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Supplementary Information of

Morphosedimentary evolution of Estonian coastline: role of climatic and hydrodynamic forcing over the past decades

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Figure S1. Location of Kiipsaare lighthouse (height 25 m) in relation to the shoreline in 1999 and 2020 (photos: Ü. Suursaar).



Figure S2. Cape Sörve before (a, July 2004) and after storm Gudrun (b, January 2005) (photos: H. Tõnisson).

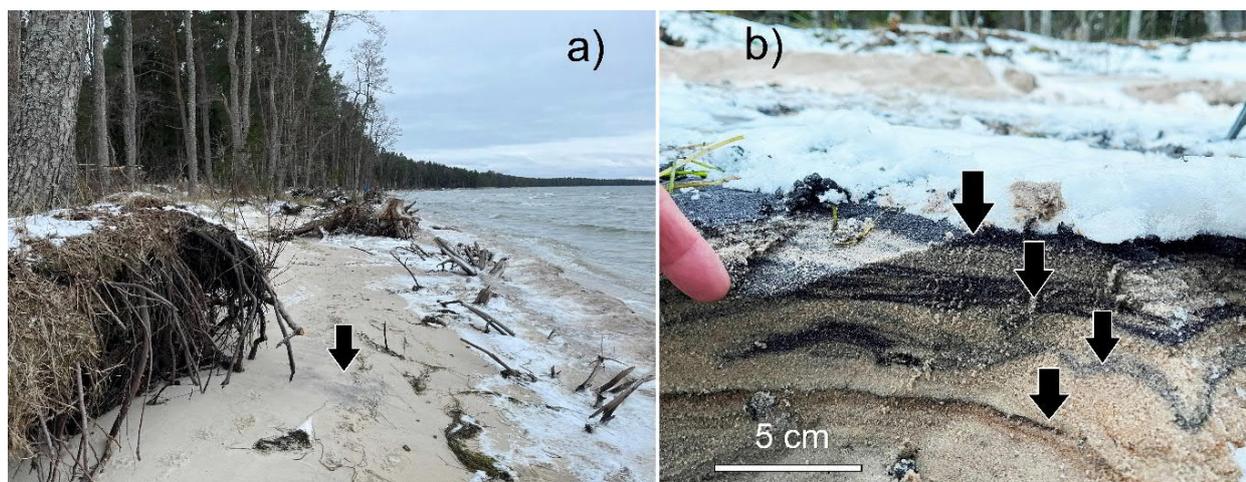


Figure S3. a) Rapid retreat at Tareste study area (near Tõrvanina campground), with fallen trees and steep erosional scarps, some of which may persist due to stabilizing root mass of still living trees (foreground). Note numerous dead root structures along the swash line and a thin heavy-mineral concentration (HMC) on the beach (arrow); b) Prominent HMCs (black horizons; arrows) on top and within a fresh beach scarp at Tareste (photos: I. Buynevich; November 2022).

Table S1. Changes by linear regression (trendline) in monthly and annual mean air temperature (°C) in 1951–2020 at coastal stations in Estonia (Fig. 1). Statistically significant changes ($p < 0.05$) are highlighted in bold.

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Kunda	2.7	4.9	4.5	2.6	2.5	0.6	1.8	2.0	2.4	0.7	2.4	3.1	2.6
Tallinn	2.1	4.5	4.1	2.9	2.4	0.5	1.8	1.5	2.0	0.2	2.1	2.7	2.3
Pakri	2.4	4.5	4.3	2.6	2.4	0.8	2.0	2.2	2.5	0.7	2.5	3.1	2.5
Virtsu	2.3	4.6	4.6	3.3	2.2	1.0	1.9	2.0	2.0	0.2	2.0	2.9	2.4
Pärnu	2.7	4.4	4.8	3.6	2.1	0.2	1.3	1.3	1.6	-	2.0	3.3	2.2
										0.1			
Kihnu	2.2	4.3	4.8	3.4	2.7	1.0	1.8	2.1	2.2	0.5	2.0	2.8	2.5
Sõrve	2.3	3.8	4.2	3.3	2.9	1.6	2.2	2.4	2.1	0.5	1.7	2.4	2.6
Vilsandi	2.3	3.8	4.2	2.9	2.7	1.6	2.2	2.6	2.3	0.7	2.0	2.7	2.5
Ristna	2.0	3.7	3.6	2.5	2.3	1.1	1.9	2.3	2.1	0.5	2.0	2.7	2.2

Table S2. Mean numbers of stormy days and their changes by linear regression during 1966–2020 in different months, autumn (September–November), winter (December–February) and entire stormy period (September–March). Statistically significant changes ($p < 0.05$) are in bold.

	Mean number of stormy days			Change by trend in the stormy days		
	Vilsandi	Sõrve	Kihnu	Vilsandi	Sõrve	Kihnu
January	3.1	3.2	2.0	1.3	1.3	-0.8
February	1.7	1.5	0.8	1.4	1.3	0.2
March	1.6	1.3	0.6	0.3	1.5	-0.6
April	0.9	0.6	0.2	-0.3	0.2	-0.2
May	0.3	0.3	0.1	0.0	0.2	0.0
June	0.4	0.3	0.1	-0.3	0.4	0.1
July	0.4	0.3	0.3	0.1	0.3	0.2
August	0.4	0.2	0.4	-0.3	-0.1	-0.8
September	1.4	1.6	1.3	-1.9	0.4	-1.7
October	2.3	2.5	2.2	-0.6	0.3	-1.9
November	3.3	3.1	2.7	-2.0	-0.4	-3.3
December	3.5	3.5	3.0	0.6	1.2	-2.3
Year	19.3	18.5	13.9	-1.8	6.7	-11.2
Autumn	7.0	8.1	5.8	-4.5	4.4	-6.9
Winter	8.3	7.3	6.2	4.0	0.4	-2.2
Storm season	16.9	16.5	12.7	0.3	6.9	-9.1