Information about Level 1 – Basic ENSO diagnostics

At this level, POD calculates simple seasonal averages, composites, regression and correlations.

Based on a reference ENSO index (e.g., area-averaged SST anomalies over Nino3.4 region), seasonal composites of variables relevant to MSE budget are constructed for the entire 2-year life-cycle of ENSO. Here, Y (0) refers to the developing, and Y (1) the decaying phase of ENSO.

To perform composites set ENSO_COMPOSITE = 1 in the ~/diagnostics/ENSO_MSE/settings.jsonc.

The code files related to this Level 1 are stored in the ~/diagnostics/ENSO_MSE/COMPOSITE directory. All input data should be under ~/diagnostics/inputdata/model/$model/mon, (e.g. $model = CESM1), the intermediate output data are in:
~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/
COMPOSITE/model/netCDF, (e.g. $model = CESM1, $first_year = 1950, $last_year = 2005),
while graphics is under
~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/model

The required input variables are:

Z(x,y,z,t)	geopotential height,
U(x,y,z,t), V(x,y,z,t)	u and v wind components
T(x,y,z,t)	temperature
Q(x,y,z,t)	specific humidity
OMG(x,y,z,t)	vertical velocity
PR(x,y,t)	precipitation
SST(x,y,t)	surface temperature
S*HF(x,y,t)*	sensible heat flux
LHF(x,y,t)	latent heat flux
RSDT(x,y,t)	top of the atmosphere shortwave down
RSUT(x,y,t)	top of the atmosphere shortwave up
RLUT(x,y,t)	top of the atmosphere longwave up
RSDS (x,y,t)	surface shortwave down
RSUS(x,y,t)	surface shortwave up
RLUS(x,y,t)	surface longwave up
RLDS(x,y,t)	surface longwave down

All input file should be in netCDF format following CF convention, one variable per file, with monthly output frequency, $model.$variable.mon.nc. For instance, CESM2 temperature data will be in CESM2.ta.mon.nc file. *CF convention refers to standard CMIP-era model outputs.*

<u>Final output directories:</u>

The output files are under ~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/ $diag_name/model/netCDF (e.g. $model = CESM1, $fist_year= 1950, $last_year = 2005, $diag_name = COMPOSITE)

The composites for El Niño/La Nina are under

~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/
$diag_name/model/netCDF/ELNINO (or LANINA)

Similarly 2-year life cycle ENSO composite results are under:
~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/
$diag_name/model/netCDF/24MONTH_ELNINO (or 24MONTH_LANINA)

Graphical output is now set to be all global and for all surface variables. The actual files are in ~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/model.