WRF model description – Andrew Penny January 29, 2008 ATMO 558

The WRF (Weather Research and Forecasting) model has been developed through a collaboration of agencies, most notably the National Center for Atmospheric Research and the National Center for Environmental Prediction. It possess two dynamical cores; the NMM (Nonhydrostatic Mesoscale Model) designed for operational use through its computational efficiency and time-proven modeling principles, and the ARW (Advanced Research WRF) which has been designed for research of both real and idealized cases. Different physics options and parameterization schemes are available depending on which dynamical core is used. The ARW core solves the primitive equations on an Arakawa "C" grid using a 3rd order Runge-Kutta time integration scheme, whereas the NMM uses the Adams-Bashforth and Crank-Nicholson time schemes to solve the equations on an Arakawa "E" grid. Both dynamical cores have the option to be either hydrostatic or non-hydrostatic and the ARW uses a mass-based terrain following coordinate, while the NMM uses a hybrid terrain following coordinate with constant pressure surfaces above 400 hPa. Both dynamical cores are bundled with relatively similar pre-processing software (WPS) that prepares the real or idealized meteorological data for time integration, and the model output from both cores can be easily converted to work with several different and widely available graphics packages.