Royal Netherlands
Meteorological Insitute
Ministry of Infrastructure and Water Management

Utrecht University

Long-Term Wind Influence on Sea Level along the Dutch Coast

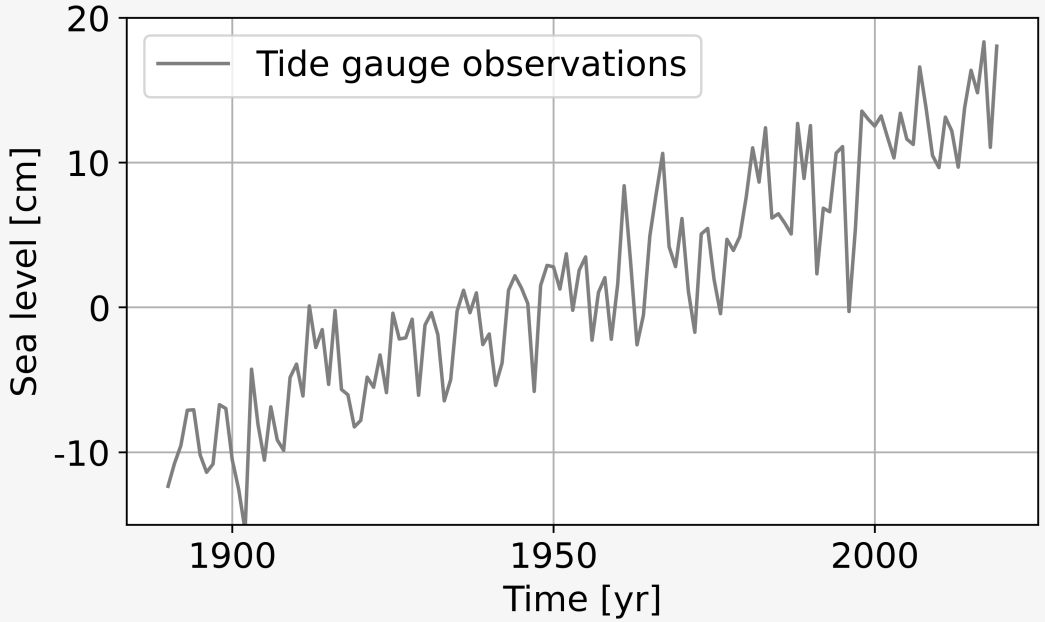
Iris Keizer, Dewi Le Bars, Cees de Valk, André Jüling,
Roderik van der Wal, Sybren Drijfhout

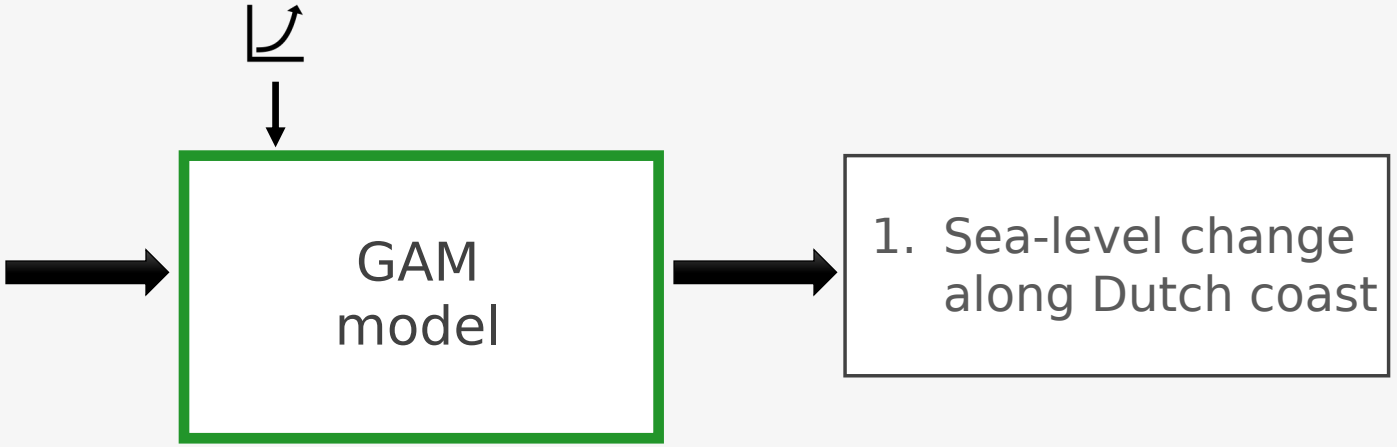
iris.keizer@knmi.nl

ReCeipt

Estimating wind influence on sea level

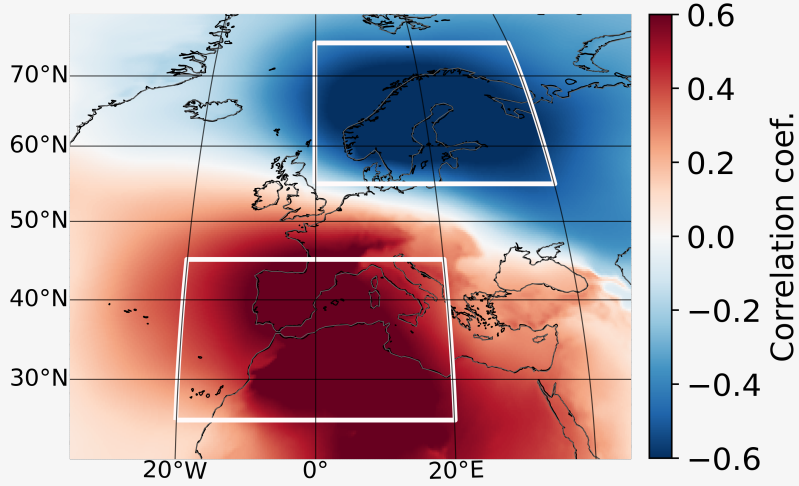
- Average observations of 6 Dutch tide gauges
- Statistical models with predictor variables:
  - B-spline (trend)

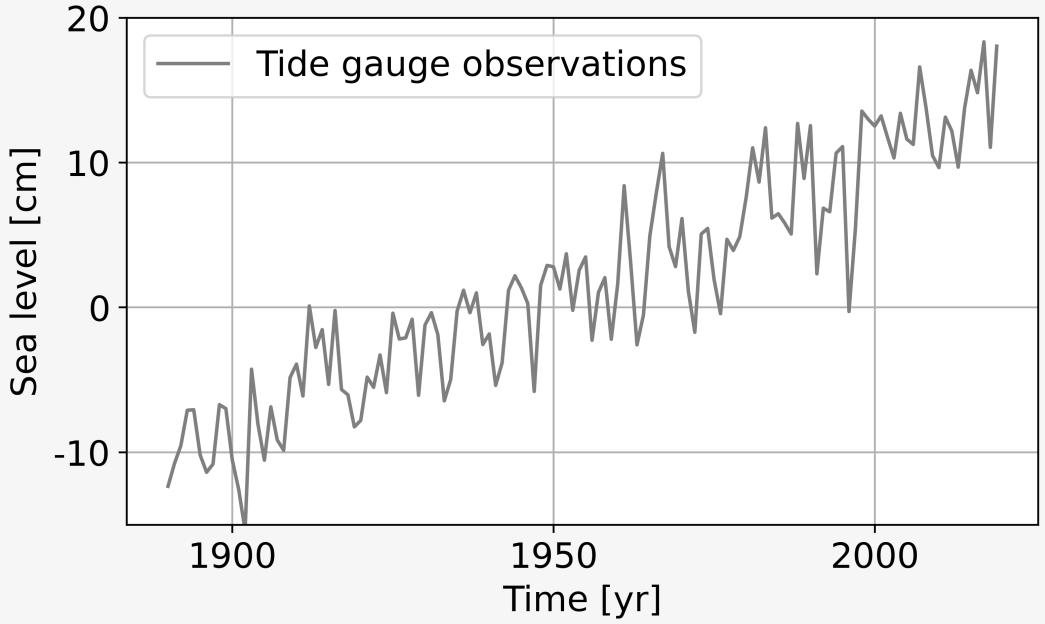


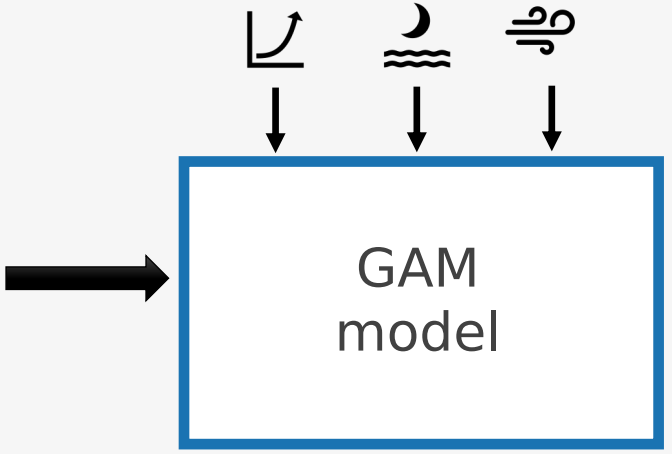


Estimating wind influence on sea level

- Average observations of 6 Dutch tide gauges
- Statistical models with predictor variables:
  - B-spline (trend)
  - Nodal tide
  - Large-scale pressure difference*



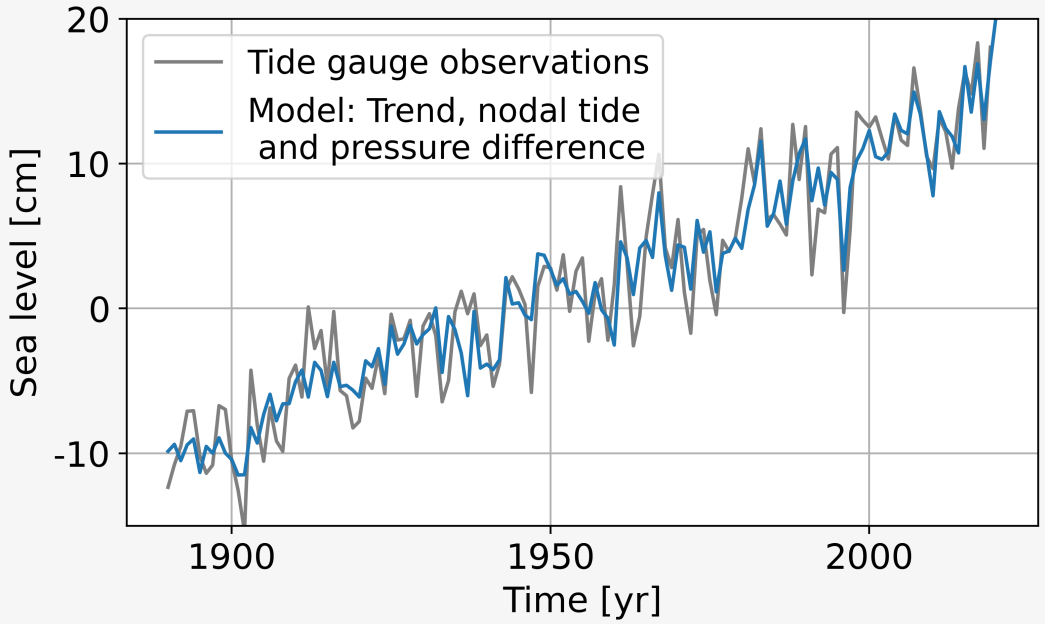


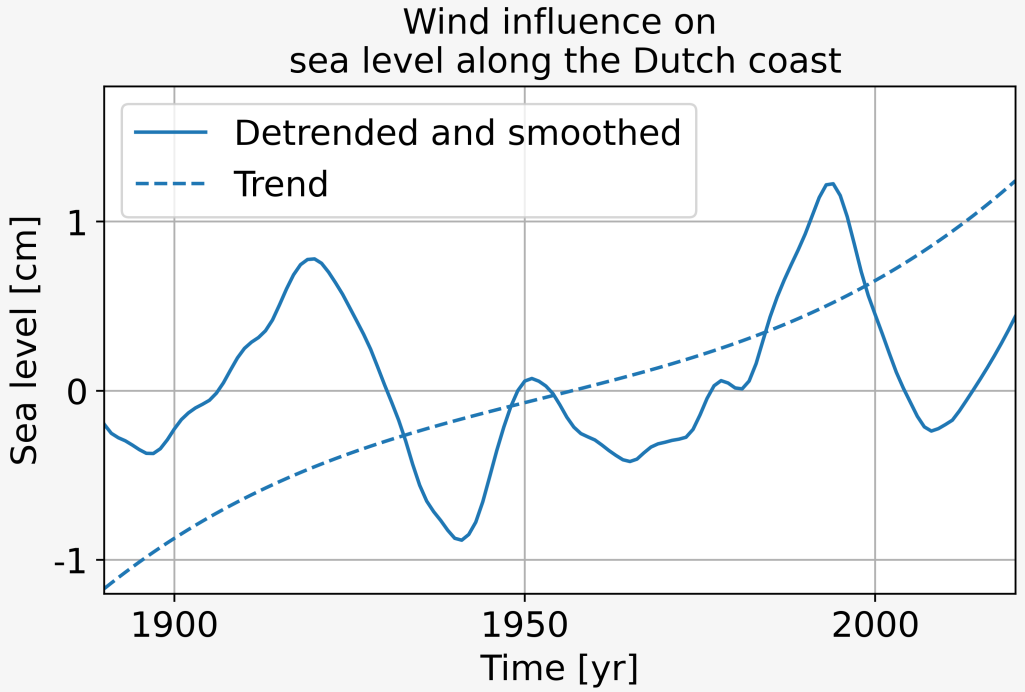


1. Sea-level change excluding wind influence
2. Wind trend
3. Wind variability

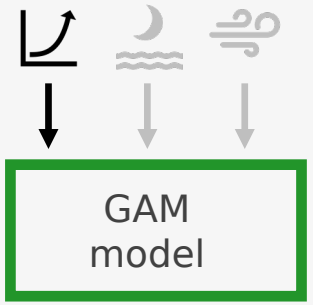
Wind influence on sea level

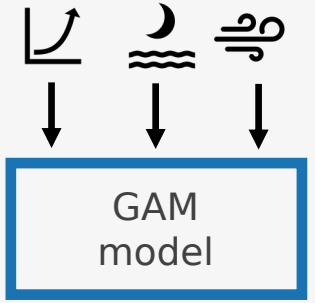
- Consistent wind-driven increase of sea level
  - Explained by changes in the jet stream location and strength*
- Wind-driven mode of multi-decadal sea-level variability
  - Linked to North-Atlantic Sea Surface Temperatures

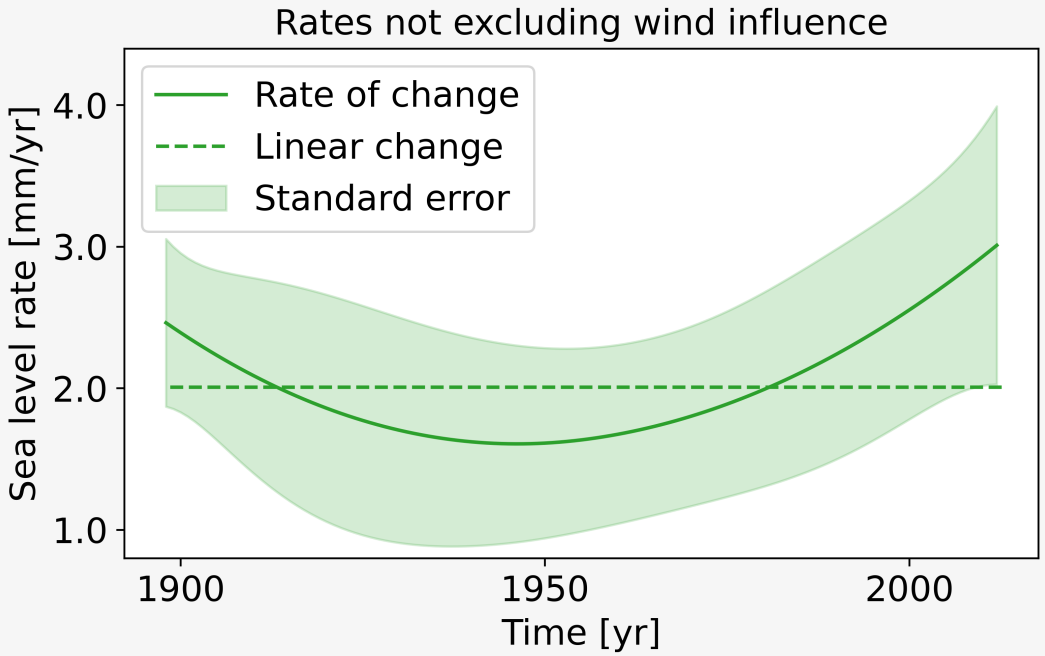


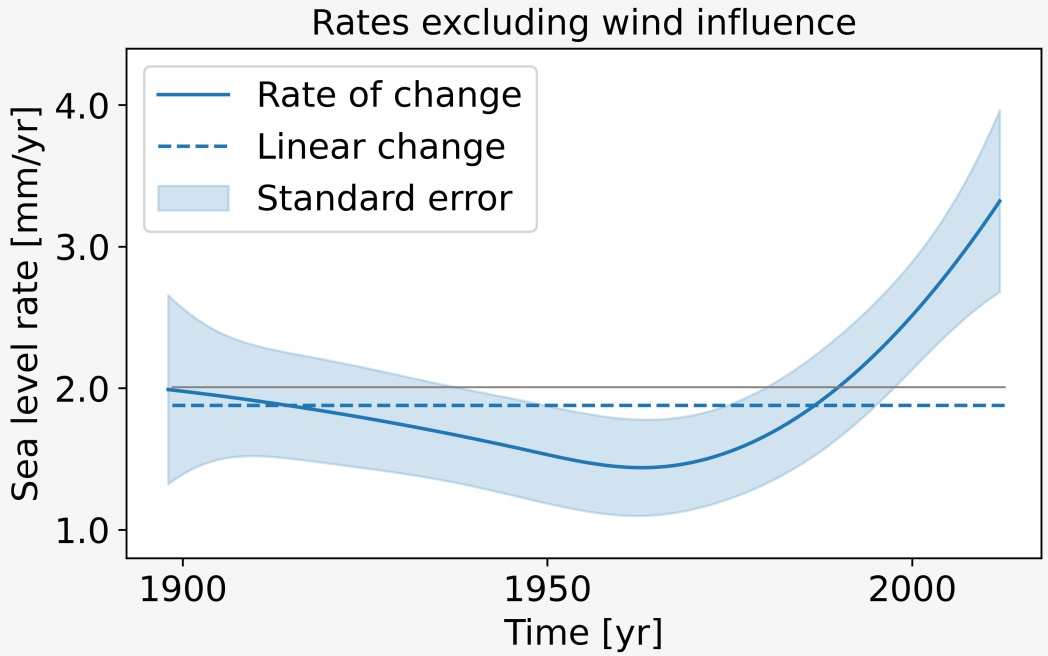


Sea-level acceleration masked by wind









Sea-level acceleration masked by wind

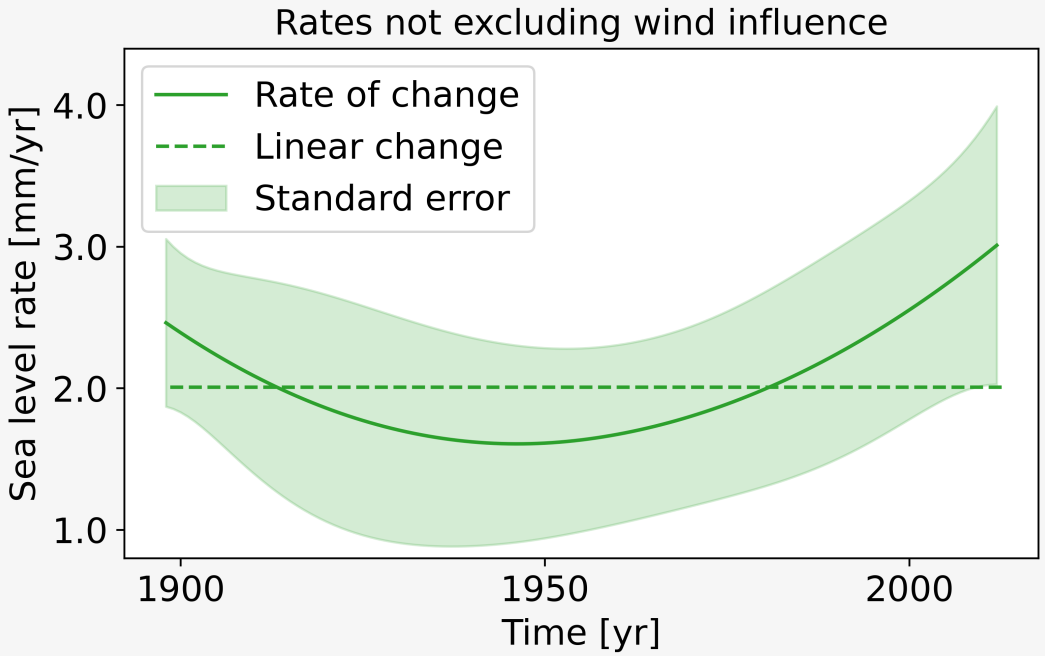
Probability estimates

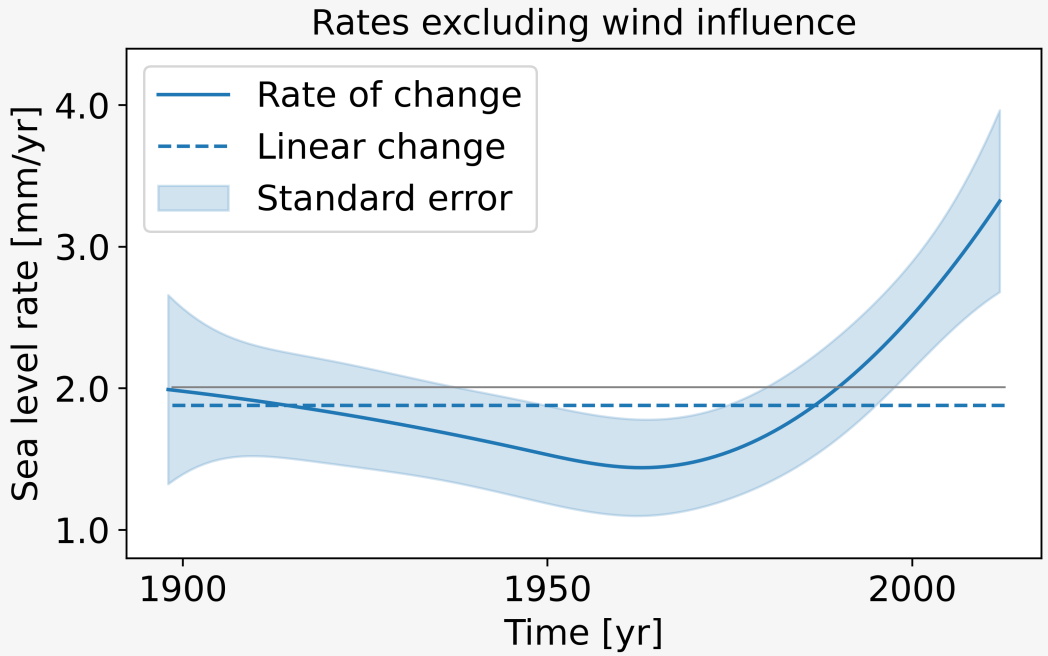
$P\,[rate_{2012} > rate_{1900}] = 70.7\,\%$

$P\,[rate_{2012} > rate_{1960}] = 87.4\,\%$

$P\,[rate_{2012} > rate_{1900}] = 93.4\,\%$

$P\,[rate_{2012} > rate_{1960}] = 99.5\,\%$





Royal Netherlands
Meteorological Insitute
Ministry of Infrastructure and Water Management

Utrecht University

Thank you!

Please reach out to me.

iris.keizer@knmi.nl @KeizerIris

This presentation participates in OSPP

EGU

Outstanding Student & PhD candidate Presentation contest

- Dangendorf, S., Wahl, T., Nilson, E., Klein, B., and Jensen, J.: A new atmospheric proxy for sea level variability in the southeastern North Sea: observations and future ensemble projections, Climate Dynamics, 43, 447–467, https://doi.org/10.1007/s00382-013-1932-4, 2014b
- Hallam, S., Josey, S. A., McCarthy, G. D., and Hirschi, J. J.-M.: A regional (land–ocean) comparison of the seasonal to decadal variability of the Northern Hemisphere jet stream 1871–2011, Climate Dynamics, https://doi.org/10.1007/s00382-022-06185-5, 2022.

Receipt