The scripts provided below are used to create plots and data files of POP model output. Examples of these plots can be found on the “CESM1.0 Diagnostics” page (http://www.cesm.ucar.edu/experiments/cesm1.0/) for the ocean model and on the “POP2 Stand Alone Diagnostics” page (http://www.cesm.ucar.edu/experiments/cesm1.0/diagnostics/pop2_diag.html). These scripts are configured to run on NCAR's Data Analysis Services Group (DASG) machines (mirage and storm); however, you can export them to your local machine. If you are running them on a local machine, you will need NCL and will also need to download the observational data from the repository. Running these scripts on a machine other than the DASG machines is untested and unsupported. These modules are a work in progress as they were initially intended for internal use; therefore, some of the modules will fail to create a plot (or data). Updates will be made periodically and announced on the Ocean Modeling with POP2 Diagnostics Package Questions bulletin board (http://forum.cgd.ucar.edu/forumdisplay.php?65-Diagnostic-Package-Questions).

What to do:

1. Export the latest version of the code to your desired directory:

   svn checkout https://svn-ccsm-release.cgd.ucar.edu/model_diagnostics/ocn/pop2/popdiag_rel_yearmndy your-directory-name

   where yearmndy indicates the year, month, and day for that version of the code. Make sure you export the latest version.

   If you will NOT be running these scripts on an NCAR DASG machine, you will need to download the observational data.

   svn checkout https://svn-ccsm-release.cgd.ucar.edu/model_diagnostics/ocn/pop2/pop_obs_data_yearmndy your-data-root

2. If you are NOT running on NCAR machines, you will need to use the makefile in /tool_lib/zon_avg to create an executable called za*. Put this executable in the /tool_lib directory. You will need to change the directories in the makefile to point to your directories.

3. Make necessary changes as indicated below. The output may be ascii files in addition to plots (if DOPLOTS=1) and a webpage (if DOWEB=1).

4. Run the script

   popdiag.csh >&! popdiagout_CASENAME &

Available Scripts

The following is a list of scripts you will use to run the diagnostics along with their description:

- popdiag.csh – compares map plots of model output with observations
- popdiagts.csh – creates time series of model output
- popdiagdiff.csh – compares map plots from one model simulation to another model simulation

Customizing the scripts

Certain settings will need changing for each case you run. If a setting is not listed below, we recommend leaving it as the default value. Each script has a list of available plot modules. Set the value to 1 if you want the module to execute and 0 if you do not want it executed.

Settings common to all scripts that the user must define:

- The scripts assume the following directory structure for model output data. If your directory structure is not set up this way, you will need to change the scripts so they can find your output. If you are reading data from a local directory, add an extra / at the end of the MSROOT path.
  # /${MSROOT}/${CASE}/ocn/hist
  # /${MSROOT}/${CASE}/ocn/logs
  # /${MSROOT}/${CASE}/ocn/proc/tavg/annual
  # /${MSROOT}/${CASE}/ocn/proc/tavg/monthly
- CASE – input the name of your run case (ex.b40.1850.track1.1deg.006)
- RESOLUTION – input the ocean model resolution (ex. gx1v6)
- SWIFT – set to 1 if you want to use SWIFT. Please read the README-SWIFT.pdf document.
- CPY_TO_HSI – use 1 if you want SWIFT to copy created averages to the HPSS
- DOPLOTS – use 1 to create plots (.gif,.png,etc.) or 0 not to create plots (output will be only ascii files)
- DOWEB – use 1 to create a webpage and 0 not to create a webpage.
- Note that once you create a webpage, if you are appending that page by running the script again, set APPEND to 1 (the default is 0 and will clobber whatever you have

already created).
- You will need to set WEBMACH, WEBDIR1, and WEBDIR2 to a machine and directories where you want a webpage created. If using the NCAR DASG machines, the default is to create the webpage on poorman.cgd.ucar.edu, so you will need an account on the CGD machines. Change this if you do not have this account.
- MSROOT – location of the input data (the model output location). If the location is in a local directory, add an extra / at the end of the path. If it is a directory on the HPSS, leave this out.
- MSPROJ – if running these scripts on an NCAR machine you will need a project number that can be charged
- DIAGROOTPATH – this should be the directory where you downloaded the package (where the scripts are located)
- WORKDIR – set to your working directory
- SET OBS INFO – all of the directories listed under this section can be left as they are if running these scripts on an NCAR DASG machine; however, if you have ported this code to a local machine, you will need to download the observational data from the repository and change all of these directory names to the location on your machine. You will keep the directory structure following /obs the same. For example, in popdiag.csh, the directory is /cgd/oce/yeager/obs/fluxes/TN460. You will change it to /your_data_root/fluxes/TN460. The exception is SST, which will become /your_data_root/sst.
- NCARG_ROOT – If running on your local machine, you will need to change this directory to the location of the NCL package.
- IDLCOLORTABLEFILE – If running on your local machine, you will need to change this directory to the location of your colortable file for the IDL package.

Settings specific to popdiag.csh:
- YEAR0/YEAR1 – The script will create plots of the mean from YEAR0 to YEAR1.

Settings specific to popdiagts.csh:
- YEAR0/YEAR1 – These values set the year bounds of the average wavelet spectrum for the ENSO plots. For all other modules, time series will be created for the entire length of the run regardless of the values you put here.
- PM_CPLLOG – WARNING! Set this to 0 unless you are analyzing a coupled simulation. If you are analyzing an ocean-only run (C compset), setting this to 1 will cause a failure and no plots will be output (even from other modules).

- Set PM_HORZMN = 0 if you are NOT running on NCAR's DASG machines (this will not work without access to the mass store as the code is now)
- MSLOGREAD – Set to 1 to read the input data (the log files) or set to 0 if you have run this script before and already have the log files in the working directory.
- FER_DIR – If running on the NCAR DASG machines, do not change; otherwise, set to the location for the Ferret executable and change FER_PALETTE, PLOTFONTS, and FER_GO accordingly.

Settings specific to popdiagdiff.csh:

- YEAR0/YEAR1 – The script will create plots of the mean from YEAR0 to YEAR1 of the simulation listed for $CASE.
- CNTRLCASE – The name of the control case to which you want $CASE to be compared.
- CNTRLYEAR0/CNTRLYEAR1 – The script will create plots of the mean from CNTRLYEAR0 to CNTRLYEAR1 of the simulation listed for $CNTRLCASE.
- CNTRLMSROOT – The location of the control simulation output.

Files you need to create ONLY if you are not running on NCAR's DASG machines and do not have access to the original ocean history output files:

For the popdiag.csh and popdiagdiff.csh

1. Create the tavg file (mean of all files) and put it in $WORKDIR:
   >ncra $DIR/$files tavg.$YEAR0.$YEAR1.nc

2. Create the mavg files (climatologies for TEMP and SALT) and put them in $WORKDIR:

   ```
   >ncra -v TEMP,SALT $DIR/$janfiles jan.nc
   >ncra -v TEMP,SALT $DIR/$febfiles feb.nc
   .
   .
   .
   >ncra -v TEMP,SALT $DIR/$decfiles dec.nc
   ```

   where $janfiles,...,$decfiles are all of the January,...,December netcdf files over the years of interest and $DIR is the location of the output files.

   ```
   >ncrcat jan.nc feb.nc mar.nc apr.nc may.nc jun.nc
   jul.nc aug.nc sep.nc oct.nc nov.nc dec.nc mavg.nc
   ```

```
>ncks -v TEMP mavg.nc ${CASE}.pop.h.TEMP.mavg_${yr0}-
${yr1}.nc

>ncks -v SALT mavg.nc ${CASE}.pop.h.SALT.mavg_${yr0}-
${yr1}.nc
```

3. You will need to make all the same files for the control and experiment simulations. Just check the script for the naming convention for the control tavg and mavg files.

For the popdiagts.csh script

1. Create MOC timeseries file and put it in $WORKDIR.

```
set fields = (MOC N_HEAT N_SALT transport_regions
transport_components moc_components)

>ncra -v $fields $DIR/$files_year1 yr1mocvars.nc
>ncra -v $fields $DIR/$files_year2 yr2mocvars.nc
.
.
.
>ncra -v $fields $DIR/$files_yearN yrNmocvars.nc
```

where $DIR is the location of the output files.

```
>ncrcat yr*mocvars.nc $CASE.pop.h.MOC.${yr0}-
01_cat_${yr1}-12.nc
```

where ${yr0} and ${yr1} are the 4 digit start and end years, respectively.

2. Move all .dt. and ocean and cpl log files from the output directory to $WORKDIR and unzip the log files. Here are the commands:

```
>cp ${ROOT}/${CASE}/cpl/logs/cpl.log* $WORKDIR
>gunzip -f cpl.log*.gz

>cp ${ROOT}/${CASE}/ocn/logs/* $WORKDIR
>gunzip -f ocn.log*.gz

>cp ${ROOT}/${CASE}/ocn/hist/*.dt.* $WORKDIR
```