Configuring the HYSPLIT Model for National Weather Service Forecast Office and Spaceflight Meteorology Group Applications

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The National Weather Service Forecast Office in Melbourne, FL (NWS MLB) is responsible for providing meteorological support to state and county emergency management agencies across East Central Florida in the event of incidents involving the significant release of harmful chemicals, radiation, and smoke from fires and/or toxic plumes into the atmosphere. NWS MLB uses the National Oceanic and Atmospheric Administration Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model to provide trajectory, concentration, and deposition guidance during such events. Accurate and timely guidance is critical for decision makers charged with protecting the health and well-being of populations at risk. Information that can describe the geographic extent of areas possibly affected by a hazardous release, as well as to indicate locations of primary concern, offer better opportunity for prompt and decisive action. In addition, forecasters at the NWS Spaceflight Meteorology Group (SMG) have expressed interest in using the HYSPLIT model to assist with Weather Flight Rules during Space Shuttle landing operations. In particular, SMG would provide low and mid-level HYSPLIT trajectory forecasts for cumulus clouds associated with smoke plumes, and high-level trajectory forecasts for thunderstorm anvils. Another potential benefit for both NWS MLB and SMG is using the HYSPLIT model concentration and deposition guidance in fog situations.

For expedience in delivering dispersion guidance in the diversity of operational situations, NWS MLB and SMG are becoming increasingly reliant on the PC-based version of the HYSPLIT model run through a graphical user interface (GUI). While the GUI offers unique advantages when compared to traditional methods, it is difficult for forecasters to run and manage in an operational environment. To alleviate the difficulty in providing scheduled real-time trajectory and concentration guidance, the Applied Meteorology Unit (AMU) configured a Linux version of the HYSPLIT model that ingests the National Centers for Environmental Prediction (NCEP) guidance, such as the North American Mesoscale (NAM) and the Rapid Update Cycle (RUC) models. The AMU configured the HYSPLIT system to automatically download the NCEP model products, convert the meteorological grids into HYSPLIT binary format, run the model from several pre-selected latitude/longitude sites, and post-process the data to create output graphics. In addition, NWS MLB and SMG run locally-configured versions of the Weather Research and Forecasting (WRF) model that are initialized with their own data assimilation systems. These locally configured WRF models can provide input into HYSPLIT that may better predict the unique mesoscale environment in Florida and southern California than the coarser resolution NCEP guidance. The AMU configured several software programs to convert WRF output into HYSPLIT format. This allows forecasters to automatically provide trajectory and concentration guidance on a scheduled basis using

either NCEP products or a locally configured WRF model and, therefore, provide timely information on hazardous conditions to their customers. A summary of the real-time HYSPLIT system in support of both the NWS MLB and SMG will be presented.