

Earth's future:

"Forcing, response, and impacts of coastal storms in a changing climate"

Supporting Information for

Ensemble Storm Surge Modelling of the Goro Lagoon (Adriatic Sea, Northern Italy)

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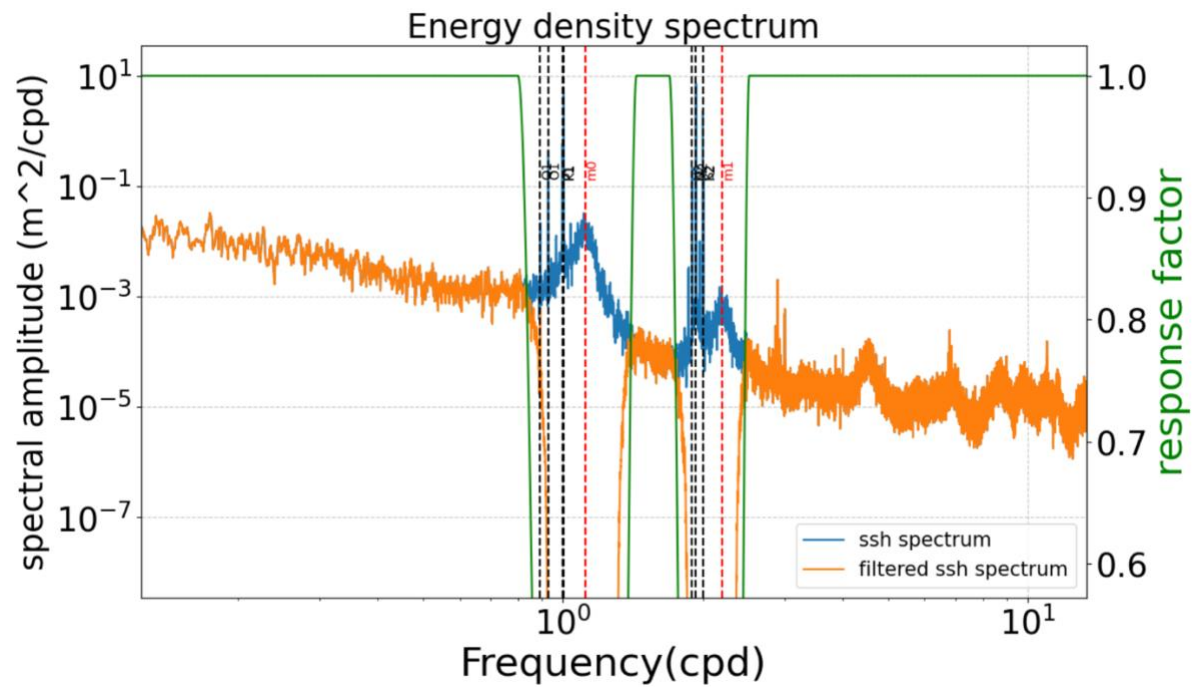
Introduction

Table S1 describes the domain extension and the main features of the large/regional scale atmospheric and ocean models used to initialize and force GOLFEM-EPS.

Figure S1 shows the Energy density spectrum (ESD) of the SL and SR computed in Faro station (see Fig. 1). The filter response factor is also shown in green. The position of the main 8 tidal components and the first two Adriatic basin mode frequencies are also shown.

NAME	DOMAIN EXTENSION MIN LON - LAT MAX LON - LAT	FEATURES
OCEAN MODELS FOR INITIAL AND LATERAL BOUNDARY CONDITIONS		
ADRIAC	12°E – 40°N 20°E – 46°N	Max horizontal resolution 1 km based on COAWST (Bressan et al., 2017)
ADRIAROM S	12°E – 40°N 20°E – 46°N	Max horizontal resolution of 2 km also based on ROMS (Russo et al., 2013)
MED-MFC	20°W – 30°N 35°E – 46°N	Mediterranean Sea forecasting model at ~ 4 km horizontal resolution based on NEMO (Clementi et al., 2017, 2021). It is the Copernicus Marine Service model (Le Traon et al., 2019)
GLOBAL	global	Global ocean model at 1/12° horizontal resolution based on NEMO (Lellouche et al., 2019).
MED-MFC-T	20°W – 30°N 35°E – 46°N	Mediterranean Sea forecasting model at ~4 km horizontal resolution including tides (Clementi et al., 2017, 2021). It is the Copernicus Marine Service model (Le Traon et al., 2019)
METEOROLOGICAL PRODUCTS		
ECMWF	global	ECMWF global forecasting model at 12.5 km horizontal resolution (Owens and Hewson, 2018).
COSMO-2I	5°E – 35°N 21°E – 49°N	High-resolution italian scale meteorological model running operationally at Arpa-SIMC at 2.2 km of horizontal resolution (Gastaldo et al., 2020).
COSMO-5M	30°W – 26°N 47°E – 55°N	European scale meteorological model running operationally at Arpa-SIMC at 5 km of horizontal resolution (Garbero and Milelli, 2020).

Table S1. Ocean and meteorological products used for lateral boundary and initial conditions and to force GOLFEM-EPS.



Data Figure S1. Energy density spectrum for Faro sea level observations (blue). The filtered dataset is also shown (orange). The green line shows the frequency response function of the filter. Black vertical dashed lines indicate the frequency of major tides. Red dashed lines indicate the frequencies of the fundamental and first mode of the Adriatic sea (seiches).