



Simulating Etesians over the Aegean and Implications for Wind Energy Production in Southeastern Europe

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Episodes of extremely strong wind can represent a threat for the safe design, construction and operation of wind energy turbines over the Aegean Sea (Greece). During boreal summer and early autumn, strong and persistent northerly winds, known as Etesians, can cause hazardous conditions over the Aegean Archipelago.

Here, an assessment of extreme Etesians is performed. Twelve measuring stations over the Aegean Sea and three different hub heights are used and compared with six-hourly wind speed measurements from five EURO-CORDEX, ERA-Interim-driven, Regional Climate Models (RCMs) for the extended summer season (May-September) from 1989 to 2008.

Results indicate, that all RCMs tend to underestimate the magnitude of wind speed extremes (50-year return levels), at the different hub heights, by approximately 10-30% when compared to station series. DMI and IPSL models achieve, however, higher skill in this respect. On the other hand, the SMHI produces lower uncertainty compared to other simulations. In addition, all the analysed models are able to reproduce with a good approximation the spatial distribution of the extremes when compared with the observations. Finally, the exposure to north-northeasterly wind directions seems to play a key role in the extreme wind distribution. More intense extremes are found over the central and northern subregions, indicating challenging sites for class 1-turbine construction and cut-out speeds higher than 25m/s.