EGU22-6215
https://doi.org/10.5194/egusphere-egu22-6215
EGU General Assembly 2022

Coastal evolution in Southern Thailand between 1990 and 2018: an application of the CoastSat toolkit.

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Coastal areas in Thailand are largely under threat from flooding as a result of a range of factors including coastal erosion, coastal land subsidence, sea level rise and climate change. The erosion of coastal areas in Thailand has been a huge concern to national and local authorities as 17% of the Thai population (approximately 11 million people) live on the coastal plains and a large part of the Thai economy revolves around the exploitation of coastal resources via tourism, fishing or farming.

A recent study estimated a mangrove forest loss of just over 45% between 1961 and 1996 (Sampantamit et al., 2020), while measurements of the shoreline evolution in 2011 by the Thai Department of Marine and Coastal Resources (DMCR) revealed high rates of erosion (>5m per year) along long stretches of sandy beaches of Southern Thailand. As a response to those emergencies, Thailand has invested a lot of money in protecting and restoring their coastal mangroves since the mid-90s, and more recently financed large realignment or replenishment plans for their beaches.

This study assessed the long-term state of coastal evolution of both the Krabi and Nakhon Si Thammarat coastlines (560 km of coastline approximately) in southern Thailand. This was undertaken using the toolkit Coastsat to digitise a time series of shoreline positions from freely available satellite images between 1990 and 2019. . Based on these digitised shorelines and the use of the software DSAS, it was possible to identify shoreline change, which varied between -66 to +16.4 m/y in the mangroves of Nakhon Si Thammarat and -22.2 to +10.6 m/y on its sandy beaches. Shoreline change rates along the Krabi coast varied -34.5 to +21.7 m/year in the mangroves and -4.1 to +4 m/y on sandy beaches.

The analysis of the spatial and temporal variations of the shoreline position during the survey period reveals, in some places along the Nakhon Si Thammarat coastline, how efficient coastal defence work has been. This work also revealed the synchronicity between large and sudden coastal erosional movements and the occurrence of typhoons or tropical storms coming from the Sea of China, highlighting the importance of extreme weather events on sediment remobilisation

on the Eastern coast of Southern Thailand.

This work also supports the use of freely available semi-automated toolkits such as CoastSat to deliver crucial and reliable time series shoreline data over extensive areas. The relevance of those newly developed tools is emphasised by the current COVID 19 travel bans and restrictions, which limit travel abroad for coastal managers and researchers to. The ability to collect, visualise and analyse remotely large datasets of environmental data has been essential over the last two years.