



KNMI'23 *klimaatscenario's*

voor Nederland



Zeespiegelstijging

Dewi Le Bars, Erwin Lambert, Sybren Drijfhout



Program

- › Method for sea level scenarios
- › Use of the scenarios
- › Is there a need for additional information?

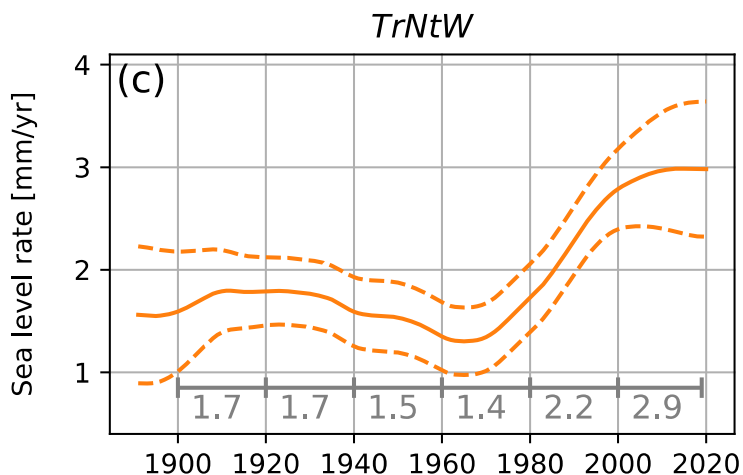
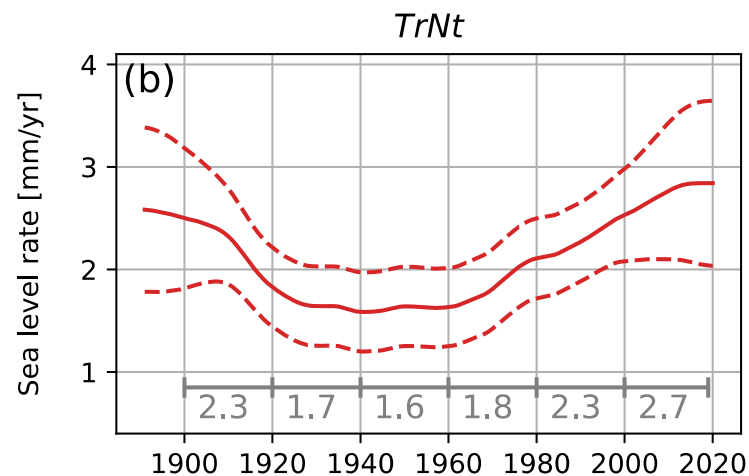
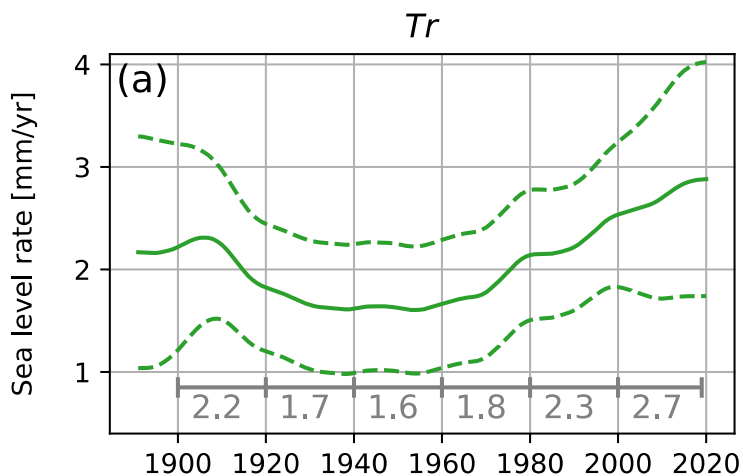


Methods

- > Connection between observations and scenarios:
 - Observed sea-level acceleration
 - Sea-level budget
 - Model selection for ODSL
 - Antarctic dynamics constrained by observations of the past decades*
- > Low-likelihood high-impact scenarios



Sea level acceleration? Yes



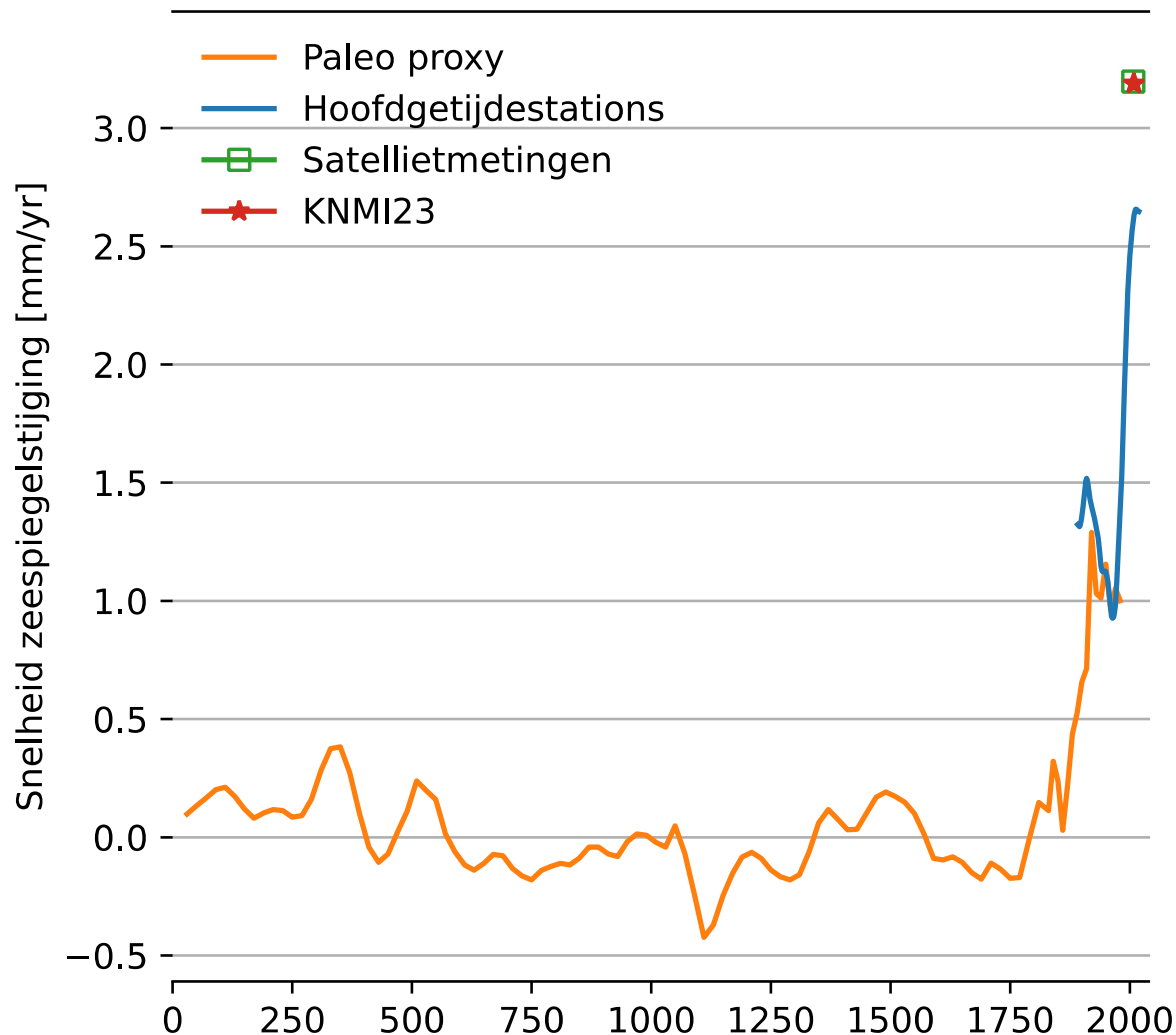
Keizer et al. 2023

We developed a new method to compute the evolution of the rate of sea-level rise along the Dutch coast (Keizer et al. 2023)

The acceleration was also detected by Steffelbauer et al. 2022 and in a new sea level monitoring report published in 2023.



Sea level rise acceleration

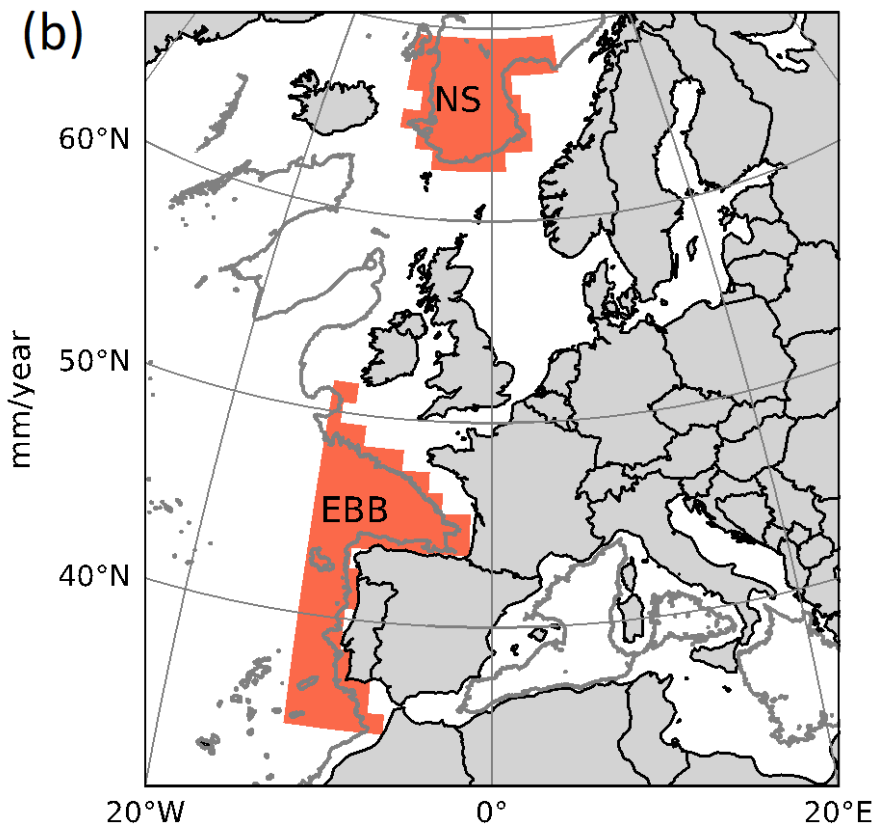
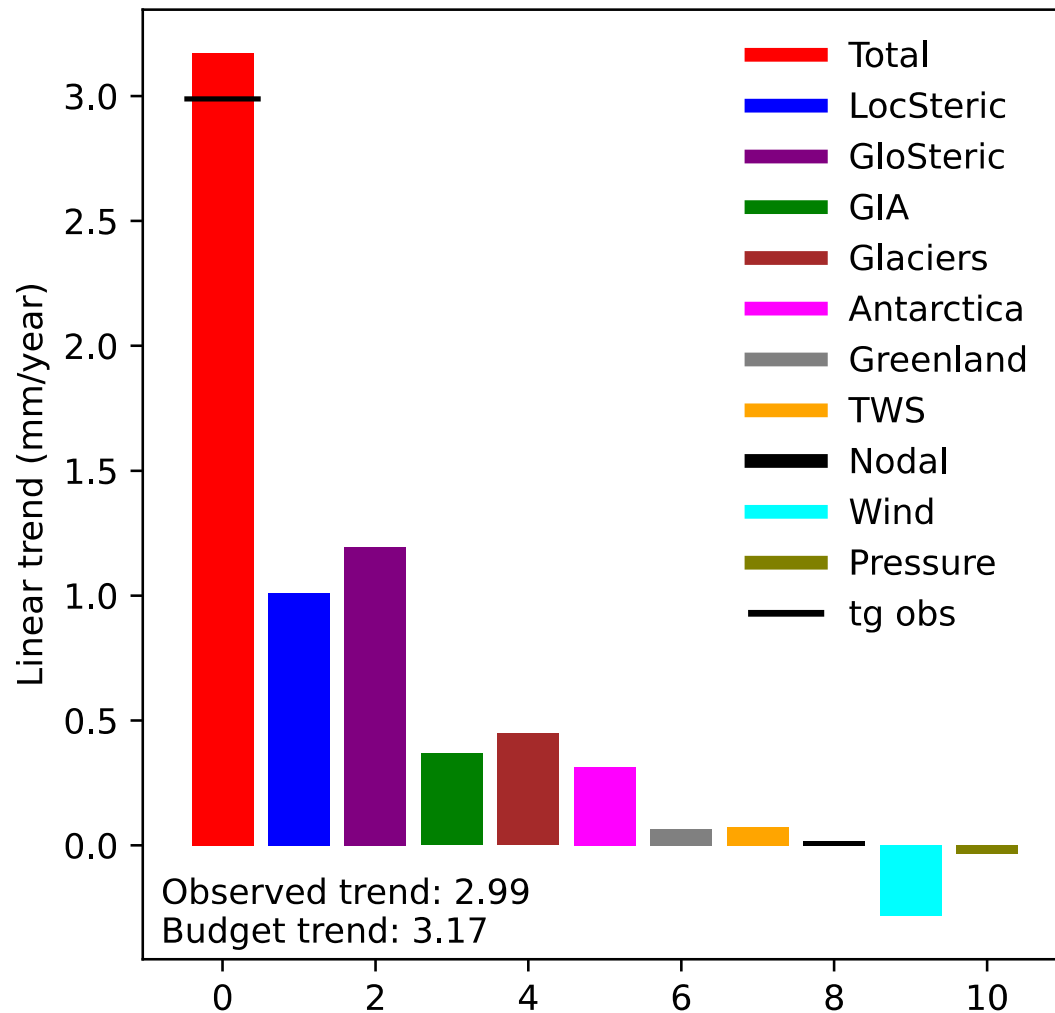


- “Global mean sea level (GMSL) rose faster in the 20th century than in any prior century over the last three millennia”
IPCC AR6
- This is also the case for the Western European coast



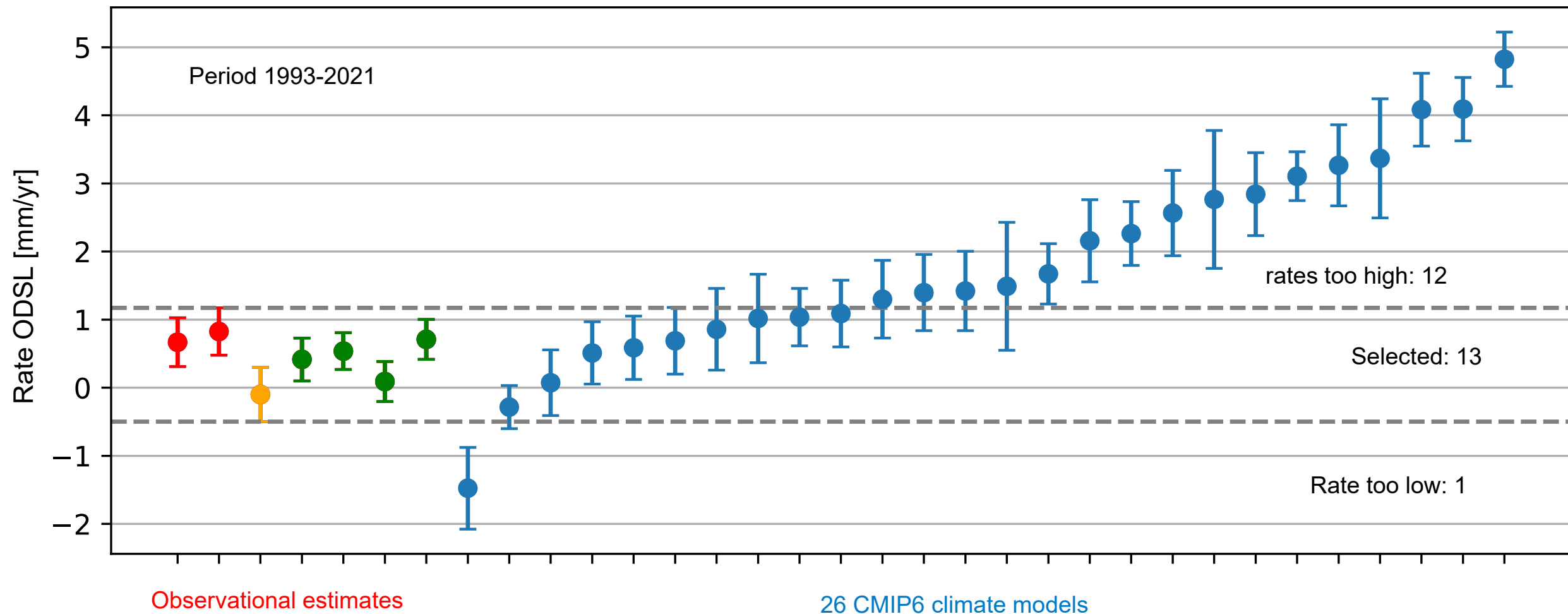
Sea level budget (1993-2021)

Linear trend budget



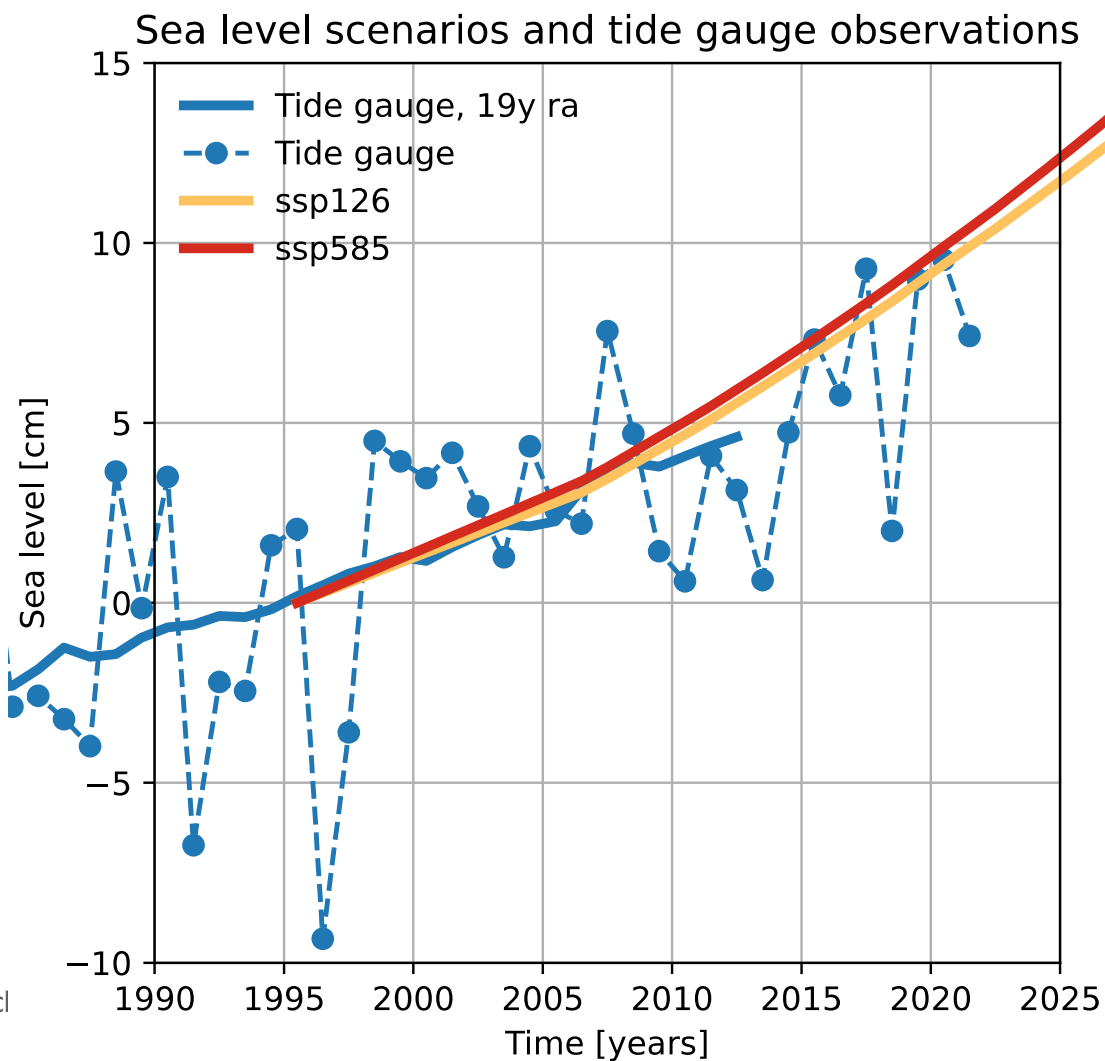


Model selection for ODSL



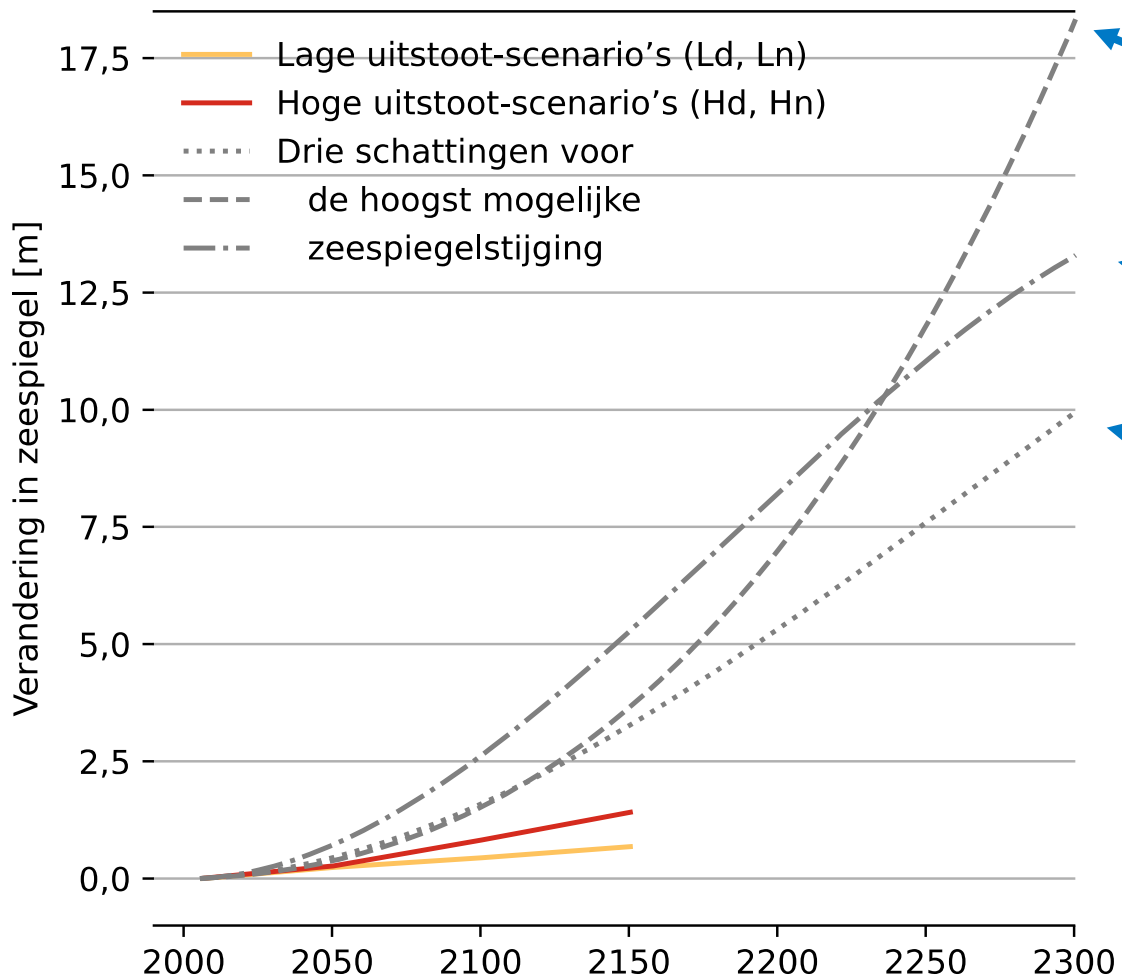


Connection between observations and scenarios





Low-likelihood high-impact scenarios



Three lines, three methods:

- Marine ice cliff instability (DeConto et al. 2021)
- Structured expert judgement (Bamber et al 2019)
- Physical evidence discussion (van de Wal et al. 2022)



Questions?



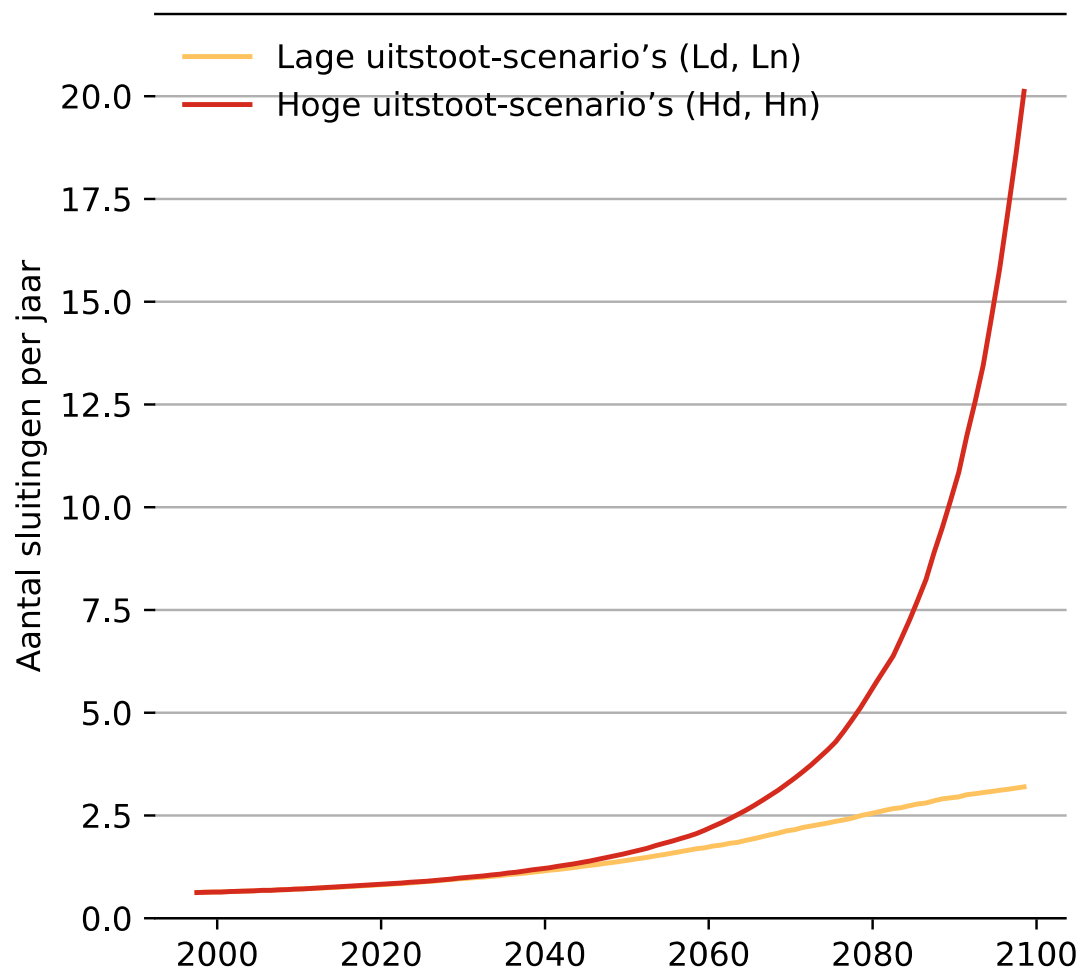
Who is using or will use the KNMI sea level scenarios?

For which application?

(Answer with microphone and/or Menti?)



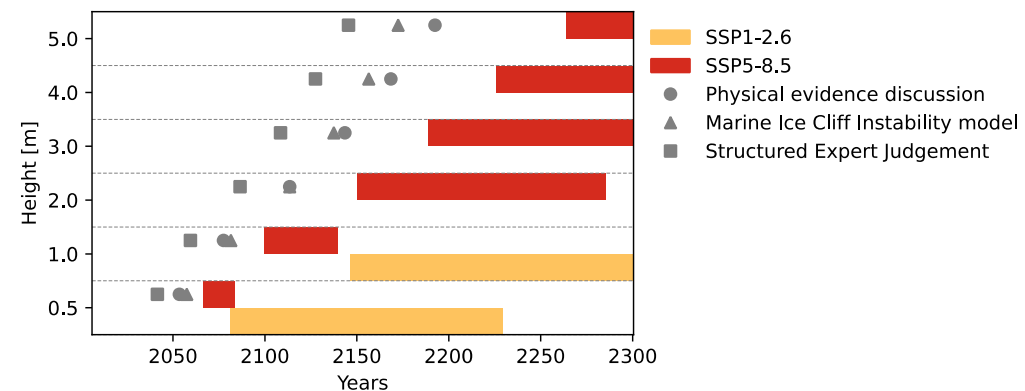
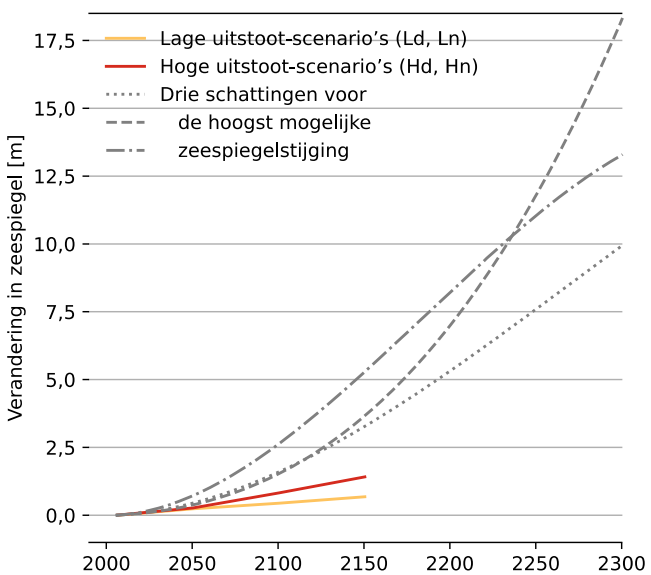
Future number of closures of the Eastern Scheldt barrier



With Robert Vos and Wilbert Huibregtse (RWS)



Are you missing information?





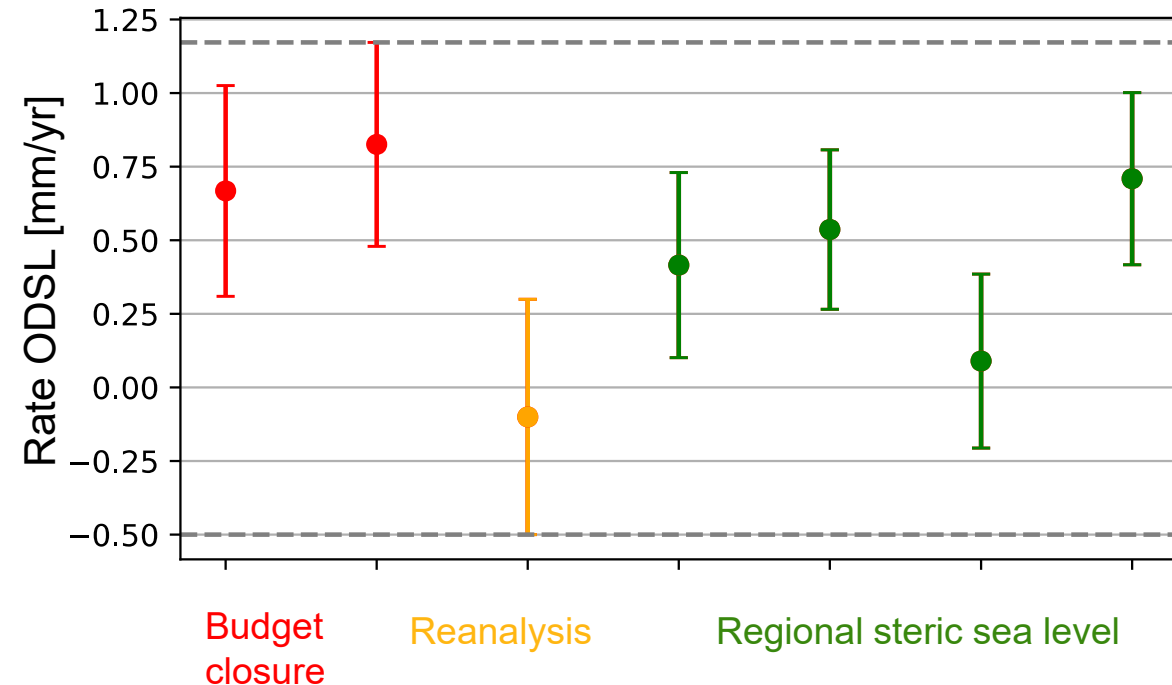
Examples of additional information

- > Learning scenarios
- > More seasonal information
- > More local
- > More short-term information
- > More long-term information
- > Different emission scenarios



Observational evidence for ODSL

Period 1993-2021



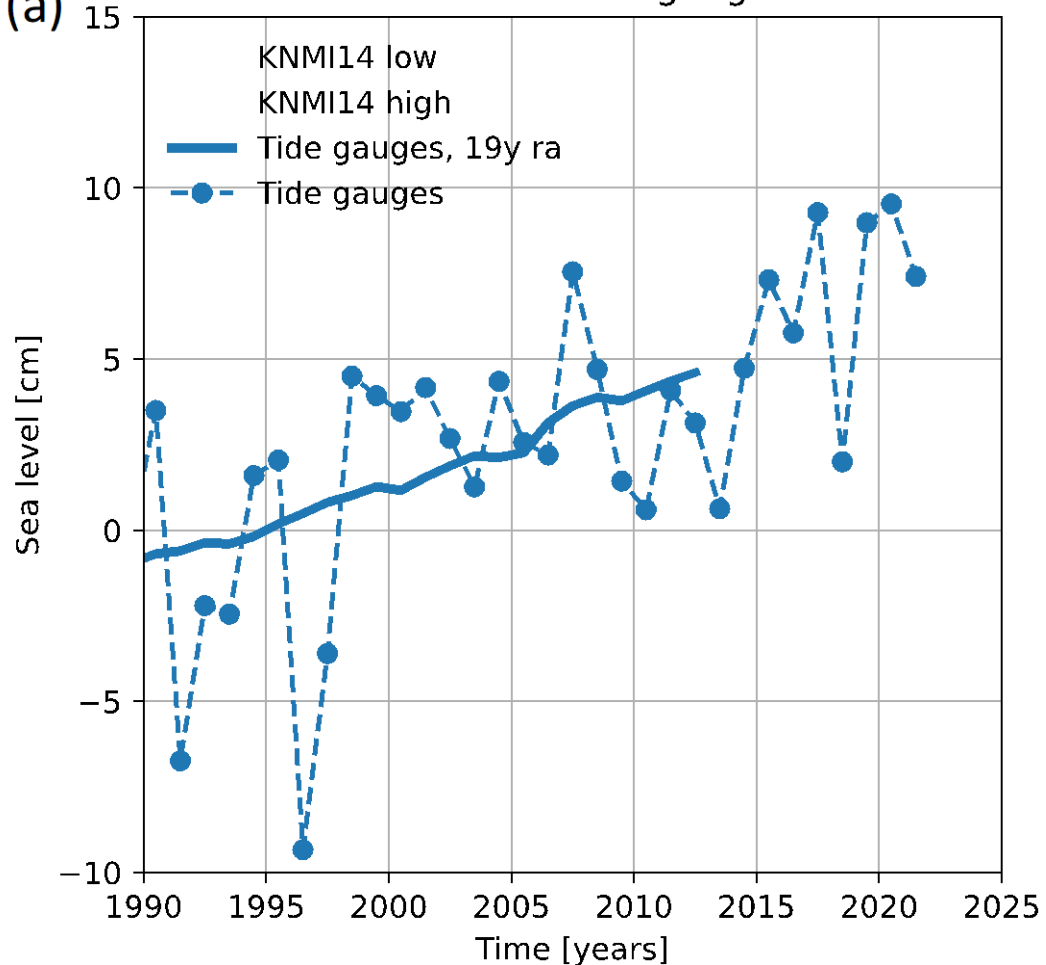
Ocean-Dynamic Sea-Level cannot be observed directly but can be estimated indirectly:

- **Reverse the sea level budget** with ODSL as unknown:
ODSL = observations – sum of other contributors (e.g. Antarctica, glaciers...)
(based on Frederikse et al. 2020)
- **Ocean reanalysis** (Simple Ocean Data Assimilation, SODA)
- Compute the **regional steric sea level** from observed temperature and salinity

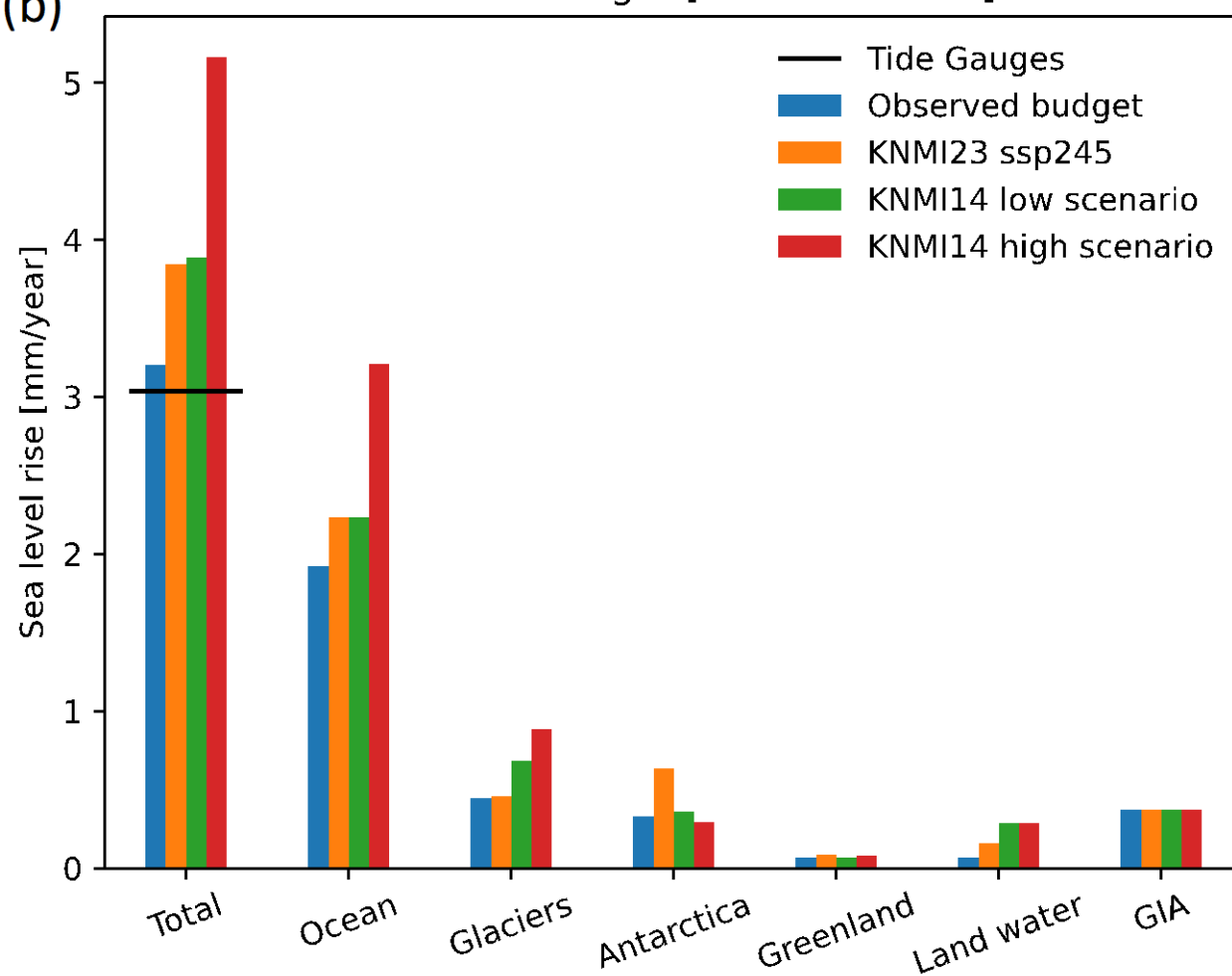


Comparing KNMI'14 with observations

(a) Sea level scenarios and tide gauge observations

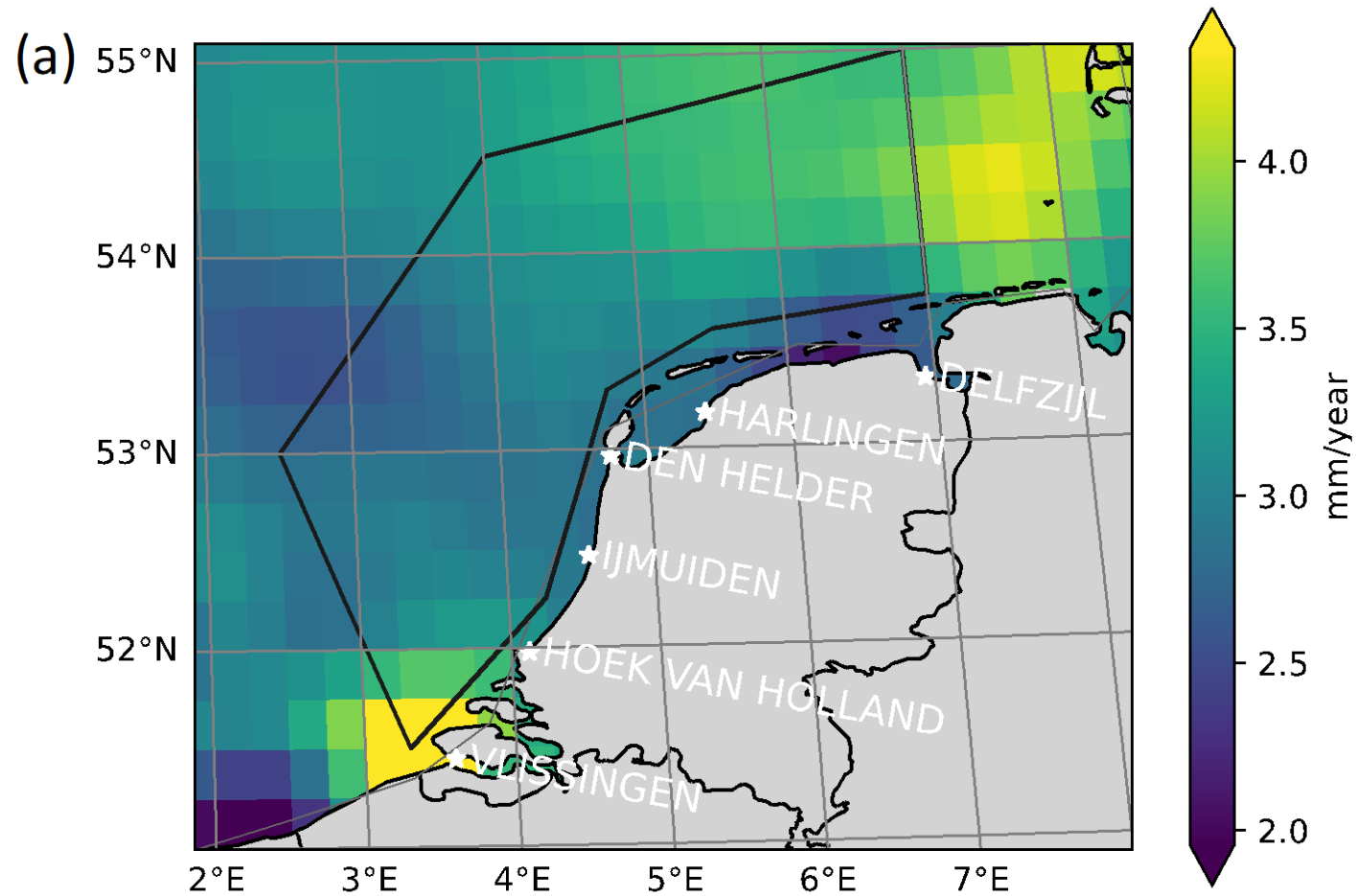


(b) Sea level budget [1995.5-2021.5]



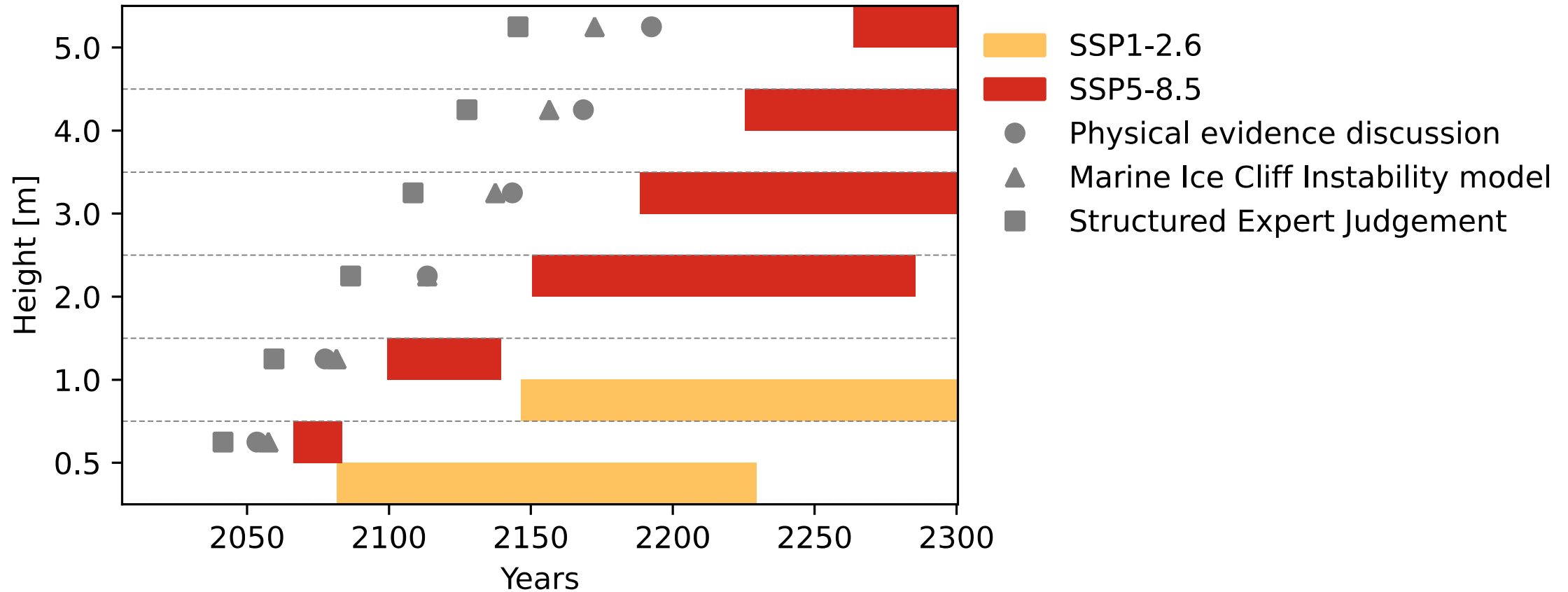


Trend in satellite altimetry along the Dutch coast





Time uncertainty to reach a given height





Sea level budget [1995.5-2021.5]

