



## **Changes in natural development of shores caused by artificial disturbance, increased cyclonic activity and related warmer winters in the Sillamäe case study area (Estonia, Gulf of Finland, Baltic Sea)**

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Prior to the founding of the town of Sillamäe in 1946 when a waste depository facility was constructed across the sediment path moving along the shore on Cape Päite, the shores nearby were one litho dynamic system with good natural balance. The shores there today are no longer in a state of dynamic equilibrium.

This study analyzes how construction along the shore, increased cyclonic activity and related warmer winters has affected Sillamäe's shores and how the shores are likely to evolve in the future. One of the aims is to detect the share of each factor to the total changes on the shores of that specific location and compare the results with the previous studies carried out in more opened shores in west Estonian Archipelago.

For purposes of this study, we undertook field observations to measure changes in the rate of erosion and accumulation of shore sediment. Waste depository is conserved and its shores are well protected by now. Sillamäe harbor has been established at the same place. Our analysis of shore processes and our direct observations indicate that the shores east of the harbor are still strongly influenced by the sea and far from dynamical equilibrium.

Over the last few decades, the average date by which the Gulf of Finland has gradually shifted from December to January, and the average date by which such ice begins to break-up has shifted earlier. As a result, the period during which wave action is free to impact the coast is longer. Such greater lack of ice cover is exposing the shores to more stormy winter months. Accordingly, as a result of increasing cyclonic activity the development of the shores in Sillamäe has accelerated and the areas affected by erosion are widening.