The non-devilish deeds of the Devil's Island - Hydrological studies on the Käsmu Peninsula

Authors: Aljaž Starič, Julija Zver, Ekaterina Likhacheva, Sofja Gorpintsenko, Polina Ivanova, Clealyandra Arm, Marit Mesi, Anneli Oro, Ivan Nikanorov, Akim Zavihhonov

Supervisor: Ronald Laarmaa
Support: Kalle Kallas

GLOBE Regional Learning Expedition 2022
Käsmu

Where we are?


Mohni saar
Pärispea
Viinistu
Pärispea poolsaar
Turbuneeme
Suurpea
Hara laht
Tapurla
Virve
Kasispea
Eru laht
Mädalaht
Käsmu
Neeme tee
Käsmu laht
Natturi
Lobi
Lahe
Koolimäe
Pedassaare
Pihlaspea
Vergi poolsaar
Vergi
Altja
Mustoja
Loksa
Rahu
Tallinna
85
Loksa
Kolga-Aabla
Hara
Vihasoo
Tammispea
Eru
Korjuse
Kooli
Võsu
Koljaku
Oandu
Tepelvälja
Lauli
Sagadi
Vihula
Valgejõgi
0 2000 4000m
X-GIS2 Maa-amet. Kõik õigused kaitstud.

Introduction

Mädalaht (Rotten Bay)

How is the sea (bays) used?

- Shipping (historically).
- Tourism: swimming, fishing, boat rides.
- Fishing.

What conditions do the sea users want?

- Clear water, warm water, deep water etc.

There are many possible uses for the sea, everyone wants something different.

We investigated hydrological parameters of Mädalaht and Käsmu laht in order to consider the possible usage opportunities.

Research questions and Hypotheses

Research questions:

1. How does the Devil's island affect the water chemistry?
2. Which bay's chemical status is better?

Hypotheses:

1. The Devil's island affects the water temperature and the oxygen level in the Käsmu bay positively.
2. It is better to swim in the Rotten bay because of the higher water transparency and warmer water.
3. The Devil's island influences the water chemistry of the bays.

Käsmu laht (Käsmu bay)

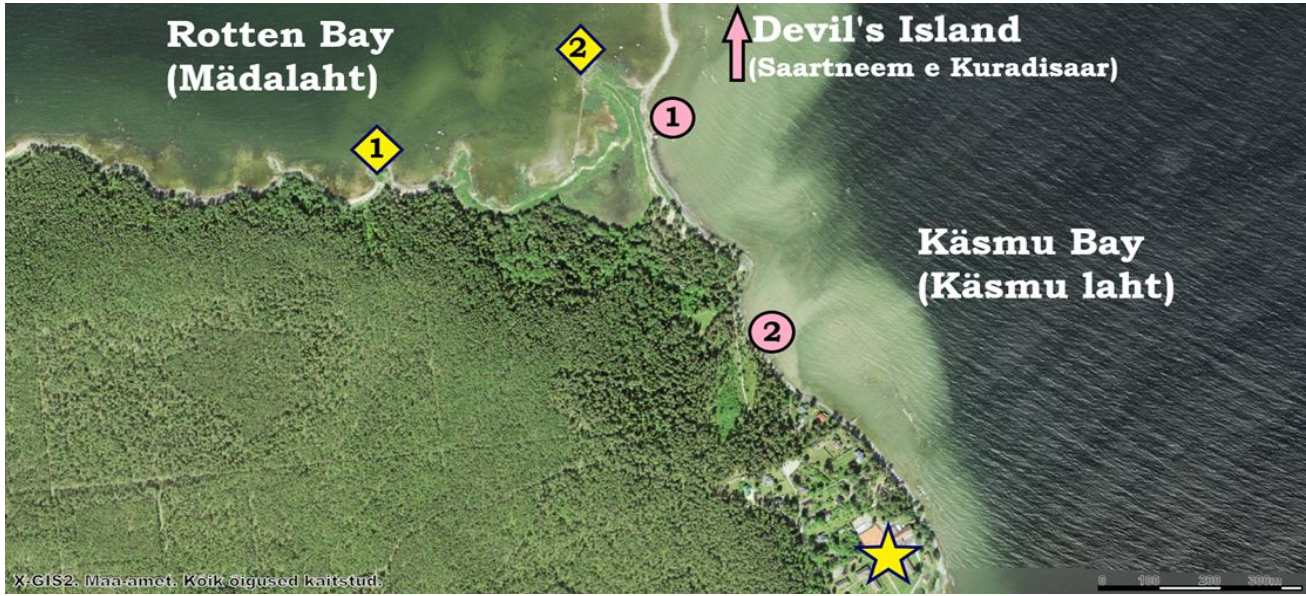
Methods

We investigated two bays, with two sampling points in each bay. Samples were analysed *in situ.*

We used globe protocols (integrated hydrology: temperature, conductivity, transparency, pH, oxygen, alkalinity, nitrates, and atmosphere).

For every parameter 3 subsamples were analysed and averaged.

Data was entered in the GLOBE Data Entry app.



Results	SITE 1 MÄDALAHT	SITE 2 MÄDALAHT	SITE 1 KÄSMU LAHT	SITE 2 KÄSMU LAHT
Sampling time, UTC	11:49	12:29	13:02	13:43
Water temperature, °C	21,8	24,1	21,8	22,3
Dissolved oxygen, mg/l	9	10	9,6	10,2
pH	8,5	8,5	8,2	8,4
Conductivity, µS/cm	9683	9256	9799	9712
Alkalinity (HCO3-), mg/l	93,5	85,4	109,8	105,7
Nitrates (NO3-), mg/l	1	1	1	1
Transparency, m	>1,2	>1,2	0,8	0,5

Discussion and Summary

Most of the parameters were in a **normal** range, only transparency in Käsmu bay was **lower** than expected.

1. The Devil's island affects the water temperature and the oxygen level in the Käsmu bay positively - **PARTIALLY TRUE**
   Käsmu bay is open to the winds and deeper so the water is colder. The Devils Island protects the Rotten bay from the North-East winds so the water is warmer.
2. It is better to swim in the Rotten bay because of the higher water transparency and warmer water - **TRUE**
3. The Devil's island influences the water chemistry of the bays - **PARTIALLY TRUE**
   There were minor differences between Käsmu bay and Rotten bay. The influence of the hydrophysical parameters (waves, currents, etc) is probably higher.

In conclusion, everybody should find the suitable environmental conditions for recreation purposes in the investigated region.

Thank you for listening!

Do you have any questions?