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From: Wanqiu Wang, Chief
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Subject: Soliciting Comments on Upgrading the Climate Data Assimilation System (CDAS) to the Conventional Observation Reanalysis (CORe) through August 30, 2024

The NWS National Centers for Environmental Prediction (NCEP) Climate Prediction Center (CPC), in partnership with both the Physical Sciences Laboratory (PSL) and the Environmental Modeling Center (EMC), is proposing to upgrade the Climate Data Assimilation System (CDAS) to the Conventional Observation Reanalysis (CORe). We plan to maintain CORe and CDAS in parallel for a period that is yet to be determined (and which could possibly be beyond 30-day that is customarily for forecast and analysis system upgrades at NCEP) and will depend on user requirements. We are seeking comments until August 30, 2024 on the proposed upgrade.

CORe is a climate atmospheric reanalysis from 1950-present, and we are proposing to implement a real-time version of CORe to replace CDAS which is the real-time extension of the NCEP/NCAR Reanalysis (1948-present). CORe, like CDAS, is an atmospheric reanalysis that uses externally produced Sea Surface Temperature (SST), sea ice and snow analyses for boundary conditions. CORe uses more modern data assimilation techniques than CDAS for its historical analyses. CORe is a Unified Forecast System (UFS)-based system (circa 2020 codes) which uses an Ensemble Kalman Filter to assimilate conventional observations as well as Atmospheric Motion Vectors (AMV), while CDAS is a Medium Range Forecast (MRF)-based system (circa 1995 operational codes) that assimilates conventional observations, as well as AMV and satellite temperature retrievals.

The output of CORe shows some significant improvements over CDAS specially in their respective climatologies.

With the implementation of CORe users need to be aware of following changes:

- The gridded binary (grib) version 1 files are replaced by grib version 2.
- The 144x73 2.5 degree CDAS atmospheric analysis is replaced by a 512x256 Gaussian grid.

- The 192x64 T62 Gaussian grid CDAS flux files are replaced by a 512x256 Gaussian grid.
- The CORE files are produced every 3 hours instead of 6 hours as in CDAS.
- The sigma grib files are not available.
- The isentropic grib files are not available.
- CDAS restart files are replaced by nemsio ensemble-mean files.
- Ensemble statistics and ensemble member data are available.
- The extended range forecasts are not available.
- The CORE atmospheric analyses are generated by the UFS post-processor.
- The contents of the pressure and "flux" files still have a considerable overlap but have changed.

The grib version 2 files from CORE can be read, regrided, and averaged using wgrib2:

<https://www.cpc.ncep.noaa.gov/products/wesley/wgrib2/>

Details about the CORE configuration and CPC expert evaluations are available at:

<https://www.cpc.ncep.noaa.gov/products/CORE/pns/eval/>

CDAS and CORE will show differences because CDAS is based on 1995 operational code, and CORE is based on modern codes (GFS v15). For climate monitoring, the modern reanalyses (CORE, ERA-5 and JRA-55) now produce large-scale climate anomalies/trends that are consistent with each other

(https://www.cpc.ncep.noaa.gov/products/CORE/pns/eval/Final_Ebisuzaki.pdf).

To make it more convenient for users to evaluate the proposal about replacing CDAS by CORE, CDAS-look-alike CORE pgb and flux files are produced for the period of 1950-2023 in grib version 1. The look-alike files only contain the subset of fields that are common to CORE and CDAS. One exception is that the soil layers from CORE four layers are converted to CDAS 2 layers. The documentation for the data sets is at:

https://www.cpc.ncep.noaa.gov/products/CORE/pns/eval/eval_datasets.html

Please submit comments, questions, or requests on the proposed upgrade to:

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National Public Information Statements are online at:

<https://www.weather.gov/notification/>

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