Information about Level 2 – MSE budget analysis

At this level, the code estimates vertically integrated MSE budget terms.

Required input data are calculated in **Level 1.** To execute this level, set the parameter ENSO_MSE = 1 in ~/diagnostics/ENSO_MSE/settings.jsonc file. Users need to complete **Level 1** diagnostics first before running **Level 2**.

The following terms are calculated as vertical integrals:

MSE: $h = C_P T + gz + Lq$

MSE vertical advection: $-\left\langle \omega \frac{\partial h}{\partial p} \right\rangle$

moisture divergence: $\langle q \nabla \cdot V \rangle$.

moisture advection: $-\langle V \cdot \nabla q \rangle$

temperature advection: $-\langle V \cdot \nabla T \rangle$

Note that vertically integrated moisture divergence is also estimated here.

Note also that surface and radiative fluxes, are already estimated in Level 1. All MSE terms are expressed in W/m^{-2}.

Final output directories:

The El Niño/La Nina composites are under directories: ~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/MSE/model/netCDF/ELNINO (or LANINA)

Graphical output files reside in : ~/diagnostics/wkdir/MDTF_$model_$first_year_$last_year/ENSO_MSE/model

(e.g. $model = CESM1, $first_year = 1950, $last_year = 2005)