RTMA/URMA

Dave Bernhardt (SOO-Great Falls)
Lead

RTMA SOO Group

- **Following is a list of items that the RTMA "Good-Enough" Sub-group would like addressed with the RTMA and its assimilation process.**

- **Until these items are addressed, it is difficult to determine what is a "good-enough" analysis.**

1. **Develop a more agile and responsive mechanism for updating observation station (METARs and mesonet) information, and improve the accuracy of station location information.** The stations should be located accurately within 0.001° (preferably 0.0001°). The station location updates should be implemented in operational systems within hours, or a few days, rather than months.
   a. The present system does not work well. There are varied means of determining station location (NWSLI, AirNav, etc.). NWS Instruction 30-1204 states that the station location (if on airport) is the FAA-assigned coordinates. These are often center-field coordinates that can vary markedly from the meteorological instrument's coordinates.
      i. The directive should be updated, noting the distinction between the airport and meteorological coordinates.
      ii. A formal and uniform means of establishing station location must be implemented.

2. **Much expanded quality control of observations and mesonets.** It is important to reduce the number of observations that are rejected because they differ from the first-guess by a threshold amount. While these can be indicative of bad observations, they are often indications where the first-guess is not capturing reality and itself needs to be adjusted. These adjustments may include time continuity, neighbor agreement and other factors that should be accounted for in order for a station to be retained, even when it does not make the cut in the current scheme.

3. **Much expanded ability for different weighting for different observations in varied situations.** The current system weights observations very broadly, either METAR or other. This is particularly important when observations differ from the first-guess, yet agree with nearby observations that also differ from the first-guess. Such cases are indications that the first-guess may be missing critical local variations and needs to be more strongly adjusted toward the observations than in other circumstances (detailed by research at the University of Utah).

- Other variations in weighting are also warranted, such as weighting observations more strongly at grid points where sub-grid topographic variability is low - and less at grid points where the sub-grid topographic variability is high.

- Expanded variation in weighting based on observation type is also necessary, where more weight is given to some types of mesonets (such as high quality sensors like permanent RAWS and possibly DoT), and less weight to other mesonets (such as public “backyard”, CWOP and other such stations).

- This will help for mountain winter cold pools, marine layer inconsistencies, cold pools behind squall lines plus any other situation where the model background field is struggling with reality.

4. Improve background co-variance “analysis uncertainty” grids so they are more representative of the current errors in the background, etc.

- A threshold can be determined, but as a starting point, maybe we should consider something less than one-half of a standard deviation, difference from mean or variance.

- These grids should be updated in real time with a running set of time periods - last hour, last day, last week, last month, last 3 months and last year. This would provide critical insight as to how the RTMA/URMA analysis is performing for both daily, seasonal and yearly basis. This information could be also be used to improve how the NDFD verifies, ie., is the gridded forecast within the RTMA analysis error.

5. Updated documentation of the RTMA/URMA system