

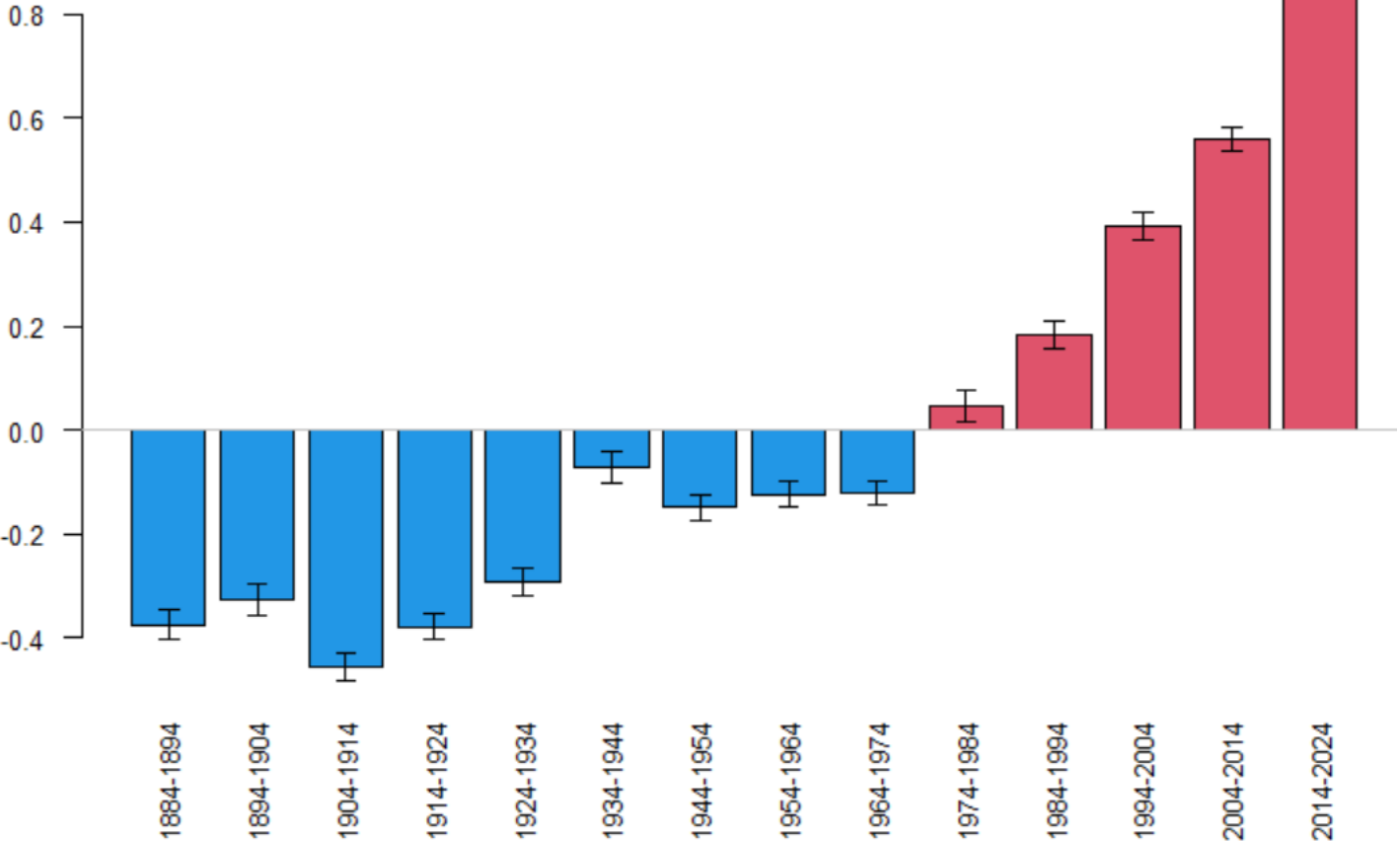
# Jacek Piskożub

## Sea level rise

Earth and Planetary Research Centre



# Observed global temperatures

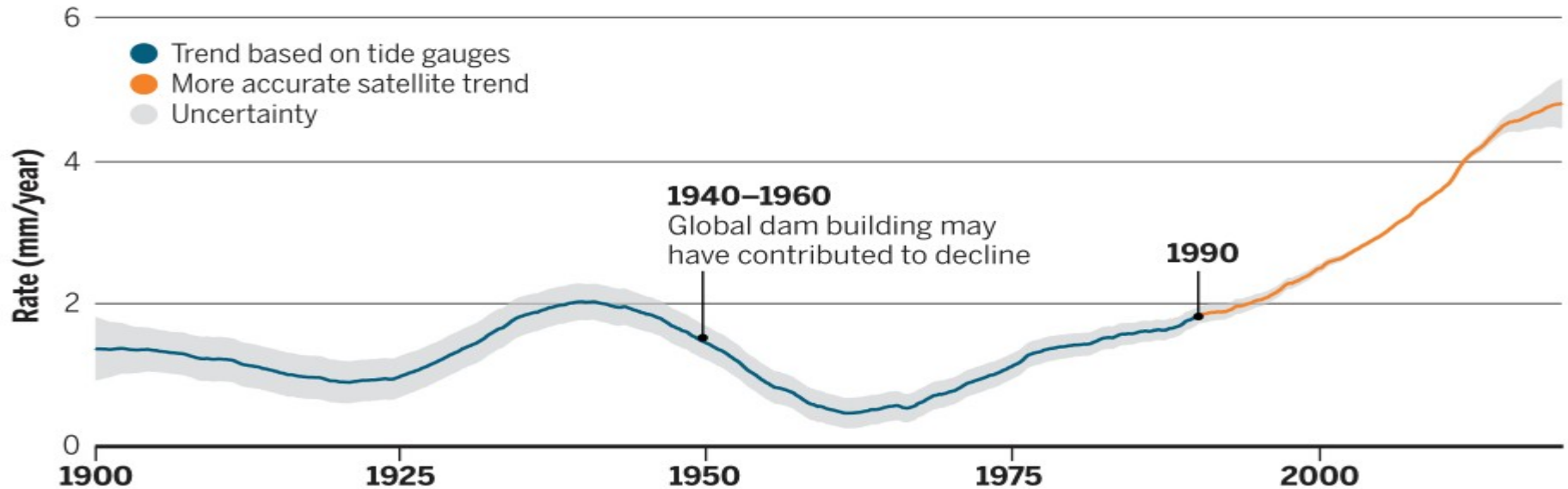


Global temperature anomalies relative to the base period 1961-1990 for decades (10-year periods) ending with years with “4” in the last position (e.g. 2024) and in October to use all available data.

# Newest news about the sea level rise rate

## High water marks

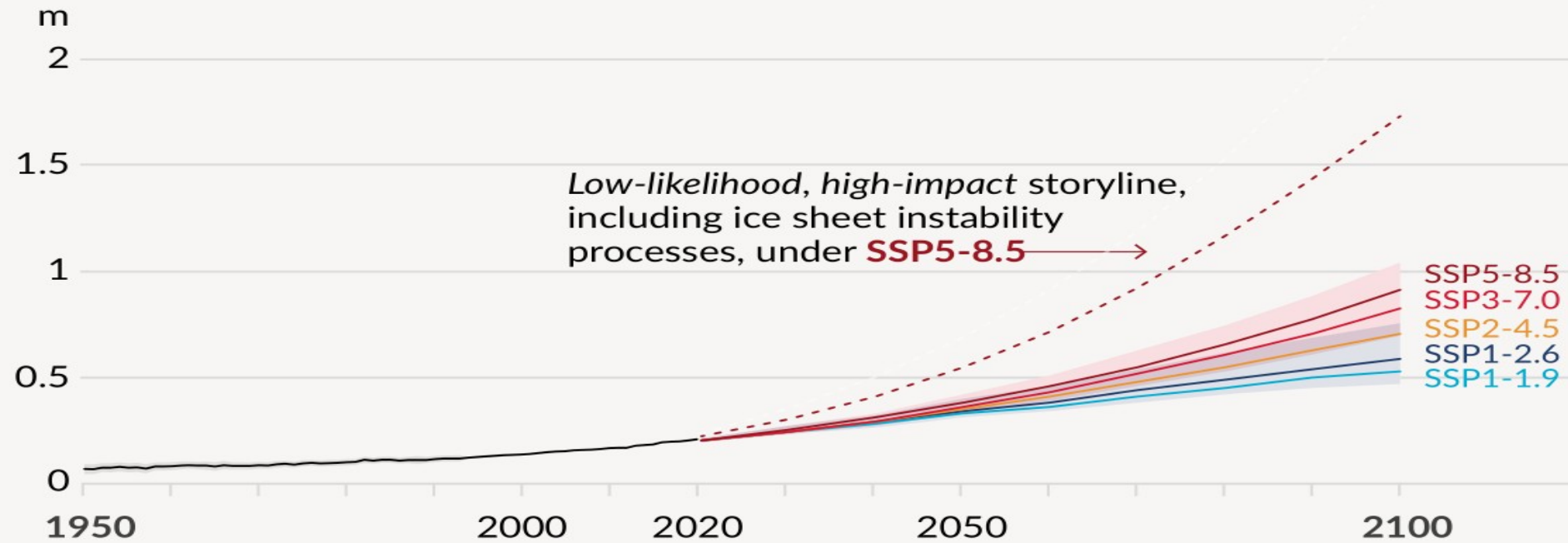
Sea level rise has been accelerating since the late 1960s. Fueled by meltwater from Greenland, seas are now rising 4.8 millimeters per year and show few signs of slowing down.



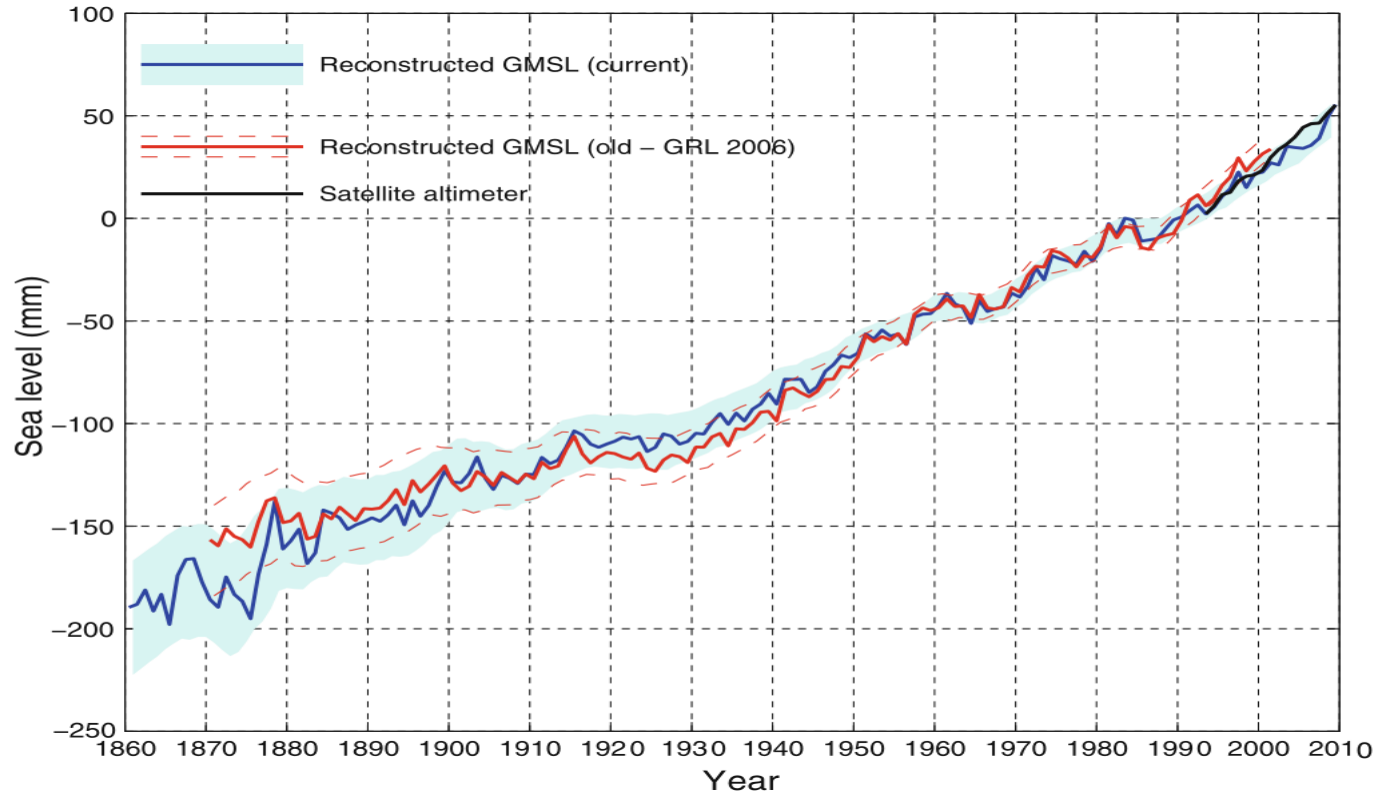
The 10-year running mean of sea level rise reached 4.8 mm/year in 2020. The rate has increased from ~2.1 mm/year in 1993 to ~4.5 mm/year in 2023

# The newest IPCC sea level rise projections

d) Global mean sea level change relative to 1900

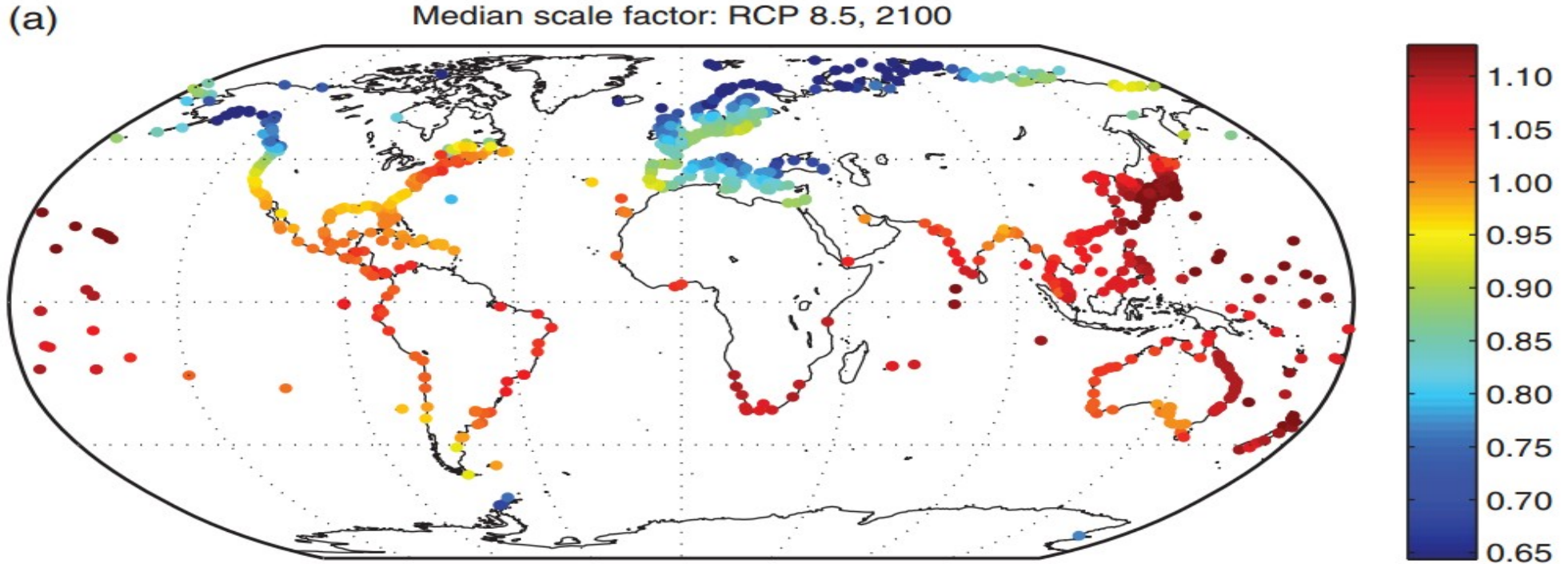


# Global sea level rise in 1960 – 2009.



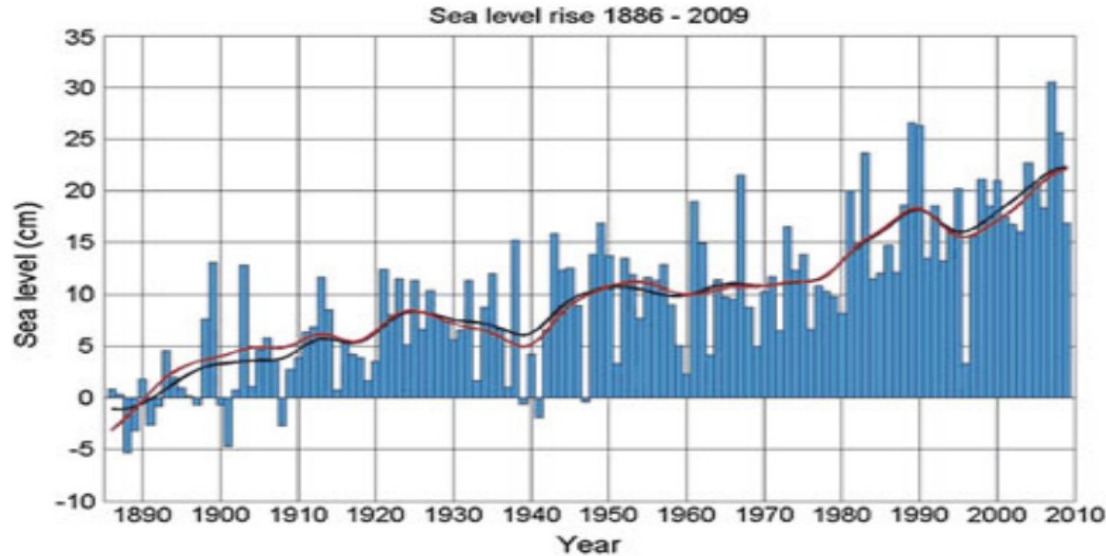
It is visible that from 1880 to 2010 the global sea level rose by about 20 cm (with a further 4-5 cm since then)

# What will be the regional sea level rise?



The scale shows in percentages how the local sea level rise will compare to the global value (100%). Low values in the polar regions and high in the tropics result from the gravitational effect of the "disappearance" of ice sheets, and other local differences, from changes in ocean circulation.

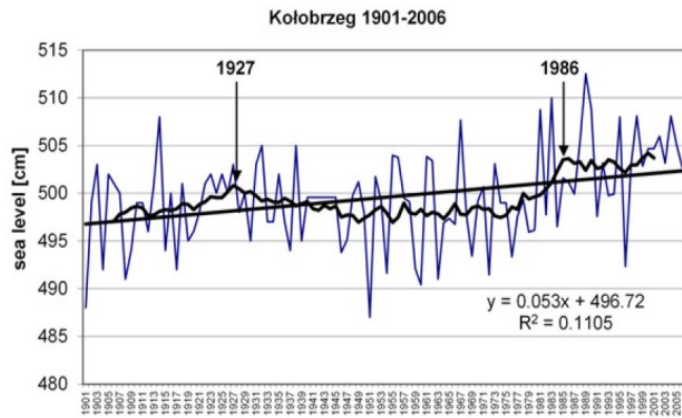
# Sea level rise at Baltic Sea measuring stations in Sweden (after taking into account the isostatic movements)



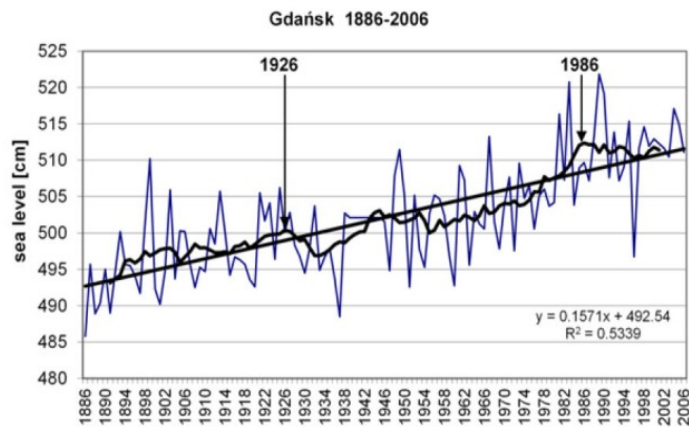
Nr	Time series	Start	a (cm/year)
1	Furuögrund	1916	1.00
2	Ratan	1891	0.94
3	Draghällan/Spikarna	1897	0.88
4	Björn/Forsmark	1891	0.78
5	Stockholm	1774	0.52
6	Landsort	1886	0.43
7	Visby	1916	0.32
8	Ölands Norra Udde	1851	0.25
9	Kungsholmsfort	1886	0.14
10	Ystad/Skanör	1886	0.06
11	Malmö/Klagshamn	1924	0.12
12	Varberg/Ringhals	1886	0.20
13	Göteborg	1887	0.30
14	Smögen	1910	0.32

Long-term trends in sea level rise in the Baltic Sea (relative to the geode) are practically equal to the global ones (a little over 20 cm in 1880-2010). However, vertical crustal movements cause large local differences (table on the right).





**Fig. 3.** Changes of the mean sea level in Kołobrzeg in 1901-2006 (the straight line represents the linear trend; the curve represents the 11-yr moving average).

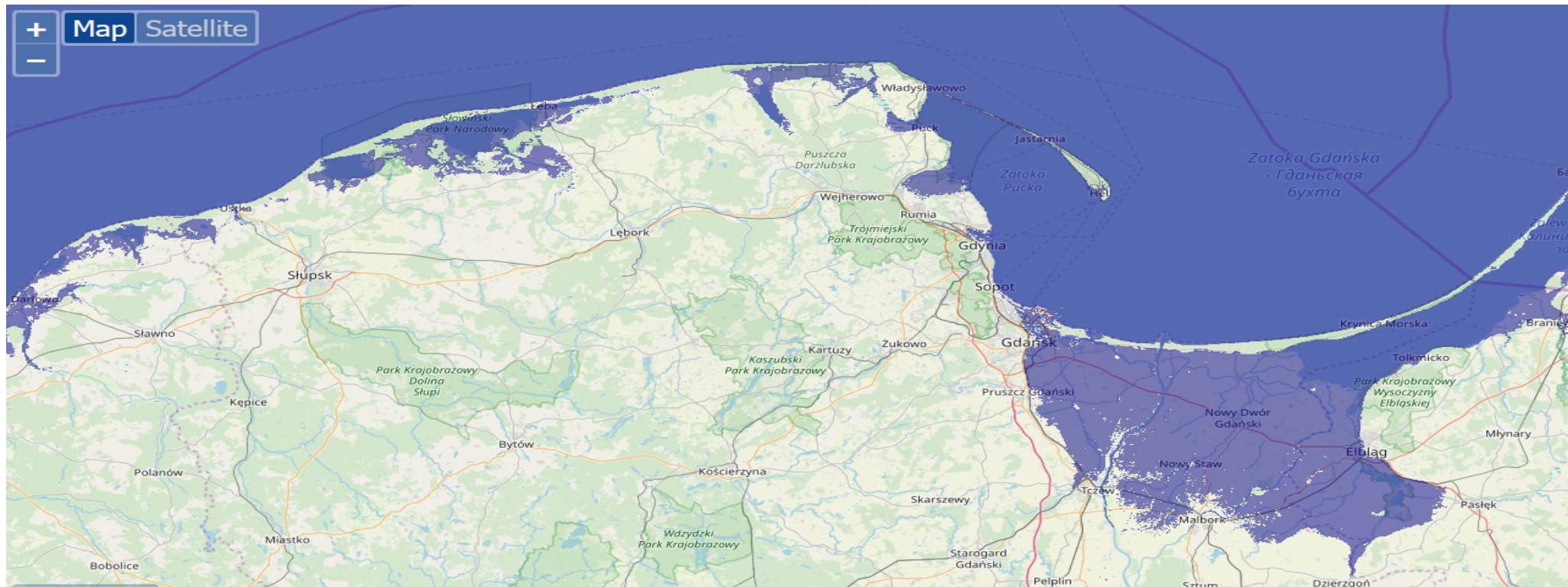


**Fig. 4.** Changes of the mean sea level in Gdańsk in 1886-2006 (the straight line represents the linear trend; the curve represents the 11-yr moving average).

# Wzrost poziomu morza na polskich stacjach: Kołobrzeg i Gdańsk

The differences in sea level rise trends for Kołobrzeg and Gdańsk seem to indicate almost zero vertical movement of Kołobrzeg and a subsidence of Gdańsk by about 1 mm per year. This causes an additional 10 cm of sea level rise per century.





Pomerania with a 2 m sea level rise, or what is likely at the end of the century with a 1 m rise and a 1 m storm surge.



Thanks for attention

R/V Oceania at the flooded Martwa Wisła pier in Nowy Port, Gdańsk during the January 4, 2017 storm surge