



Characteristics and present trends of wave extremes in the Mediterranean Sea

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Wind generated surface waves are an important factor characterizing marine storminess and the marine environment. This contribution considers characteristics and trends of SWH (Significant Wave Height) extremes (both high and low extremes, such as dead calm duration are analyzed). The data analysis is based on a 44-year long simulation (1958-2001) of the wave field in the Mediterranean Sea. The quality of the model simulation is controlled using satellite data. The results show the different characteristics of the different parts of the basin with the variability being higher in the western (where the highest values are produced) than in the eastern areas of the basin (where absence of wave is a rare condition). In fact, both duration of storms and of dead calm episodes is larger in the east than in the west part of the Mediterranean. The African coast and the southern Ionian Sea are the areas where exceptional values of SWH are expected to occur in correspondence with exceptional meteorological events. Significant trends of storm characteristics are present only in sparse areas and suggest a decrease of both storm intensity and duration (a marginal increase of storm intensity is present in the center of the Mediterranean). The statistics of extremes and high SWH values is substantially steady during the second half of the 20th century. The influence of the large-scale teleconnection patterns (TlcP) that are known to be relevant for the Mediterranean climate on the intensity and spatial distribution of extreme SWH (Significant Wave Height) has been investigated. The analysis was focused on the monthly scale analysing the variability of links along the annual cycle. The considered TlcP are the North Atlantic Oscillation, the East-Atlantic / West-Russian pattern and the Scandinavian pattern and their effect on the intensity and the frequency of high/low SWH conditions. The results show it is difficult to establish a dominant TlcP for SWH extremes, because all 4 patterns considered are important for at least few months in the year and none of them is important for the whole year. High extremes in winter and fall are more influenced by the TlcPs than in other seasons and low extremes.