

# **Probabilistic prediction of tropical cyclone rapid intensification using passive microwave imagery**

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This talk will describe a research-to-operations effort to improve the forecast skill of tropical cyclone (TC) rapid intensification (RI). Previous research has shown that the inclusion of satellite passive microwave imagery (MI) in a probabilistic logistic regression model of RI significantly improves the forecast skill of RI prediction (Rozoff et al. 2015; Wea. Forecasting). Given these promising results, this talk will report on extending these efforts to additional probabilistic RI models to develop a multi-model consensus of RI probabilities. This multi-model consensus includes logistic regression, Bayesian, and linear discriminant analysis-based (SHIPS-RII) probabilistic models for the Atlantic and Eastern Pacific Ocean basins. In addition, a variety of new structure-based MI predictors were developed that improve upon the simple predictors of Rozoff et al. (2015). These new predictors account for the nature of TC organization, including structural asymmetries, rainbands, and the degree of coupling between latent heating and inertial stability. They are tested in each of the MI-based models to determine whether they add skill. The resulting model consensus is evaluated in a simulated operational setting, where retrospective forecasts on archived real-time data are performed. Real-time results for the Eastern Pacific and Atlantic Ocean from the 2016 season will be shown.