Extracting Data from NWP models

NWP Model Data

- Model data available through NOAA-NOMADS

- http://nomads.ncdc.noaa.gov

- Numerous models available each have their own assumptions, methods, configurations etc.

- Models are run at regular intervals and have forecasts for specific hours

  – Model run at 0z forecast hour 6z

Data format

- NWP files can be in either grib, grib2, netcdf
- Data can be in Lat/Lon or projected coordinates
- Data can be in either height or in pressure levels
  - A pressure level is a "slice" of the atmosphere at a constant pressure, so the actual height above the ground may not be constant for a given pressure level

Example

- Extracting data from HRRR (High Resolution Rapid Refresh) Model
- Used MATLAB with the NETCDF toolbox (available through github) and the mapping toolbox
  - http://polar.ncep.noaa.gov/waves/examples/usingmatlab.shtml
  - https://github.com/nctoolbox/nctoolbox
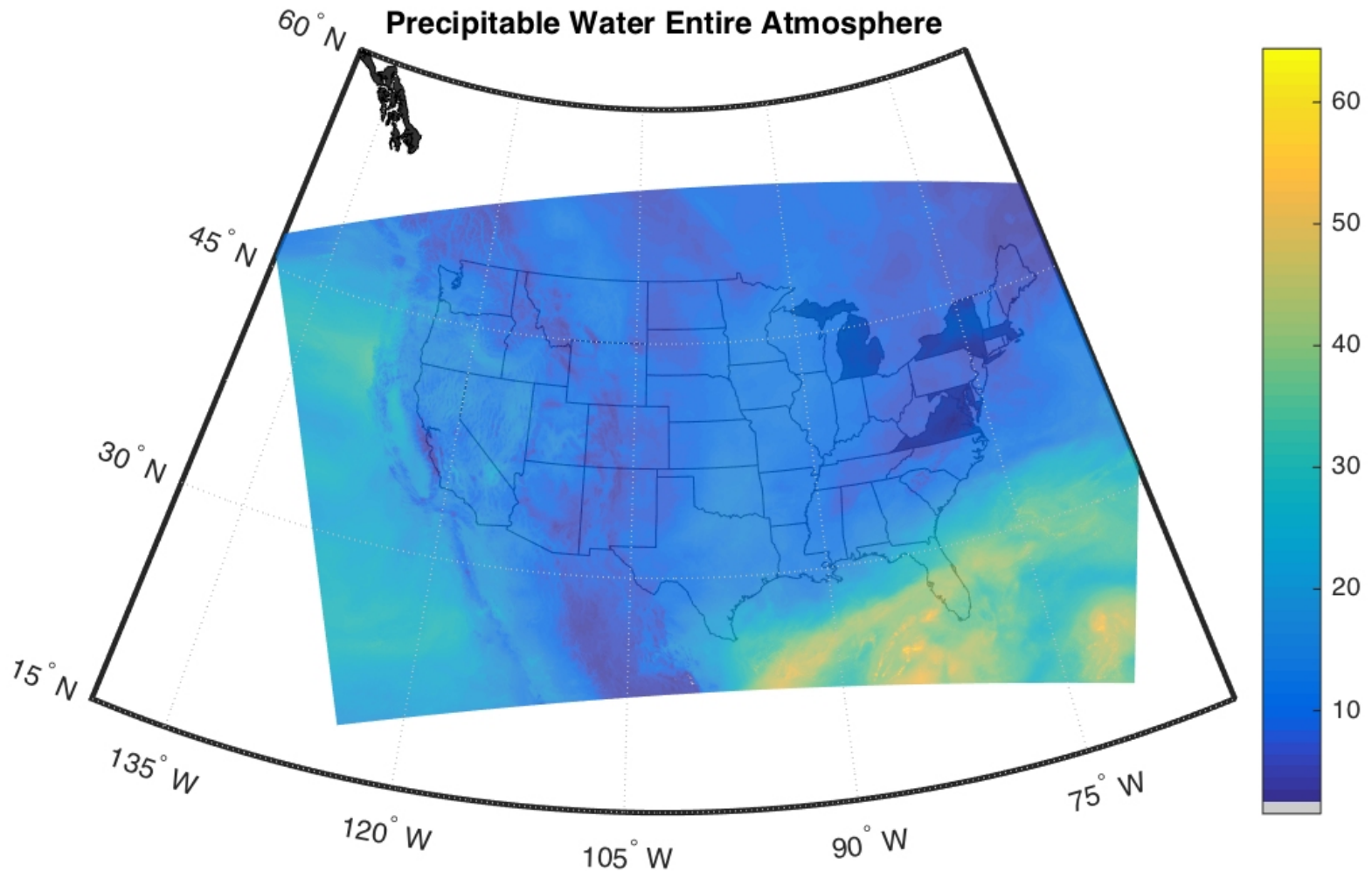- Projection information can be found in grib2 file attributes

Map Projection

```
aStruct = hdf2struct(fullfile(getenv('H5_HRRR_DATA'),'hrrr.20141221','hrrr.t17z.wrfnatf01.h5'));

mStruct  = defaultm('lambertstd');
mStruct.geoid  = [6371229./1000 0]; % radius of the earth in Km
mStruct.origin = [38.5 262.5 0];

[meshX,meshY] = meshgrid(aStruct.X,aStruct.Y);
[sLat,sLon]   = projinv(mStruct,meshX,meshY);

ax = worldmap([15 60],[-140 -65]);
states = shaperead('usastatelo', 'UseGeoCoords', true);
geoshow(ax, states, 'DisplayType', 'polygon','FaceColor',[1 1 1],'FaceAlpha',0.1);
pcolorm(sLat,sLon,squeeze(aStruct.PrecipitableWaterEntireAtmosphere));
alpha(0.8)
```

Precipitable Water Entire Atmosphere

Miscellaneous

- Road weather:
  - https://www.ral.ucar.edu/wsap/surface-transportation-weather
- SNOTEL – sensor network to monitor snowpack for water planning
  - http://www.wcc.nrcs.usda.gov/snow/