ATMO 1300 Section 001
Take-Home Worksheet #9
Aug 4th, 2017
Chapters 11 and 13

1. Tornadoes are rated with what famous scale? What is the rating/scale based on and what is it *not based* on?

Enhanced-Fujita Scale. Based on structural damage and NOT on wind speed!

2. What is the difference between a tornado "watch" and a weather "warning"?

Tornado watches are released a few hours before the threat of severe weather and tornadoes could potentially begin. Tornado warnings are released once a tornado has been spotted by storm spotters or is radar-indicated.

3. What are the four easiest ways to forecast the weather for tomorrow?

Persistence
Climatology
Trend
Analog.

4. What are the three basic steps to numerical weather prediction? Briefly describe each.

Analysis – combination of observations with a "first guess" from a model forecast
Prediction – run the model forward in time to produce a forecast
Post-processing – take the model output and put it into graphics for a forecaster to utilize

5. What is the difference between deterministic and probabilistic forecasting?

Deterministic- run a weather model once and receive one forecast state of the atmosphere
Probabilistic (ensembles)– run a weather model multiple times to estimate probabilities of weather events from the model forecasts

a. Which kind of model forecast above (deterministic or probabilistic) "should" be better?

Probabilistic! (ensembles are better!) They provide estimates of uncertainty

b. What does a probabilistic forecast provide that deterministic forecasts don't?

Probabilistic forecasts (ensembles) provide an estimate of uncertainty. How certain are we that it's going to rain in Lubbock tomorrow? One model forecast doesn't display this.

6. Why are numerical models not perfect? What are the two sources of errors?

Numerical models and the process of model forecasting contain errors in the models themselves (i.e. physics errors) related to small-scale processes that can't be modeled but have to be parameterized as well as errors in the initial conditions (i.e. observations and analysis) that are used to start the model.

7. Describe the process of data assimilation in numerical weather prediction. What is needed? What is the result?

Observations and a "first guess" from the model (a previous forecast) are needed. The observational error and forecast uncertainty are also needed so

that the model and observations can be combined to produce a more accurate guess of the atmosphere to initialize the model and create a new forecast.