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Evaluating Real-time Subseasonal to Seasonal Tropical Cyclone Prediction

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The real-time WWRP/WCRP Subseasonal to Seasonal (S2S) Prediction Project Phase 2 database was used to evaluate the prediction skill of tropical cyclone from eleven forecasting systems for the North Western Pacific. The variable introduced to evaluate S2S tropical cyclone prediction is daily tropical cyclone probability, which is the occurrence probability of tropical cyclone within 500 km in one day. Using such a definition, the occurrence of tropical cyclone is a dichotomous event. The skill of S2S tropical cyclone prediction can be evaluated using debiased Brier Skill Score, which is the traditional Brier Skill Score with impact of forecast ensemble size removed. Sensitivity tests were conducted to analyze the influence of difference in temporal window and radius in the definition of daily tropical cyclone probability. It is demonstrated that though the daily tropical cyclone probability would vary with a changed radius and temporal window, the debiased Brier Skill Score does not change much since it is related with the ratio of mean error of model forecast and the mean error of a reference climatological forecast. The robustness of the prediction skill indicates the suitability of using the daily tropical cyclone probability and debiased Brier Skill Score to measure tropical cyclone prediction skill at S2S timescale. Compared with the prediction skill of the S2S Prediction Project Phase 1, the real-time S2S tropical cyclone prediction is improved for some forecast systems. Some early results by combining multi-model tropical cyclone forecasts to improve tropical cyclone prediction will also be presented.