The NCEP North American Regional Reanalysis (NARR) assimilates a great deal of observational data. Much of the data was the same as used as in the NCAR/NCEP Reanalysis, hereafter referred to as the Global Reanalysis (GR). This dataset includes temperatures, winds, and moisture from radiosondes, as well as pressure data from surface observations. Also included in this dataset are dropsondes, pibals, aircraft temperatures and winds, and cloud drift winds from geostationary satellites.

In addition to the above list, a major component of the NARR is the assimilation of precipitation. The precipitation dataset comes from a variety of sources. The data over the continental United States comes from a 1/8-degree gauge dataset analyzed using PRISM and a least-squares distance weighting algorithm. Over Canada and Mexico, the precipitation comes from 1-degree gauge datasets. Much of the rest of the domain's precipitation comes from the precipitation comes from CMAP (CPC [Climate Prediction Center] Merged Analysis of Precipitation), a merged combination of satellite and gauge precipitation.

Other datasets include winds and precipitable water from TOVS (TIROS [Television InfraRed Observations Satellite] Operational Vertical Sounder) satellite radiances, wind and moisture from hourly and 3-hourly surface stations, and ship and buoy data. Snow depth comes from the 512x512 Air Force snow data set. Sea-surface temperatures (SSTs) contain a 1-degree Reynolds dataset, including the Great Lakes. Sea ice data comes from a satellite dataset used for the GR. Canadian lake ice comes from the Canadian Ice Center.