Methods for comparing tropical cyclone activity from models and historical data

James Elsner[†]; Thomas Jagger; Robert Hodges [†] Florida State University, USA Leading author: <u>selsner@fsu.edu</u>

To meet the goal of effective and efficient comparisons of tropical cyclone predictions from numerical climate models, we propose a new spatial framework for tropical cyclone climatology. The framework consists of a spatial tessellation of the storm basin using equal-area hexagons. The hexagons are efficient at covering cyclone tracks and provide a scaffolding to combine attribute data from tropical cyclones with spatial climate data. The framework's utility is demonstrated using examples from recent hurricane seasons. Seasons that have similar tracks are quantitatively assessed and grouped. Regional cyclone frequency and intensity variations are mapped. A geographically-weighted regression of cyclone intensity on SST emphasizes the importance of a warm ocean in the intensification of cyclones over regions where the heat content is greatest. The largest differences between model predictions and observations occur near the coast. We suggest the framework is ideally suited for comparing tropical cyclones generated from different numerical prediction systems.