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Historical storm climate in the South of Portugal

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Two different data sources were used to characterise the wave storm climate in the past 50 years (1958 until 2008) at the South of Portugal (Algarve): a) Offshore wave height measurements from a directional waverider buoy during 1995-2008; and b) hindcast wave height data from 1955 until 2001, from the nearest HIPOCAS (www.mar.ist.utl.pt/hipocas/info.asp) database grid-point. Both were used to analyse changes on the number of storms per year (storm frequency), number of days with storms per year (storm duration) and wave height trends. Storm conditions were considered when the significant wave height exceeded 3 m (Pires, 1998 and Costa et al., 2001), while different time thresholds were tested to differentiate storm events (independence analysis). The independence criterion threshold was defined as 34 hours, which is close to the 30 hours chosen by Morton et al. (1997) and Dorsh(2008). Among the various estimated parameters, only the 50th percentile of the significant wave height (near mean wave height conditions) showed a statistically significant decrease for the 50 years period considered (95% confidence interval). The decrease was ∼0.2 m and comes in agreement with Kushnir et al. (1997) numerical modelling results for south of 40ºN. Higher percentiles did not present statistically significant trends (95% or 99% confidence intervals) a behaviour which can be attributed to the wide range of variability timescales, from annual to interdecadal (WASA 1998). Temporal variations in various scales could be identified for both the number of storms/year and the days of storms/years along the studied 50 years. Although not statistically significant, increasing and decreasing trends were discerned for the number of storms/year (0.5 storms/year increase in 50 years) and the days of storms/year (less 2 days of storms/year in 50 years). Oscillations of about 8-10 years can also be observed for both storm frequency and duration pointing to periods of higher storm activity alternating with others of smaller activity. The link of these oscillations with the NAO index variations was not conclusive. Further effort is still necessary to discuss the local observations on a broader temporal and spatial scale and in comparison with the storminess across Europe.

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