

# Astronomy Weather 101

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# Weather 101

- NOAA's National Weather Service
  - Collects data from around nation/world
  - Assimilates that data into computer models
  - Resulting forecast guidance is used by humans to create official NWS forecasts
  - Models are also disseminated to partners who also create forecasts

# About NWS

- National Weather Service is:
  - Part of NOAA, Part of Dept of Commerce
  - 122 forecast offices (ours is KLWX, Sterling, VA)
  - 11 River Forecast centers
  - 9 National centers (Hurricane, Storm, Space)
  - About 5,000 employees
  - \$900 million budget

# Observations

- Observations come from many sources:
  - Surface observations (2000 from airports)
  - Twice/daily balloon launches
  - Satellite sounding
  - Data from 158 doppler radars
  - Automated commercial aircraft observations
  - Surface, balloons, and others from around the world
  - Thousands of other surface sites, radar profilers
  - Experimental from autos, wind mills, others

# Computer Models

- Observations are used to snapshot the state of the atmosphere. What does it look like?
- Computer models use physics (numeric)
- Many different types and relations:
  - GFS/WAFS
  - NAM
  - RUC
- Statistical models add in historical data
  - MOS, LAMP

# More models

- Models are run by weather agencies around the world.
  - US: NWS/NCEP/NCO/EMC
  - Europe: ECMWF (Exeter, UK)
  - Canada, Japan, China, all run models
- Most also run ensembles to quantify uncertainty
- Related models: air quality, plume, radiation, volcanic ash are a few

# Forecasting

- Meteorology is the science, forecasting is the art
- NWS human forecasters use models as guidance and attempt to add value, usually at a mesoscale level
- Today, models and forecasts are “gridded” data
- Forecasters use tools to tweak models
- Computer code builds words from data
- 5x5km or 2.5x2.5km resolution

# The Weather Enterprise

- NWS disseminates raw model data to partners and academia
- Partners produce many products and services
  - TV, Radio, niche markets, etc
- \$15 billion plus industry, 1000's of jobs
- Exports products and service to other countries

# Approach to Astro Weather

- More than five days; Don't bother
- Watch the NWS point forecast starting a five days
- Watch the NWS Gridded MOS at five days
- Start reading NWS forecast discussion at three days for uncertainty
- Watch CSC at 48 hours. Compare to GMOS
- Watch dew point, wind speed on NWS point forecasts at 48 hours (hourly wx graphs)
- Watch GOES images at 6 hours

# URLs

- Point forecasts: <http://www.weather.gov>
- GMOS: <http://graphical.weather.gov/gmos/>
- AFD: Off point forecast page
- CSC: <http://cleardarksky.com>
- Bob's custom GOES images:  
<http://www.ladyandtramp.com/>