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Installation and initial testing of the Weather Research and Forecasting (WRF) Model on the CSU Chico Department of Physics server

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Numerical simulation of weather and climate is an important tool in weather forecasting, climate prediction, air quality forecasts, wind energy assessments, and atmospheric research. Several state-of-the-art models exist and are freely available for use by the scientific community. We chose the Weather Research and Forecasting (WRF) model for its versatility, integrity, and user-friendliness. We used the CSU Chico Department of Physics server as the computational platform. It has 8 cores and 24 GB of RAM. In order to compile and install the model, several additional software requirements had to be satisfied. These included: a UNIX based OS; compilers (e.g, Fortran 90/95 and C/C++); scripting languages (e.g., perl, Cshell and Bourne shell); library software (e.g., netCDF); and a post-processing utility (NCAR Command Language (NCL)).

After the software packages and the WRF model were compiled, we ran an idealized test case provided in the WRF installation. The idealized test case selected was a baroclinic atmospheric wave. This is a mid-latitude cyclonic circulation. The simulation begins from a horizontally homogeneous initial condition with a baroclinically unstable jet u(y,z) on an f-plane. The simulation has symmetrical boundary conditions in the north/south and periodic boundary conditions in the east/west; 100-km grid point spacing over a domain of 41 x 81 points in the horizontal; 64 layers over a 16 km depth; and a 4-km damping layer in the top. The simulation created one output file containing five days of model output. The data file was then visualized using the open source NCL post-processing visualizer.

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