



Estonian national coastal monitoring programme – a good tool to follow climate change impacts and human impacts on the coasts.

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Estonia is a small country with remarkably long coastline (ca. 4,000 km). Naturally changeable, strongly indented by peninsulas and bays, and rich in islands (over 1,500 islands) coastline of Estonia is an attractive environment for eco-tourism, human settlements, economic activity and also for coastal researchers. Notably, an increasing activity in seashore dynamics in recent decades has been detected in many countries worldwide including Estonia. Particularly rapid changes occur on depositional (sand, gravel, pebble, till, silt) shores. For example, sandy beaches high in recreation value often suffer from erosion, the areas of erosion and accumulation are shifting, the waterways to harbours need frequent dredging due to siltation, etc. Additionally, an increasing pressure by human activities might be also the cause of erosion in a number of locations. Finally, the impact of climate change combined with increasing human pressure is causing even more rapid changes. The main aim of this poster is to introduce some of the most spectacular findings of this monitoring program and discuss how these results help to increase awareness of people on climate change impacts on the coast and what might be the consequences of mismanagement.

This study is based on the results obtained during the fieldwork in the study sites in different parts of Estonia as well as on the analysis of existing maps and datasets. During the fieldworks, we took GPS and RTK-GPS measurements to ascertain short-time changes in shoreline position, contours of beach ridges and location of scarps over the last two decades. Topographic survey (using levelling technique and RTK_GPS) was conducted to assess the beach profiles and the volumes of lost/gained sediments. At present, the modernization of the methodology of coastal monitoring is ongoing. The preliminary measurements are carried out in underwater sections of the monitoring sites using geophysical (acoustic-seismic) methods.

In this poster, we present three cases to show different ways of impacts to the coastal zone: a) rapid shore erosion caused by climatic changes; b) gradually worsening erosion-accumulation problem related to unsuitable harbour location and mismanagement of surrounding coastal areas; c) loss of public beach as a result of combination of climate change and wrong coastal protection measures.

The natural shoreline retreat in well exposed sandy shores at Harilaid Peninsula may reach over 10 m/year. Primary cause of these changes are shifts in the climatic condition, while direct human impact can be neglected. We have also proved that Lehtma harbour in Hiiumaa, which was established about 100 years ago in the middle of an active zone of longshore sediment transport, is causing massive lack of sediments a few kilometres down-drift resulting in over 60 m of shoreline retreat over the last half century. Our calculations show that an annual loss of the sediment budget is approximately 1500m³. Finally, rebuilding a cafeteria on Valgeranna beach after the extreme storm in 2005 and protecting it from erosion by using stone-walls has resulted in the loss of sandy beach down-drift from this cafeteria.