

Ocean Web-based Reanalysis Intercomparison Tools (WRIT)

<http://psl.noaa.gov/writ/>

Catherine Smith, Gilbert P. Compo, Michael Alexander, Matt Newman,
and Don K. Hooper, Chia-Wei Hsu NOAA/PSL and CIRES



Project Background

Purpose: Create a set of web-based tools that allow users to easily plot and compare reanalyses datasets and gridded observational datasets.

Method: Use the web based HTML forms as the user interface. Perl code reads and processed the inputs. NCL programs process the data, do necessary interpolations, and create output plots and other products.

Reanalysis	Original horizontal resolution	Time range	Original vertical resolution
NOAA GODAS	418x360	1979-present	40 levels
UMD SODA3	330x720	1980-2017	50
JRA-55			
UMD SODA3 JRA-ERA1	330x720	1980-2017	50
ECMWF ORAS5	1021x1442	1979(58)-2022	75
ECMWF ORA20C	360x180	1979(01)-2017	N/A
Observed	Atmosphere	Time range	Original vertical resolution
UK HadISST1.1	1x1	1870-present	N/A
NOAA OI SST	2x2	1982-present	N/A
NOAA ERSST V5	1x1	1894-present	N/A
NASA GPCP Precipitation	2.5x2.5	1979-present	N/A
JMA JRS-55 Fluxes	0.75	1958-present	N/A
UK EN4	1x1	1980-2017	42

Example Time-Series			
SST	Atmospheric	Ocean	Miscellaneous
Nino 1+2,3,4,4	PNA	Tidal Height San Diego	NHSH Ice Area and Extent
ONI	NAO	Equatorial Heat Content	IOD (DMI)
MEI	AO	AMM/PMM	Sierra Rainfall
MEI Extended	QBO	Hurricane ACE	Sunspots
IOD	ALISA	Central Pacific Heat Content	Solar Flux Index

Standard Variables:

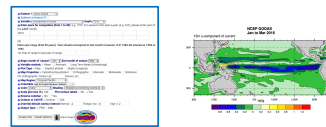
- **Depth:** Potential Temperature, Salinity, U current, V current.
- **Single Level:** SST, SSH, salinity, wind stresses, heat content, mixed layer depth, bottom temperature.....

Output Products:

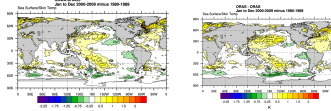
- PNG Image
- Postscript image
- NetCDF file of data plotted
- Dataset information

Mapping

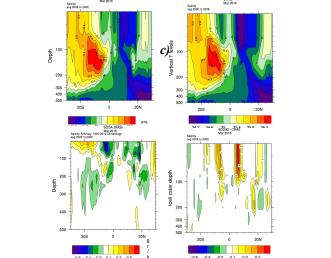
Description: Web interface plots maps and cross-sections of reanalysis and observational datasets. Users can create vertical cross-sections of reanalyses and can compare different datasets over different sets of years.



Web page interface used to create the plot of the NCEP-GODAS 15m u current for Jan-Mar 2016 and the corresponding plot.



Decadal Differences of SST from 2 different ocean reanalysis dataset for 1980-1989 to 2000-2009 for annual average.



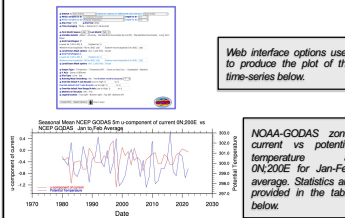
Salinity vs Depth over the tropical Pacific for a) SODA-JRA55 and the b) ORAS5 datasets for Jan 2016 (El Nino). Also c) the anomalous salinity for SODA-JRA55 and d) The difference between the datasets.

Output Products:

- PNG Image
- Postscript image
- NetCDF file of data plotted
- Dataset information
- Spatial Correlation

Time Series

Description: Users can extract and plot time-series and time series products from reanalyses and observational datasets. Other



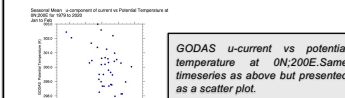
Web interface options used to produce the plot of the time-series below.

NOAA-GODAS zonal current vs potential temperature at ON:200E for Jan-Feb average. Statistics are provided in the table below.

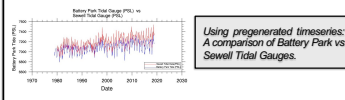
Correlation is 0.414605 RMS Difference is 300.286

Time-series Statistics

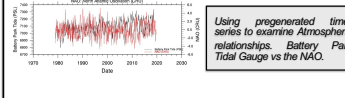
	GODAS u-component of current	GODAS Potential Temperature
Mean:	0.316353	299.566
Standard Deviation:	0.307389	1.4398
Skewness:	-0.82518	0.29099
Kurtosis:	1.67917	-0.77158
Slope *	0.00437817	-0.0142652
Percent Missing:	0	



GODAS u-current vs potential temperature at ON:200E. Same timeseries as above but presented as a scatter plot.



Using pregenerated timeseries: A comparison of Battery Park vs Sewell Tidal Gauges.



A difference plot of ORAS5 vs SODA3-JRA55 SST over the north tropical Atlantic ocean.



Output Products:

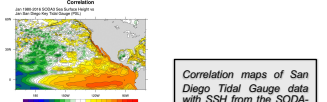
- PNG Image
- Postscript image
- NetCDF file of data plotted
- Dataset information
- ASCII timeseries files
- Statistic(s)

Correlations

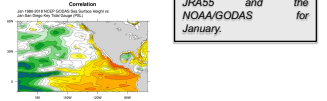
Description: Users can extract and plot time-series and time series products from reanalyses and observational datasets.



Web Interface used to create correlation plot of SSH with San Diego Tidal Gauge data.

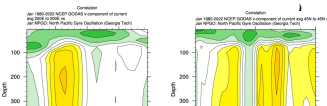


Correlation maps of San Diego Tidal Gauge data with SSH from the SODA-JRA55 and the NOAA-GODAS for January.



7 month lead correlation of Nino 3.4 SST in October with the HadISST1.1 SST in April.

Vertical Correlation Plots: Depth by Latitude and Depth by Longitude with the NGPO for the North Pacific Ocean in January with the NOAA GODAS v-current.



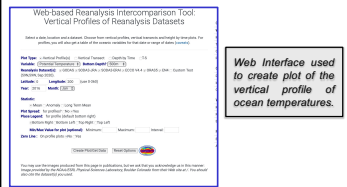
Vertical Correlation Plots: Depth by Latitude and Depth by Longitude with the NGPO for the North Pacific Ocean in January with the NOAA GODAS v-current.

Output Products:

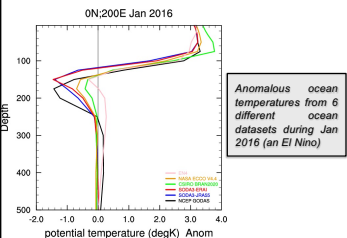
- PNG Image
- Postscript image
- NetCDF file of data plotted, index time-series
- Dataset information
- ASCII Timeseries, CSV file

Profiles

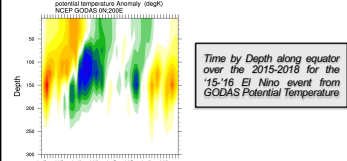
Description: Allow users to examine vertical profiles, depth by time plots, vertical cross sections, and temperature/salinity (TS) plots.



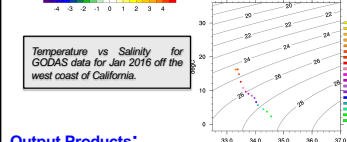
Web Interface used to create plot of the vertical profile of ocean temperatures.



Anomalous ocean temperatures from 6 different ocean datasets during Jan 2016 (an El Nino)



Time by Depth along equator for the 15-16 El Nino event from GODAS Potential Temperature



Output Products:

- PNG Image
- Postscript image
- NetCDF file of data plotted
- Dataset information
- ASCII data, CSV