



A post-processing approach for probability forecasts of multi-category marine fog

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Marine fog does not occur so often but is a great threat to sailing over open sea and even affects human activities over coastal areas. Although marine fog could not be predicted well by a deterministic model, an ensemble prediction system may provide valid probability forecasts for it by proper post processing. One of such post-processing approaches is to couple a physical model of marine fog with the predictions of the ensemble members. The physical model comprises three sets of criteria for atmospheric and oceanic parameters related with 3-category of marine fog, of which visibilities are less than 1000m, 500m and 50m respectively, including temperatures, humidities, winds and stability in the atmospheric boundary layer and at air-sea interface. It is developed by analyzing the statistical characteristics of the parameters with in-situ surface observations from synoptic stations, ships and buoys, and the NCEP Global Forecast System analyses as well. The approach is applied to a 25-member operational regional ensemble system to forecast the hourly probabilities of 3-category marine fog in the area of the Taiwan Strait up to 3 days. It is indicated that the forecasts are available, of which the Ranked Probability Scores (RPSs) in the winter of 2016, from December in 2016 to February in 2017 are not more than 0.2 for all lead times, with an average of 0.16.