EGU21-13557
https://doi.org/10.5194/egusphere-egu21-13557
EGU General Assembly 2021

Performance evaluation of bias adjustment methods for wave climate projections in the Mediterranean Sea

Andrea Lira Loarca and Giovanni Besio
Department of Civil, Chemical and Environmental Engineering. University of Genoa, Italy (andrea.lira.loarca@unige.it)

Global and regional climate models are the primary tools to investigate the climate system response to different scenarios and therefore allow to make future projections of different atmospheric variables which are used as input for wave generation models to assess future wave climate. Adequate projections of future wave climate are needed in order to analyze climate change impacts and hazards in coastal areas such as flooding and erosion with waves being the predominant factor with varied temporal variability.

Bias adjustment methods are commonly used for climate impact variables dealing with systematic errors (biases) found in global and regional climate models. While bias correction techniques are extended in the climate and hydrological impact modeling scientific communities, there is still a lack of consensus regarding their use in sea climate variables (Parker & Hill, 2017; Lemos et al, 2020; Lira-Loarca et at, 2021)

In these work we assess the performance of different bias-adjustment methods such as the Empirical Gumbel Quantile Mapping (EGQM) method as a standard method which takes into the account the extreme values of the distribution takes, the Distribution Mapping method using Stationary Mixture Distributions (DM-stMix) allowing for a better representation of each variable in the mean regime and tails and the Distribution Mapping method using Non-Stationary Mixture Distributions (DM-nonstMix) as an improved methods which allows to take into account the temporal variability of wave climate according to different baseline periods such as monthly, seasonal, yearly and decadal. The performance of the different bias adjustment methods will be analyzed with particular interest on the futural temporal behavior of wave climate. The advantages and drawbacks of each bias adjustment method as well as their complexity will be discussed.

References:

- Lemos, G., Menendez, M., Semedo, A., Camus, P., Hemer, M., Dobrynin, M., Miranda, P.M.A. (2020). On the need of bias correction methods for wave climate projections, Global and Planetary Change, 186, 103109.
- Lira-Loarca, A., Cobos, M., Besio, G., Baquerizo, A. (2021) Projected wave climate temporal variability due to climate change. Stoch Environ Res Risk Assess.

- Parker, K. & Hill, D.F. (2017) Evaluation of bias correction methods for wave modeling output, Ocean Modelling 110, 52-65