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Model Summary
ATMO 558
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Model Summary: MM5
http://www.mmm.ucar.edu/mm5/mm5-home.html

The MM5, or Fifth Generation NCAR / Penn State Mesoscale Model, is a model that was created in the 1970s and has been worked on ever since by a community (now global) of users. It is a limited-area model, focusing on mesoscale and regional scale atmospheric conditions. It is a terrain-following model that uses the sigma-coordinate (which relies on pressure) in its calculations. In order to run, the MM5 must have initial conditions input, not just a lateral boundary condition. This model accepts surface and rawinsonde observations, terrestrial data sets, and global/regional reanalysis data in order to produce simulations of and attempt to predict weather events. The MM5 is capable of simulating nonhydrostatic atmospheric dynamics, an ability that lets the model make useful runs at the few-kilometer scale. The number of physics options has also increased, allowing it to use more data as well as produce more realistic results.

Meteorological data is horizontally interpolated through two auxiliary programs (an integral part of the model) to a rectangular, mesoscale domain on one of three projections: Lambert Conformal, Polar Stereographic, or Mercator. Observations, such as those mentioned earlier, provide supplementary mesoscale detail lacking from the interpolation process. Another program interpolates data vertically to provide a three dimensional structure to the simulation. Time is handled by a leapfrog scheme, which is constrained from some conditions for stability, but is capable of dealing with nonlinear advection or Coriolis terms, for example.

Below is an image that demonstrates the flow of the model in a simple diagram. The capitalized boxes leading to the MM5 model are auxiliary programs to help with data.