

Enabling Reanalysis Intercomparison with the CREATE-IP and CREATE-V Projects

Laura Carriere, Gerald L. Potter, Judy Hertz, Yingshuo Shen, George Britzolakis, Julien Peters, Thomas Maxwell, Jian Li, Savannah Strong, John Schnase
NASA Center for Climate Simulation (NCCS)
NASA GODDARD SPACE FLIGHT CENTER

Atmosphere Reanalysis Data

The NCCS has published monthly and selected 6-hourly data from seven major atmosphere reanalysis projects (see table on right) from 1979 to 2016. Up to 47 monthly variables have been processed and published. Sixteen 6-hourly variables (see table below) have been processed and published.

Atmosphere Reanalysis

- NASA MERRA
- NASA MERRA2
- ECMWF ERA-Interim
- NOAA/NCEP Climate Reanalysis
- NOAA/ESRL 20CRv2c
- JMA JRA-25
- JMA JRA-55

6-Hourly Variables

- Total Cloud Fraction
- Evaporation
- Relative Humidity
- Specific Humidity
- Precipitation
- Precipitable Water
- Surface Pressure
- Sea Level Pressure
- Air Temperature
- Surface Air Temperature
- Ozone Mole Fraction
- Eastward Wind
- Near Surface Eastward Wind
- Northward Wind
- Near Surface Northward Wind
- Geopotential Height

All CREATE-IP project data is available in ESGF. Most of it is available in THREDDS. The data can be found here:

esgf.nccs.nasa.gov
cds.cnes.nasa.gov

In addition, 14 of the monthly and 6-hourly variables are available for visualization, comparison, and analysis through CREATE-V, found here:

cds.cnes.nasa.gov/CREATE-V

Ocean Reanalysis Data

Ocean Reanalysis

- NOAA/NCEP Climate Reanalysis
- CMCC C-GLORSv5
- NOAA/GFDL ECDASv3
- U.S. Navy GECCO2
- NOAA/NCEP GODAS
- MOVE MR-COM-G2
- ECMWF ORAS4
- ECMWF ORAS5
- ORA-Ensemble

The NCCS has published monthly data from eight major ocean reanalysis projects (see table on left) from 1980 to 2010. Four state variables have been processed:

- Potential Temperature
- Sea Water Salinity
- Sea Water X Velocity
- Sea Water Y Velocity

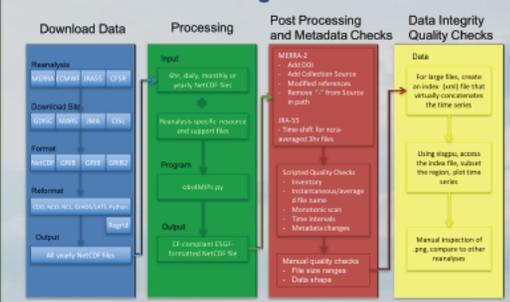
The eight reanalyses were regrided and interpolated to a common grid, and an ensemble was generated. All data were published in CREATE-IP, THREDDS, and CREATE-V.

ABSTRACT

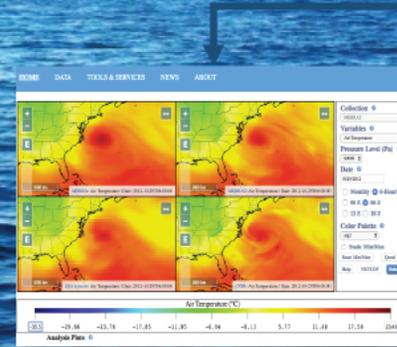
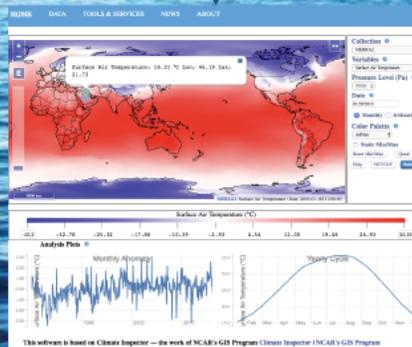
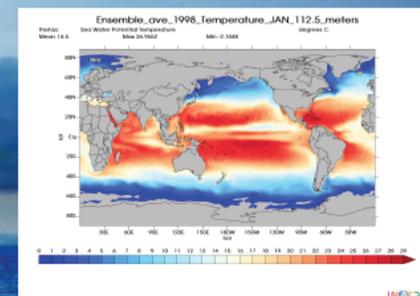
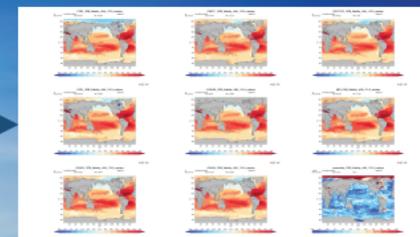
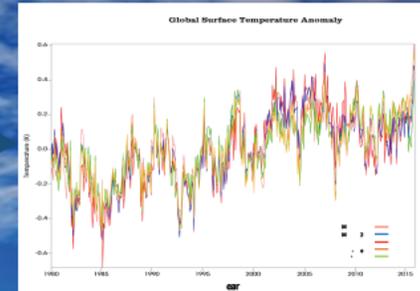
To reduce the time and effort required by scientists to download and reformat data from numerous data providers, the NCCS has partnered with various atmospheric reanalysis centers (NASA, NOAA, EMCWF, and JMA) and the CLIVAR Global Synthesis and Observations Panel (GSOP) to reprocess seven atmospheric reanalyses and eight commonly used ocean reanalyses into CMIP5-compliant format and made them available to scientists through ESGF and THREDDS. The ocean reanalyses have been regrided to a common $1^\circ \times 1^\circ$ grid, vertically interpolated to the first 33 World Ocean Atlas 09 (WOA09) depths (5-5750), and an ensemble has been generated.

To further facilitate science, the NCCS developed CREATE-V, a web-based visualization tool that leverages the Web Mapping Service (WMS) and OpenLayers to allow scientists to explore variables, dates, and levels and to visualize the data side by side to identify features for future study. The addition of a backend analytics engine, based on UV-CDAT and Scala, provides the ability to generate a monthly anomaly and a yearly cycle for any given location on a map.

Processing Workflow



Data Services



Summary

CREATE provides access to seven atmosphere reanalysis datasets, eight selected ocean reanalysis datasets, and an ocean ensemble through the CREATE-IP project space on ESGF and the CREATE-V web interface. It is anticipated that this collection of data, services, and science collaborations will support future work in reanalysis intercomparison and interdisciplinary science.

For Additional Information

<http://cds.nccs.nasa.gov>
laura.carriere@nasa.gov

