CLIMATE CHANGE IMPACT ON WIND, WAVES AND SURGES

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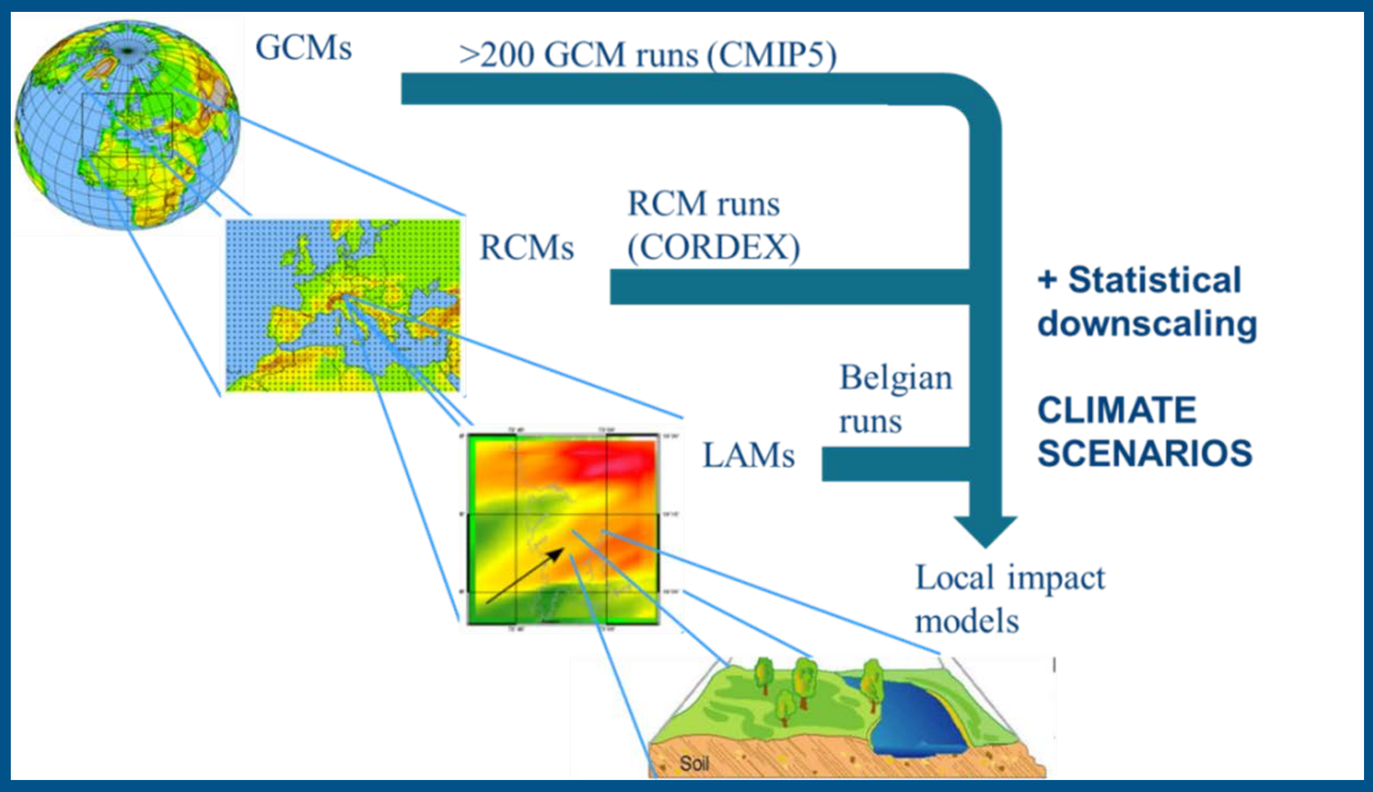
Downscaling regional climate model results



Different runs

- Evaluation runs: 1980-2010: validation
- Historical runs: 1976-2005: current climate
- Climate runs: 2070-2099: RCP8.5 climate

Different models

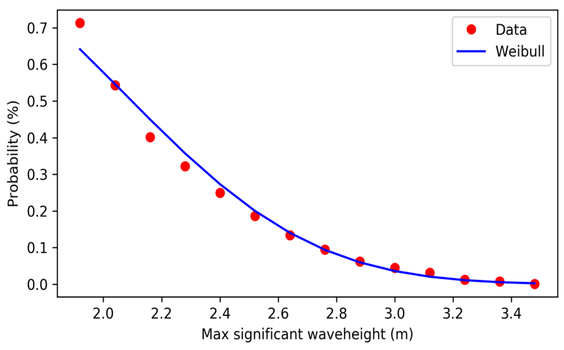
- ALARO – RMI
- COSMO – KULeuven
- CNRM, ECMWF, ICHEC, IPSL, MOHC, MPI – www.cordex.org

Local area models

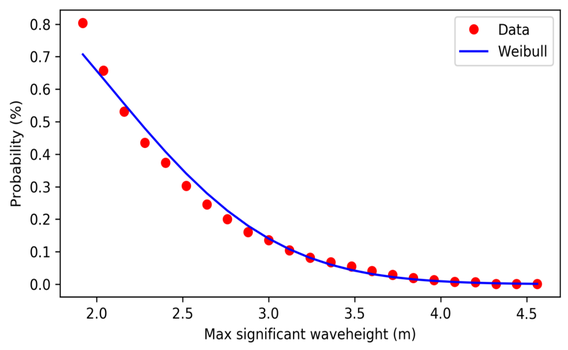
- COHERENS hydrodynamic model
- WAM wave model

Bias correction by quantile mapping

$$P_{corr} = CDFobs^{-1}\left(CDF_{ori}\left(P_{ori}\right)\right)$$

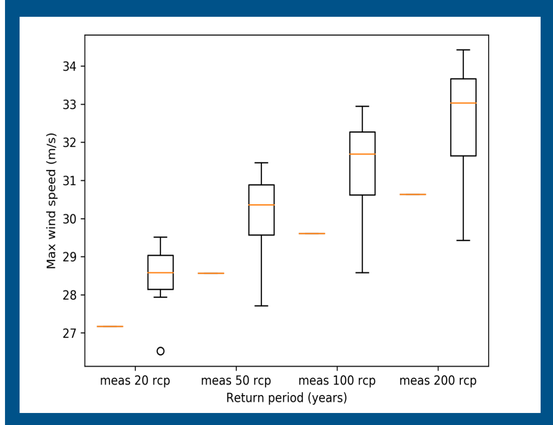


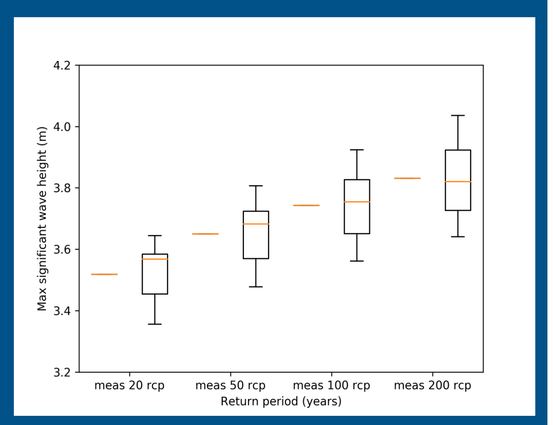
Weibull CDF of measurements



Weibull CDF of ALARO evaluation run

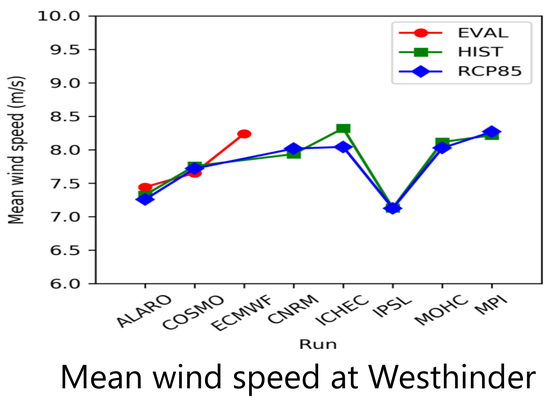
Results



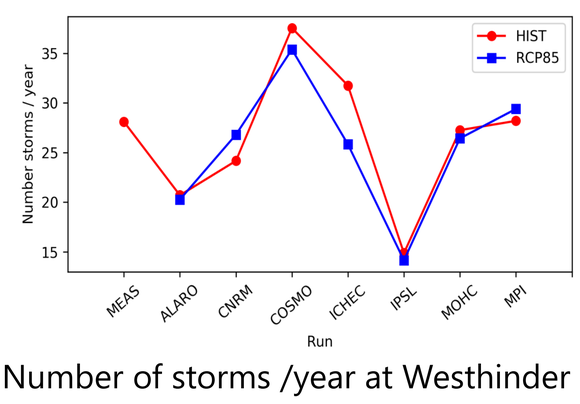


Change in maximum wind speed and maximum significant wave height for a certain return period

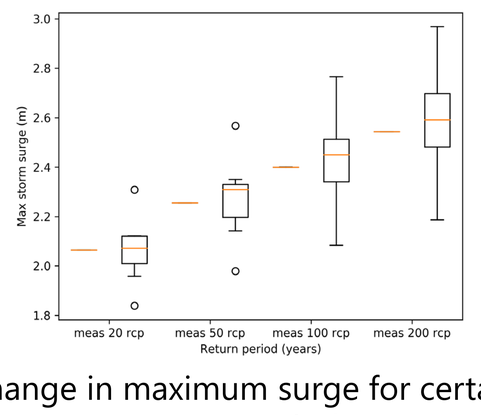
Mean wind speed & number of storms



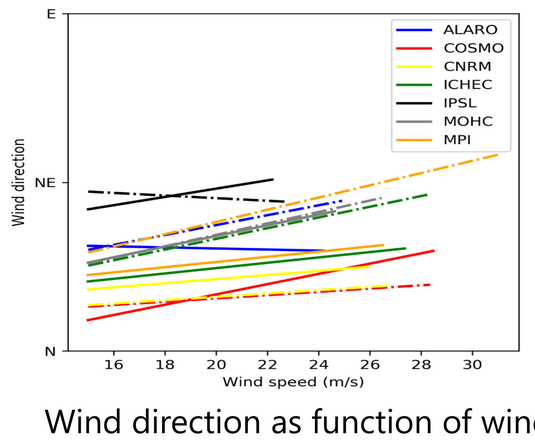
Mean wind speed at Westhinder



Number of storms /year at Westhinder



Change in maximum surge for certain return period



Wind direction as function of wind speed for historical runs (full line) and climate runs (dashed lines)

CONCLUSIONS

No increase in mean wind speed and number of storms is to be expected due to climate changes. On the other hand an increase of maximum wind speed seems occuring. Furthermore no increase in waves and storm surges are expected. This is due to geographical differences over the North Sea and due to changes in wind direction.

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