



Hindcasts of Integrated Kinetic Energy in North Atlantic Tropical Cyclones

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Integrated kinetic energy (IKE) is a recently developed metric that evaluates the destructive potential of a tropical cyclone by assessing the size and strength of its wind field. Despite the potential usefulness of the IKE metric, there are few, if any, operational tools that are specifically designed to forecast IKE in real-time. Therefore, a system of artificial neural networks is created to produce deterministic and probabilistic projections of IKE in North Atlantic tropical cyclones out to 72 hours from a series of relevant environmental and storm specific normalized input parameters. In an effort to assess its real-time skill, this IKE forecasting system is run in a mock-operational mode for the 1990 to 2011 North Atlantic hurricane seasons. Hindcasts of IKE are produced in this manner by running the neural networks with hindcasted input parameters from NOAA's second generation Global Ensemble Forecasting System reforecast dataset. Ultimately, the results of the hindcast exercises indicate that the neural network system is capable of skillfully forecasting IKE in an operational setting at a level significantly higher than climatology and persistence. Ultimately, forecasts of IKE from these neural networks could potentially be an asset for operational meteorologists that would complement existing forecast tools in an effort to better assess the damage potential of landfalling tropical cyclones, particularly with regards to storm surge damage.