1077-49-2047 **Lynn R. Greenleaf*** (lynngreenleaf@ou.edu), Department of Mathematics, 601 Elm Avenue, Room 423, University of Oklahoma, Norman, OK 73019. *Mathematical Modeling and Analysis of Atmospheric Vortices.*

The focus of this talk concerns valid statistical inferences from tangential wind measurements on intense atmospheric vortices arising in dust devils, waterspouts, tornadoes, mesocyclones and tropical cyclones when the analysis depends on a parametric model of the information in the data. In order to achieve this, a set of a priori candidate tangential velocity models of atmospheric vortices that each possess a small number of parameters are selected based on scientific principles and are ranked as to their ability to capture information in the data. The candidate models include versions of the Wood-White tangential wind profile as well as the idealized Vatistas, Rankine, Burgers-Rott and Sullivan vortex models. A model is selected from this list of candidate models to seek the model that loses as little information from the data as possible using Akaike's Information Criterion (AIC). The goal of this mathematical analysis is to assess each model's ability to capture information about the true tangential winds contained in observations. The model selection method will address two approaches. The first approach will involve ranking the models. The second approach will involve optimization predictions. (Received September 21, 2011)