ATM 419/563 – MET and verification of surface forecasts

Spring, 2024 – Fovell

Due Thursday, April 18, by start of class.

In class, we ran the script MET6_ALL.sh (along with network_plots.sh and do_station_analysis.sh) to verify forecasts for 10 m wind speed (F10), 2 m temperature (T2M), dewpoint, and relative humidity for a network-averaged analysis and F10 and T2M for a station analysis. This verification considered all stations from all available networks, including ASOS, AWOS, RAWS, APRSWXNET, MESOWEST, and the Colorado Ag Meteorology (COAGMET) network, among others. This analysis suggested the model had a fairly sizable cold and wet bias and considerably overpredicted the sustained winds.

The simulation obviously has flaws. How to fix them?

First, note you are also provided with pre-configured scripts performing verification against subsets of these stations: MET6_ASOS.sh, for example, just uses ASOS sites, and MET6_WXNET.sh focuses only on APRSWXNET observations. See the demonstration script and PPT for more information. Examine the verifications for these subsets.

Second, propose a change to the WINDSTORM model configuration and test it by running the simulation again. Does your revised experiment verify better?

Some suggestions: Consider the question, are all observations equally good? Are there some networks you should trust and others you should ignore? Maybe also realize that, as a first step, you may not be able to mitigate both the temperature and wind biases simultaneously, so perhaps just pick one. Also realize that most first hypotheses are not correct. Please keep in mind that some hypotheses will be easier to test than others.

Write up a short report, using PowerPoint for Word, identifying the flaw(s) you focused on and discussing your hypothesis, experiment, and result. Include supporting figures. Also include what your next hypothesis might be. There's always a next hypothesis!