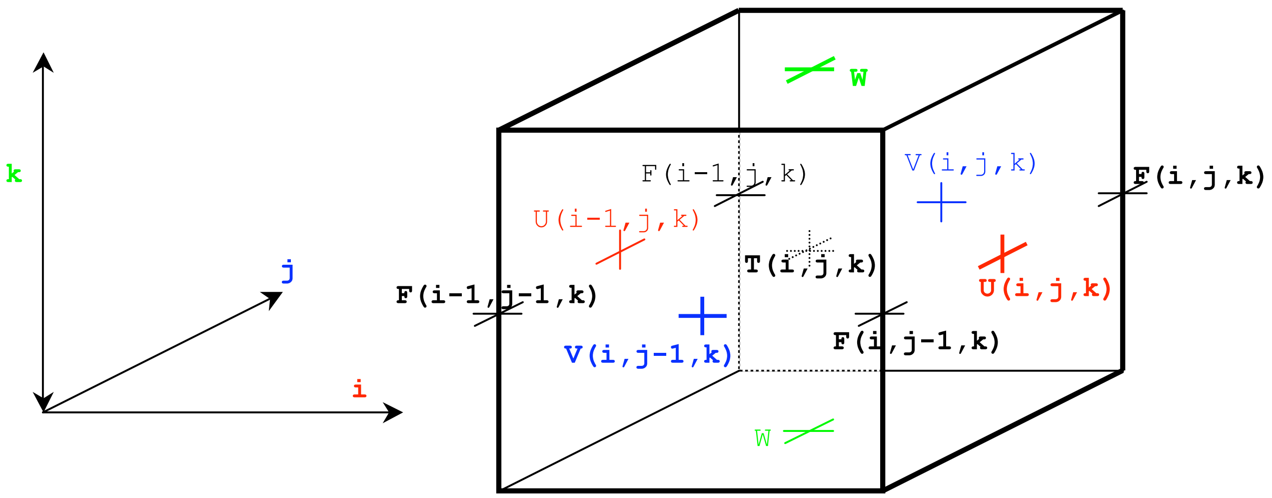
Formatting **your** OGCM output for **our** Lagrangian diagnostics…

Dear MOTIF Collaborators,

In order to help us to derive fast and reliable Lagrangian diagnostics from your own results, we would like you to format your output fields in the way that fits best ARIANE's formalism.

Basically, you are asked to adjust your model output to the structure of a **C-grid** (introduced in Arakawa's classification [1981]), as it is our standard grid format as well as a natural framework to express mass conservation.

Figure 1



Your model grid should then be a parallelepipedic layout, as a succession of temperature-cells along `i`, `j` and `k` directions, **centered on tracer** (T) **points**.
Your model lateral dynamics is to be provided as **transports** (and **not** velocities) across (and centered on) any lateral side of each T-cell (U and V points).
Mass conservation (i.e., absence of source or sink of mass within the ocean) ensures that the mass budget (**algebraic** sum of entering zonal, meridional and vertical transports, see Figure 1) is virtually zero within each individual T-cell, and enables the diagnostic of vertical transports (at W points).
Finally, your model fields must cover a full **climatological** year.

Let `imt`, `jmt` and `kmt` be the number of T-cells available along the three space directions of the C-grid.
Let `lmt` be the number of sampled outputs in time (i.e., 12 for a monthly climatological output).

Here follows the information we need about your model grid and fields.
Please provide it either as **NetCDF** files, or ASCII or IEEE-binary files with **easy-to-handle** Fortran 77 scripts to read them.

Yours sincerely,

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GRID DIMENSIONS

- the values of `imt`, `jmt` and `kmt` (space) and `lmt` (time)
- the number of days (`ndays`) documented by each successive model output (this number must be a constant, i.e., 30 for monthly files over a 360-day climatological year, 73 for 5-day averages over a 365-day climatological year, etc.)

CONTINENT/OCEAN MASK

- the ocean/land mask applicable for T cells
  `tmask(imt,jmt,kmt)` (**=0** for continent, **=1** for ocean)

GEOGRAPHICAL COORDINATES

- the geographical coordinates of the T-cell **centers**
  `xt(imt,jmt)`,`yt(imt,jmt)` (in **degrees**)
  `zt(imt,jmt,kmt)` (in **meters**)

Note: for simple configurations, `zt` *is likely to depend only on* `k`*,* `xt` *on* `i`*, and* `yt` *on* `j`*; please apply and indicate all available simplifications to save disk and memory!*

- the horizontal coordinates of the centers of the T-cell **sides**:
  `xu(imt,jmt)`,`yu(imt,jmt)` (in **degrees**)
  `xv(imt,jmt)`,`yv(imt,jmt)` (in **degrees**)

Note: for most configurations, some of these horizontal coordinates are redundant with the T coordinates; please indicate all available equivalences and provide only the essential variables!
  `zw(imt,jmt,kmt+1)` (in **meters**)

Note: as T points lie between W points, one must define `kmt+1` *useful depths for W, with the extreme values corresponding to the ocean surface (z=0) and bottom.*

- the horizontal coordinates of the T-cell vertices (same horizontal position as F points, see Figure 1)
  `xf(imt,jmt)`,`yf(imt,jmt)` (in **meters**)

Note: for most configurations, some of these coordinates may be redundant with U or V coordinates; please indicate all available equivalences.

SCALE FACTORS

- the scale factors giving the true dimension (length, width and depth along i, j and k axes) of the T cells
  `e1t(imt,jmt)`,`e2t(imt,jmt)` and `e3t(imt,jmt,kmt)` (in **meters**)

MODEL FIELDS

- the horizontal **transports** (in m^3/s)
  `U(imt,jmt,kmt,lmt)`,`V(imt,jmt,kmt,lmt)`

Note: "horizontal" here refers to constant-k levels.

Note: mass fluxes must be zeroed on continents ; please check that whenever `tmask(i,j,k)=0` *your transport fields do respect at each time step* `U(i-1,j,k)=U(i,j,k)=0` *and* `V(i,j-1,k)=V(i,j,k)=0`*.*

Note: we will compute ourselves the vertical transport, by assuming mass conservation within each T-cell and a null bottom vertical velocity, and by integrating upward the divergence equation. Therefore, any possible residual at the surface will be considered as an "evaporation-precipitation" flux. In other words, $W(i,j,k_{surf.})=Sum_{over\_k}\{U(i-1,j,k)-U(i,j,k)+V(i,j-1,k)-V(i,j,k)\}$

- if available, **potential** temperature (in °C) and salinity (in psu)
  `T(imt,jmt,kmt,lmt)`, `S(imt,jmt,kmt,lmt)`

*Note: we use Jackett and McDougall's revised equation to diagnose **potential** density. Please provide your own 4D potential density field or your own model potential density equation if you feel uncomfortable with this.*

GRID PERIODICITY

- any periodicity and overlapping present in your grid, most probably in the zonal direction, but also possibly in the meridional direction, with **explicit** rules to derive them (as equivalences between grid indices) for **all** (T, U, V and F) model gridpoints.