Sea Level Rise
Ávísi nummar 47

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Yvirlit

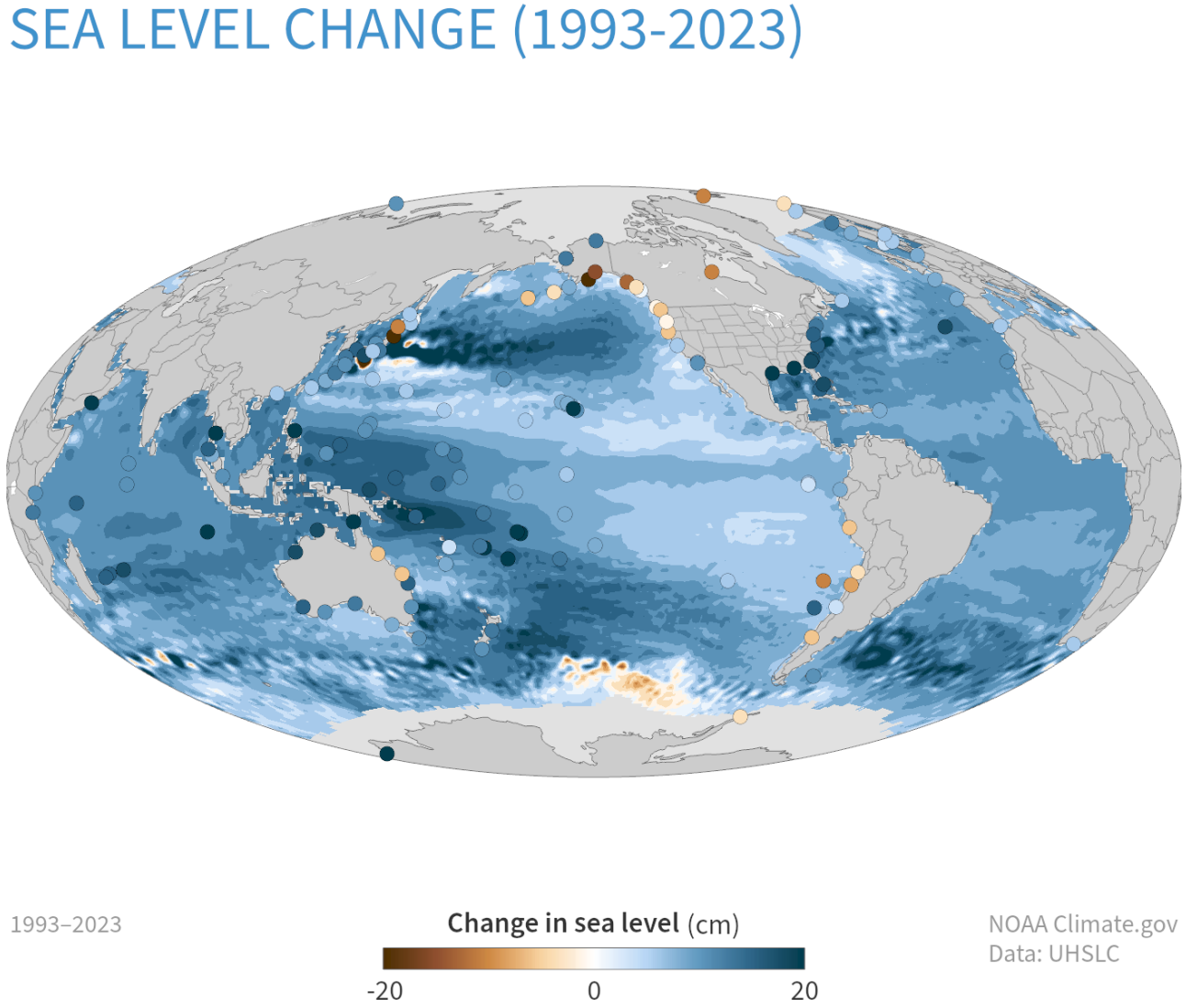
- Ávísi nummar 47
- Mátiháttur
- Miðalhækkingin í globala havstiginum
- Føroysk tøl og mátingar
  - Søguligar mátingar og mátingar í dag
- Mátingar og model
- Hvat kunna vit gera/brúka í Føroyum

Vatnstøðubretti á Tinganesi. Kelda: us.fo

Ávísi 47 - Hækkandi sjóvarmáli

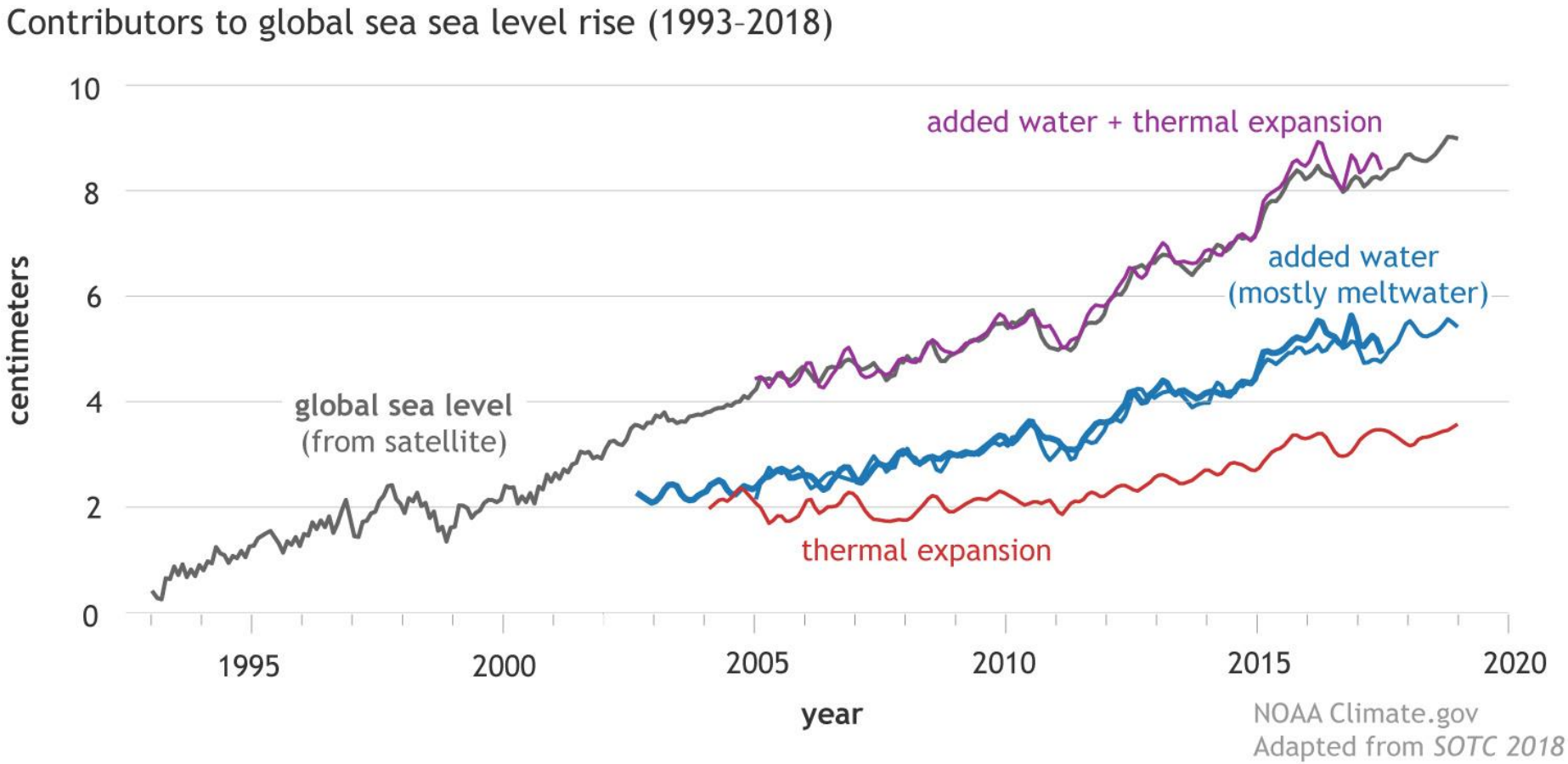
Allýsing:

- 1. stig: Ávirkan (en: impact)
- 2. stig: Tekin um veðurlagsbroytingar (en: climate change evidence)
- Tema: Hav og strendur
- Mátiháttur: Hæddarmáting
    - hæddarbroyting/ár
- Heiti: Hækkandi sjóvarmáli (en: sea level rise)
- Skilt verður millum:
    - Globala miðalhækking:
      hæddin á sjóvarmálanum í mun til eina globala geoidu
    - Broytingar í staðbundna sjóvarmálanum:
      sjóvarmálabroytingar í mun til eitt ávíst stað á landi.



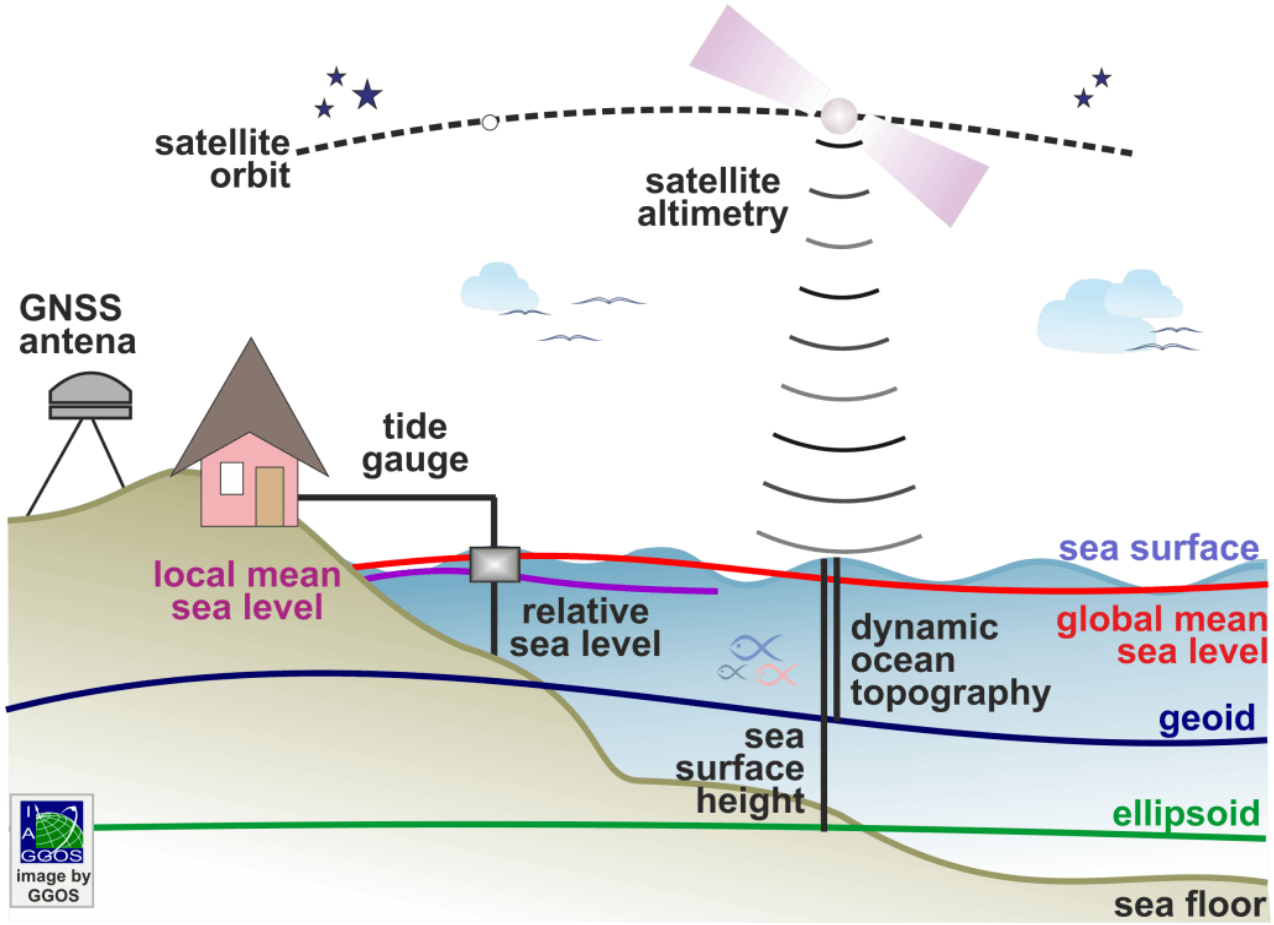
Hví hækkar sjóvarmálin?

1. Vatn legst afturat sjónum frá bráðnandi ískápum og jøklum
2. Hitavíðkan av sjónum vegna hækkandi globalan miðalhita



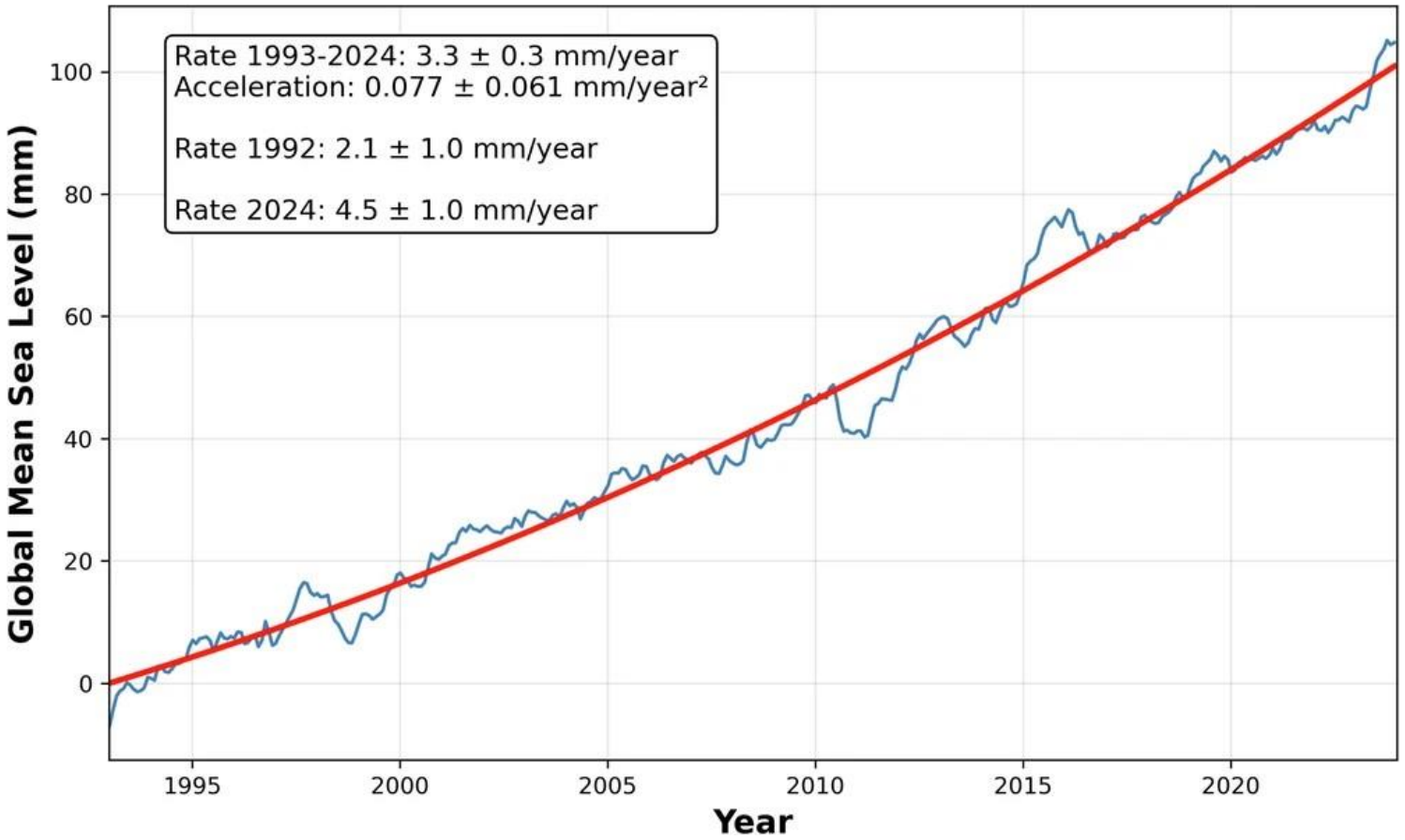
Hvussu máta vit sjóvarmálabroytingar

- Tveir høvuðshættir:
  1. Hæddarmáting við fylgisveinum (en: satellite altimetry)
     - Globalar hæddarmátingar frá fylgisveinum finnast aftur til 1993
     - Rigga best á opnum havi, uml. 50 km frá landi og longur út
  2. Vatnstøðumátarar
     - 7 vatnstøðumátar eru kring Føroyar.
     - Ein tíðarrøð hjá DMI er frá 1957-2006 úr Havn



Miðalhækkingin í globala havstiginum (1)

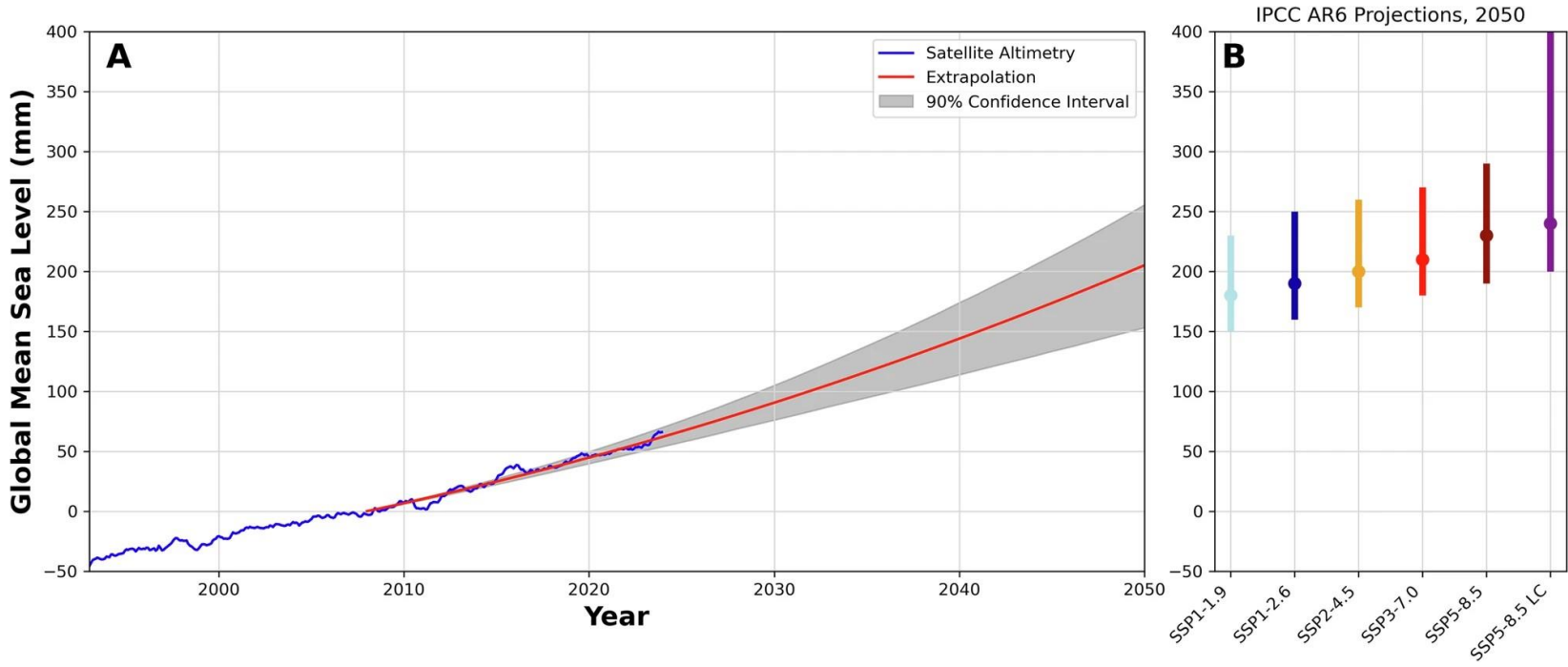
- Ferðbroyting í miðalhækkingini
  - 2.1 ± 1.0 mm/ár í 1992
  - 4.5 ± 1.0 mm/ár í 2024
- Miðalferðin í tíðarskeiðinum 1993-2024 var 3.3 ± 0.3 mm/ár



Hamlington, B.D., Bellas-Manley, A., Willis, J.K. *et al.* The rate of global sea level rise doubled during the past three decades. *Commun Earth Environ* **5**, 601 (2024). https://doi.org/10.1038/s43247-024-01761-5

Miðalhækkingin í globala havstiginum (2)

- Miðalhækkingin sambært fylgisveinahæddarmátingum (1993-2024) er 111 mm
- Við verandi gongd er sannlíkt við globalari miðalhækking yvir 169 mm næstu 30 árini



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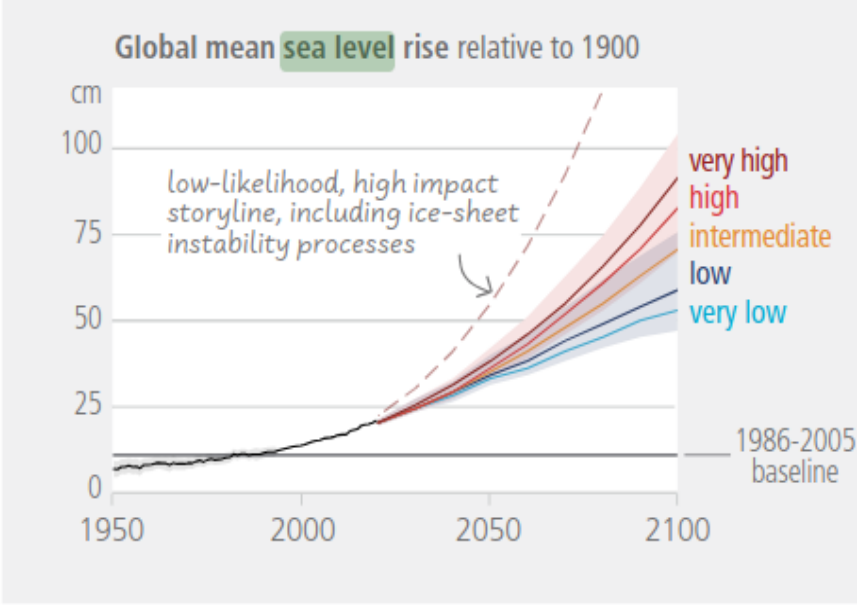
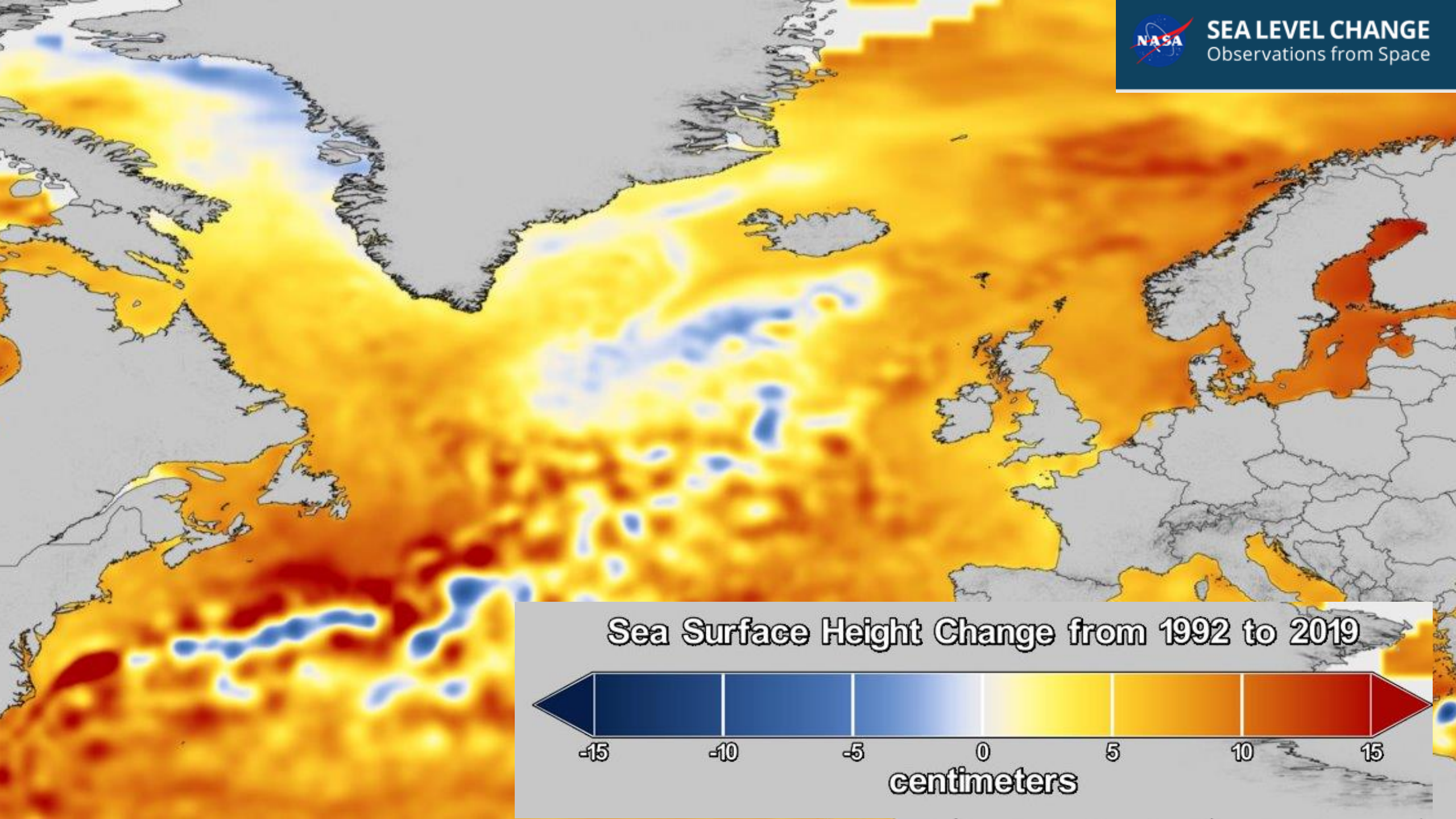
IPCC um sjóvarmálahækking

Sea level				
Global mean sea level (GMSL)	'Since 1901, GMSL has risen by 0.20 [0.15–0.25] m', and the rate of rise is accelerating.	2.3.3, 9.6.1 (Fox-Kemper et al., 2021; Gulev et al., 2021)	There will be continued rise in GMSL throughout the 21st century under all assessed SSPs (*virtually certain*).	4.3.2.2, 9.6.3 (Fox-Kemper et al., 2021; Lee et al., 2021)
Extreme sea levels	Relative sea level rise is driving a global increase in the frequency of extreme sea levels (*high confidence*).	9.6.4 (Fox-Kemper et al., 2021)	Rising mean relative sea level will continue to drive an increase in the frequency of extreme sea levels (*high confidence*).	9.6.4 (Fox-Kemper et al., 2021)



Vatnstøðu róknari:
https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool


SEA LEVEL CHANGE
Observations from Space
Sea Surface Height Change from 1992 to 2019
-15
-10
-5
0
5
10
15
centimeters

NASA sea level change róknari:

SEA LEVEL CHANGE
Observations from Space

TORSHAVN

RETURN TO MAP

Regional Relative Sea Level = Short-Term Effects + Sterodynamic Variability + Glaciers + Land Water Storage + Ice Sheets + Subsidence

Summary of Projected Totals and Rates for Select Time Periods

	1.5 °C	2.0 °C	3.0 °C	4.0 °C	5.0 °C	High Warming-Low Confidence
Total (2030)	0.13 (0.06–0.20)	0.14 (0.07–0.21)	0.14 (0.09–0.20)	0.13 (0.07–0.20)	0.14 (0.10–0.19)	0.13 (0.06–0.20)
Total (2050)	0.22 (0.10–0.36)	0.22 (0.11–0.34)	0.25 (0.18–0.34)	0.24 (0.13–0.38)	0.26 (0.20–0.35)	0.26 (0.12–0.38)
Total (2090)	0.36 (0.19–0.55)	0.39 (0.20–0.61)	0.48 (0.31–0.71)	0.49 (0.31–0.74)	0.54 (0.42–0.76)	0.59 (0.26–0.93)
Total (2100)	0.41 (0.21–0.65)	0.43 (0.24–0.67)	0.52 (0.33–0.78)	0.58 (0.34–0.89)	0.65 (0.49–0.92)	0.74 (0.31–1.19)
Rate (2040-2060)	4.0 (1.4–7.2)	4.0 (1.6–6.9)	5.6 (3.9–8.1)	5.7 (2.8–9.3)	5.3 (2.8–8.8)	5.8 (2.4–11.0)
Rate (2080-2100)	4.0 (0.8–7.6)	3.2 (0.8–6.4)	4.2 (0.3–9.1)	7.6 (3.3–13.3)	8.8 (4.4–15.2)	12.2 (2.8–28.8)

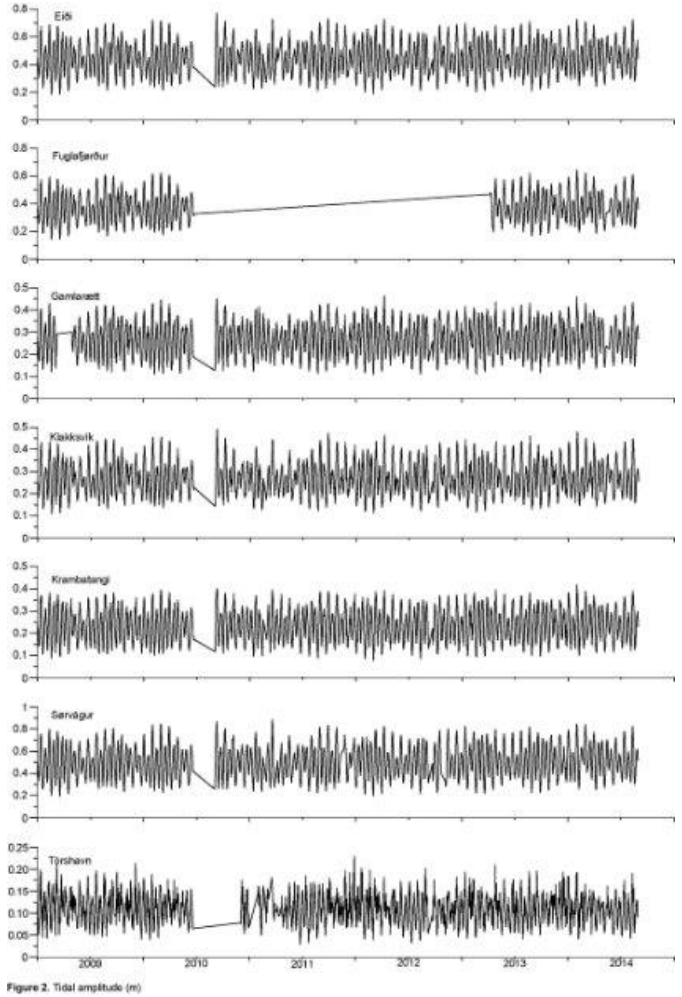


Figure 2. Tidal amplitude (m)

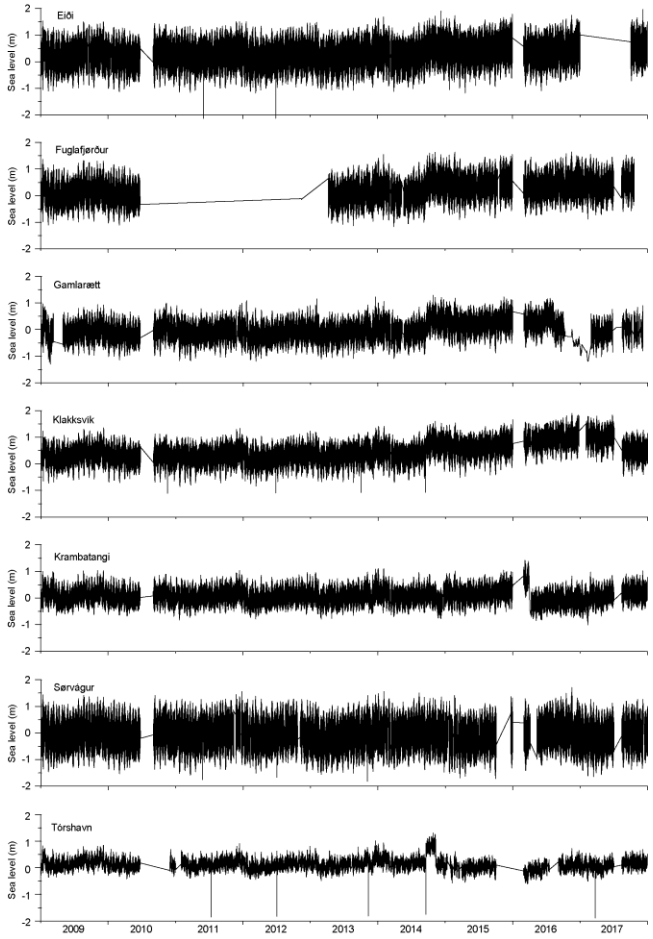


Figure 1. Raw time series of sea level height at seven Faroese coastal sites.

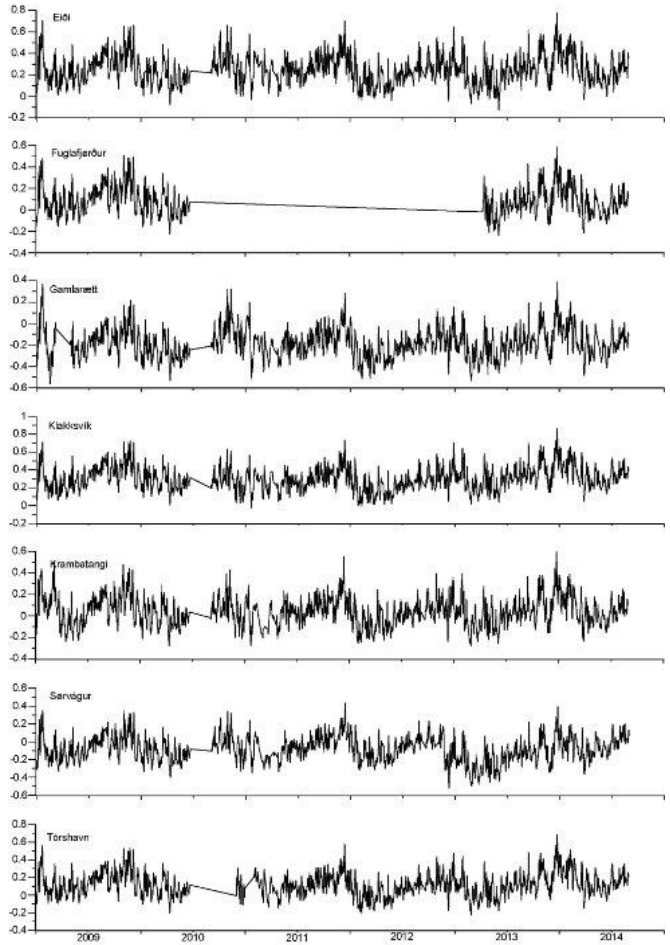
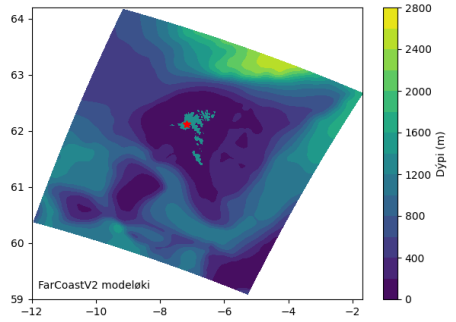
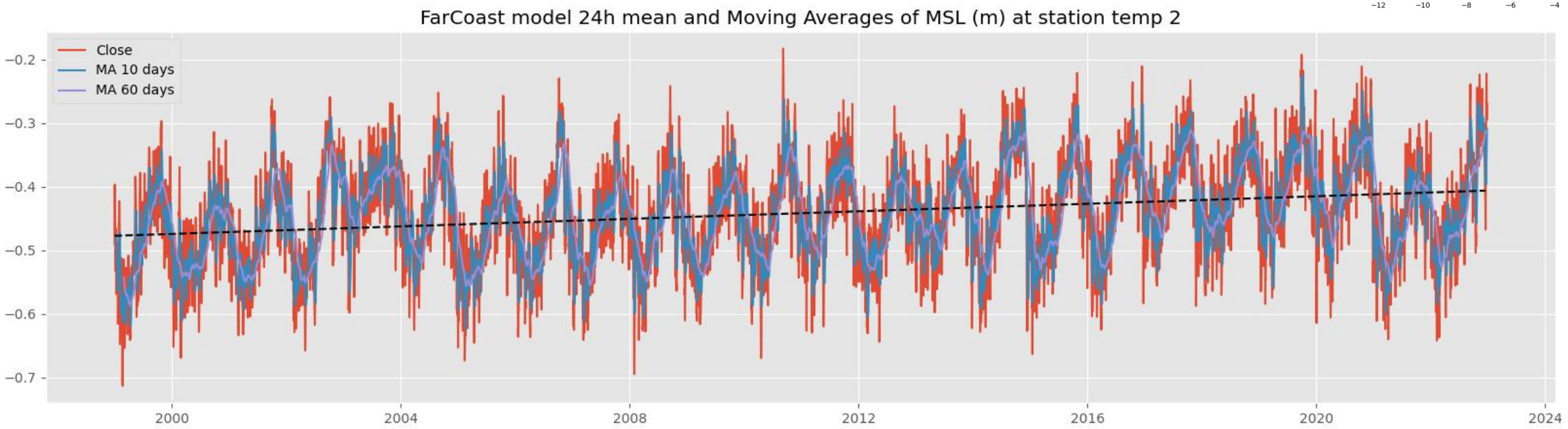


Figure 3. Lowpassed sea level height (m)

Frá í fjør (Sølvi Sjúrðarson og Bogi Hansen): Føroyskar mátingar og ósikkuheitur av mátingum

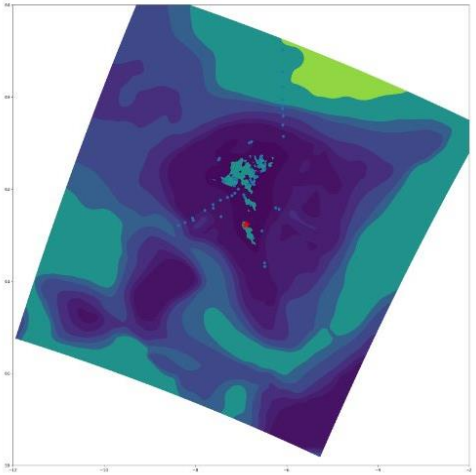
Hækking úr Føroyska havmodelinum
(FarCoast havmyndilin)

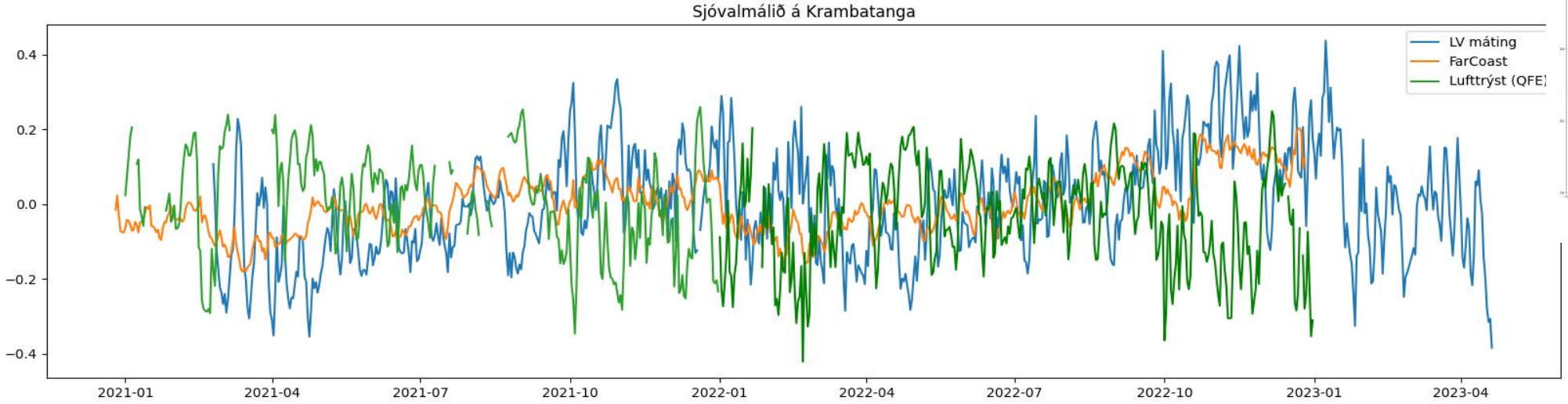


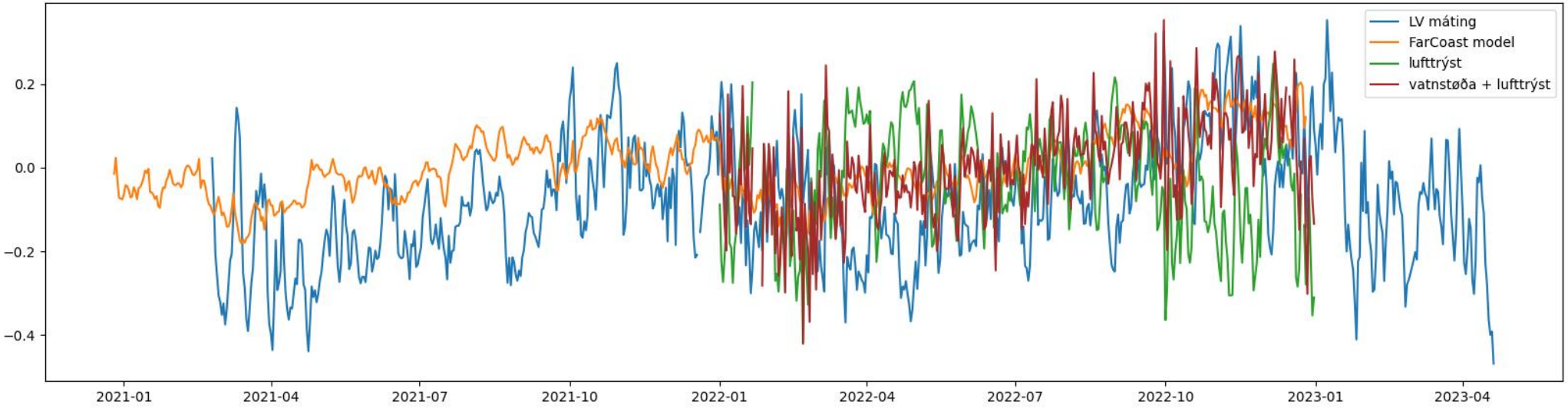


- ~ umleið 2.9 mm per ár í miðal frá 1999 til 2023 úr FarCoast
- 70,6 mm fyri alt tíðarskeiðið á hesari støð nærhendis Oyragjógv
- Eitt vet lægri enn globala økingin í vatnstøðu

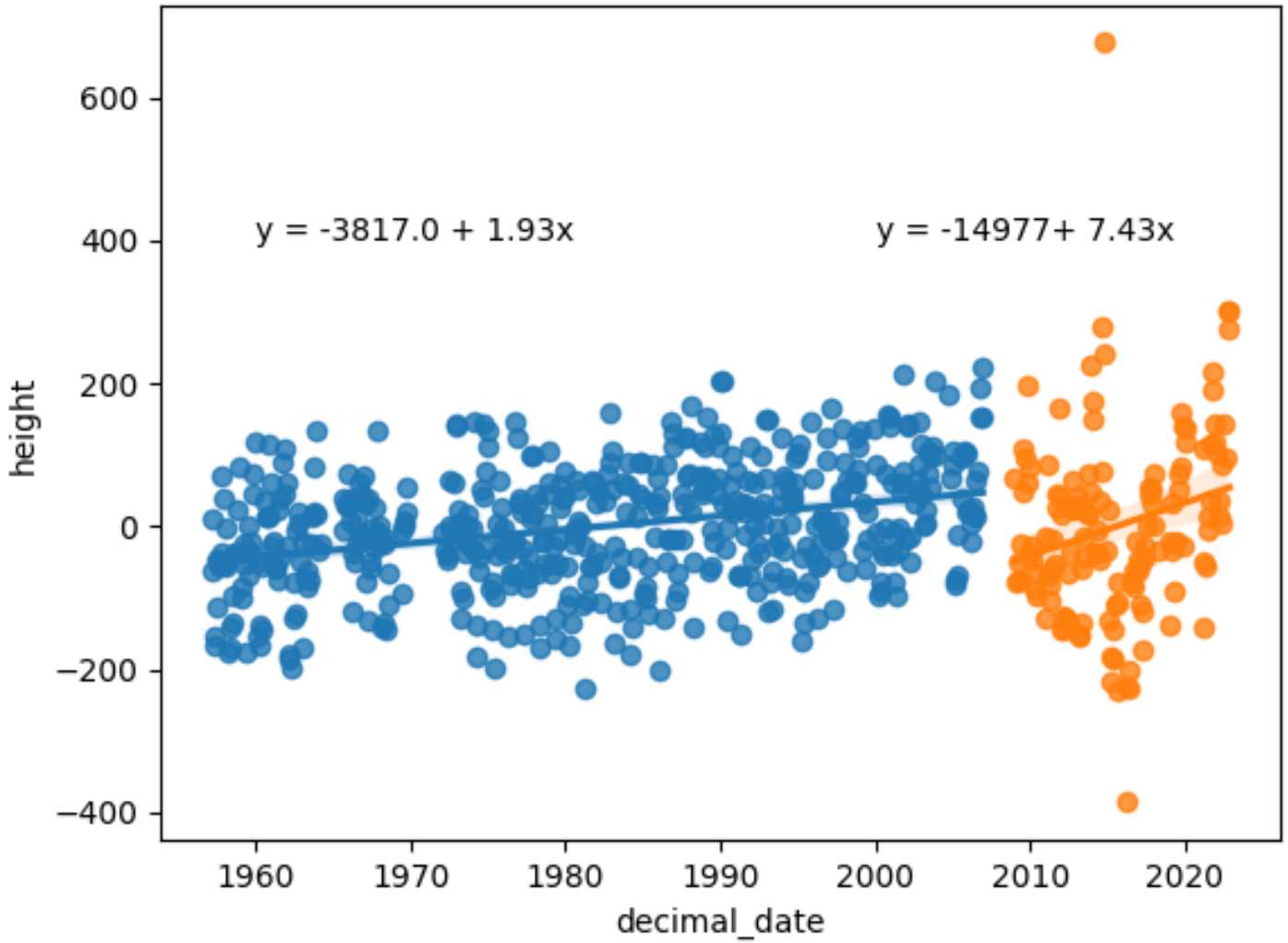
Samsvara model og mátingar?





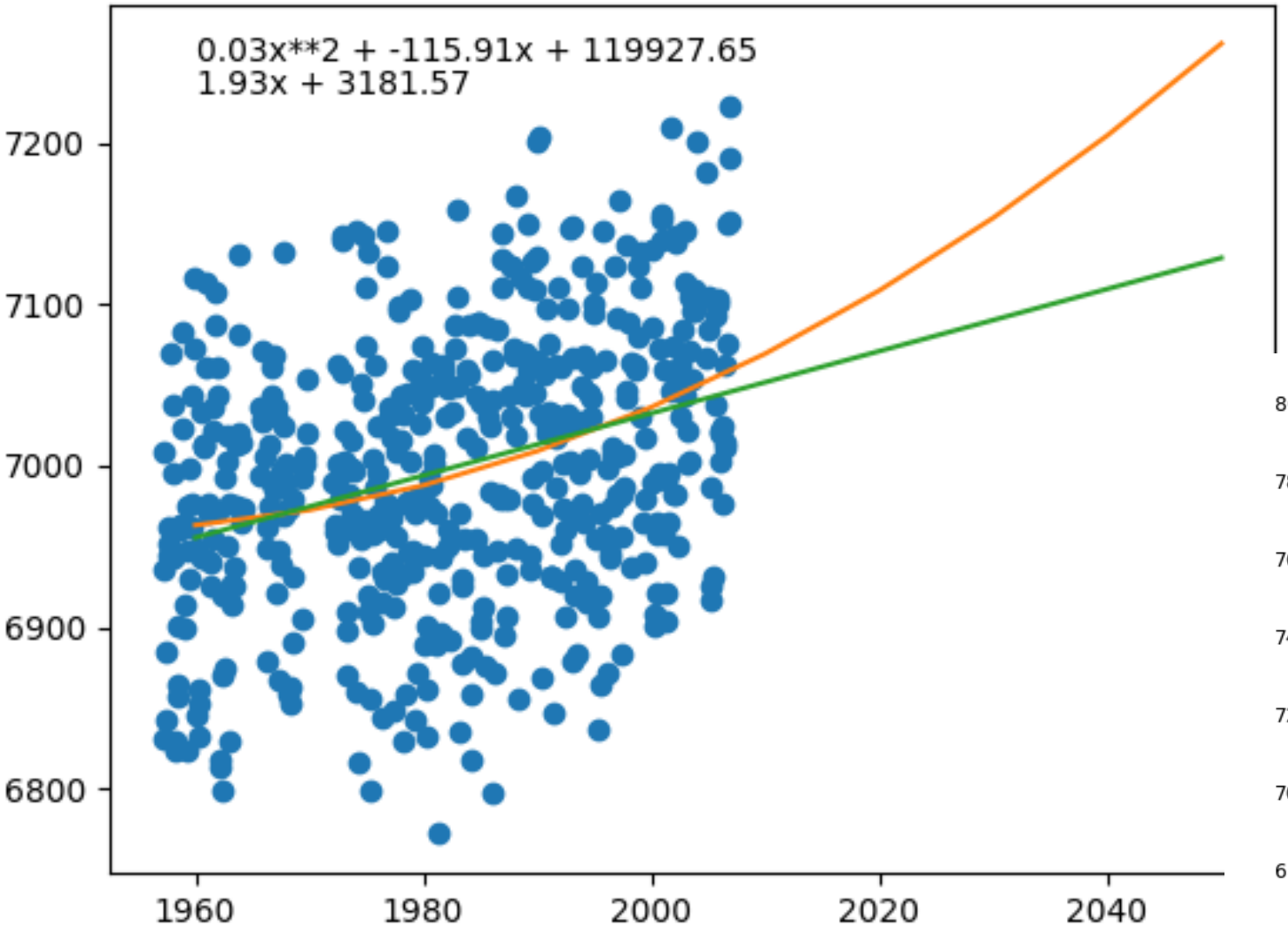


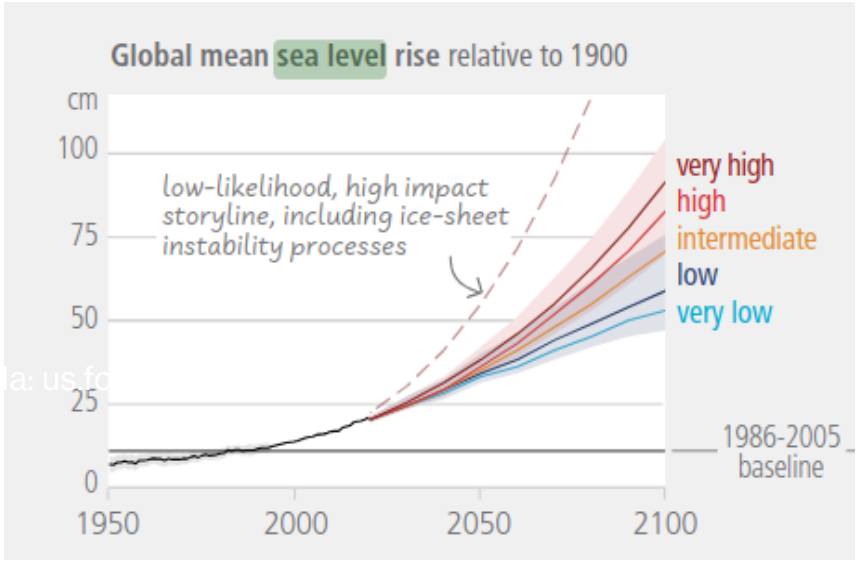
Nýggjar og gamlar mátingar frá Tórshavn

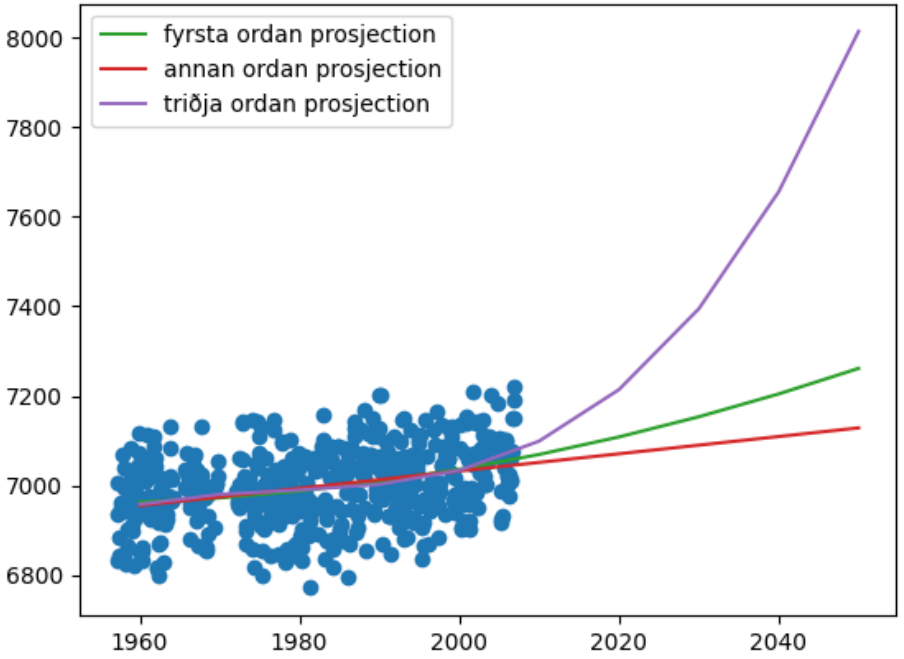


Síggja lokalar broytingar frá 2010-2023

Statistisk prosjektion frá mátingum







Samandráttur

- Globala miðalhækkingin í 2024 mett til 4,5 ± 1,0 mm/ár og økist. Í 1992 var ferðin 2,1 ± 1,0 mm/ár.
- FarCoast havmyndilin metir miðalhækkingina til 2,9 mm/ár í tíðarskeiðinum 1999-2023.
- Mátingar hjá DMI við gamla vatnstøðumátaranum í Havn vísa miðalhækking á 1,9 mm/ár frá 1957 til 2006.

- Í sambandi við hækkandi sjóvarmála í Føroyum er størsta óvissan knýtt at óstøðugum broytingum í iskápunum (Grønlandi og Antarktis)
- Næststørsta óvissan er broytingar í stórskala ráki /havstreymum nærhendis

- Hendingar sum fyrr hava verið 1:100 fara at henda 30-40 ferð so ofta (IPCC), (extreme sea levels)