords:  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$ , sedimentation rate, reclamation