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Operational forecasting of wind-generated waves by tropical cyclones

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The Direction of Meteo-France, the French National Weather Service, in La Reunion has been formally designated as the Regional Specialized Meteorological Centre (RSMC) for tropical cyclones monitoring over the South-West Indian Ocean by the World Meteorological Organization (WMO). In order to better forecast tropical cyclone conditions, a limited area Numerical Weather Prediction (NWP) model has been implemented with a dedicated bogusing scheme and more recently an associated new operational wave model has been implemented to forecast sea-states conditions. The new wave system is based on an improved third generation wave model and has been validated locally over several tropical cyclone seasons using significant wave height measurements derived from altimeters on board Jason-1, Jason-2 and ENVISAT. Data have been collected, checked and cross-corrected in order to provide a consistent and homogeneous altimeter data set suitable for wave model validation. The new system and the validation results are presented here, with a particular attention to extreme wave conditions. The impact of using other wind input to the wave model, such as produced by ECMWF for wind analyses or by IFREMER for Blended scatterometer products, is also investigated for a few tropical cyclone situations. A recent geophysical wind model function to derive wind speed above 20 m/s from radar altimeters is applied to analyse some wind forcing used in our study.