Existing code added to UFO

“Atmsfcinterp” added to UFO

- U/V 10m
  - Option to use “wind reduction factor” provided in GeoVaLs (which I believe is what is used in GSI for global analysis)
    - U10(i,j) = U(i,j,k=1) * factor(i,j)
    - Test passes with 10^{-5} tolerance
  - Option to compute this factor in UFO using from GeoVaLs:
    - U, V, T, Q, P, Tskin, roughness length, land/sea mask
    - Test passes with 10^{-3} tolerance (not perfect for a couple of locations)
- T 2m
  - Using similarity theory code in GSI (apparently not used though)
    - Test passes with 10^{-4} tolerance
- Q 2m
  - Same process as T2m but not tested currently

Scatwind obs in GSI for global analysis use wind reduction factor (either computed or provided) to get U,V at 10m

Anything like Psfc or something that the field already exists in the background, the “identity” operator can be used

Planned future operators / capabilities needed

Need to consult with Jacob Carley, Manuel Pondeca, and others what our needs at EMC are for regional DA/obs not used in GFS analysis for UFO

Variables/observations specific to RTMA/URMA

- The 2D RTMA/URMA system uses control variables for wind gust, visibility, cloud ceiling height, lowest cloud base-height, wspd10m, uwnd10m, and vwnd10m for the direct assimilation of the corresponding observation type. In other words, the system assimilates observations of wind gust, visibility, cloud ceiling height, etc.

  We probably want to keep this capability in JEDI, even if the current operational 2D RTMA/URMA is to be subsumed by an operational 3DRTMA/URMA.

10-m assimilation in 2D RTMA/URMA

The system currently assumes that wind observations are all at 10m above the RTMA terrain. However, the next (and last) system upgrade which will be implemented early next year will use similarity theory to account for the fact that many wind observations are not at 10 m (while the background is by design valid at 10 m). That work is being done by Xiaoyan Zhang.

Need to know how near-surface aircraft observations are handled in global analysis: the terrain height (or surface pressure)-> adjustment is done through the inflation of the observation error

Other GSI capabilities for surface obs that are not listed here (note not other regional specific obs like radar,