How to use CESM water tracer output files

The data can be accessed via Globus:
https://g-804753.7a577b.6fbd.data.globus.org

Do not use 1985 data. The water tracers give unrealistic values during the first several months of this year as they spin up.

The precipitation variables have the following naming convention:

"Variable_RegionName+EvaporativeFlux+PrecipType"

For example, "PRECRC_UPRTr" represents:

PRECRC = Variable = convective rainfall
UPR = RegionName = Upper Rockies
T = EvaporativeFlux = Transpiration-sourced
r = PrecipType = convective

There are 4 precipitation variables:

PRECRC = convective rainfall
PRECRL = stratiform rainfall
PRECSC = convective snowfall
PRECSL = stratiform snowfall

There are a lot of region names — some for land regions, some for ocean regions.

Land Regions:
Please see Harrington et al. 2023 for a figure with all the regions and their acronyms (note, I used slightly different names for the regions in my paper, but the regions themselves are the same).

https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2022JD037290
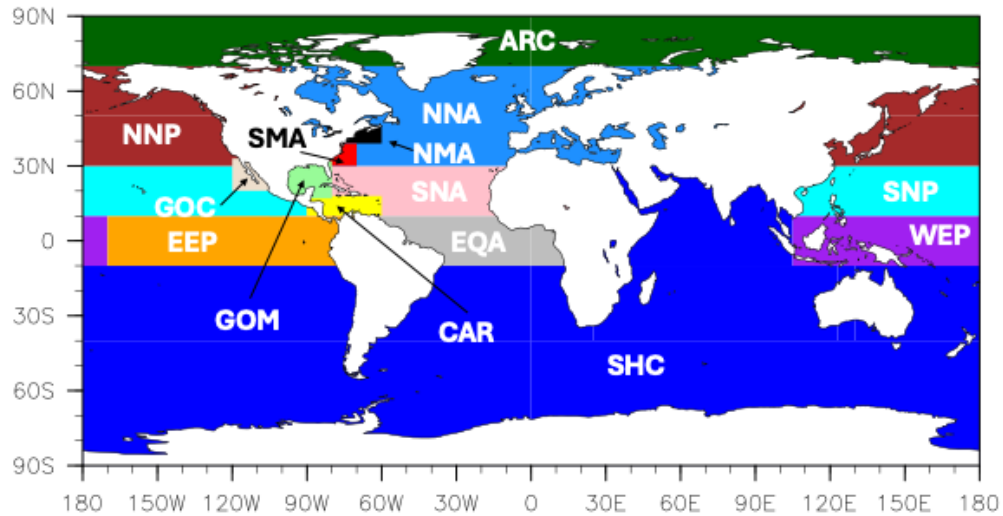
Ocean regions:

Note, there is some overlap of the ocean boxes, so you need to do the following to get the contributions for SNA, SNP, and NNA (unless of course you don't care about the smaller regions within them):

SNA = SNA – GOM – CAR
SNP = SNP – GOC
NNA = NNA – SMA – NMA

There are 3 evaporative fluxes:

       T = transpiration-sourced
       G = ground evaporation-sourced
       C = canopy evaporation-sourced

There are four PrecipType options (these are redundant with the precipitation variable name):

       r = convective
       R = stratiform
       s = convective

S = stratiform

To determine the total amount of precipitation from a particular source region, you would add all of these together. For example, to get all the precipitation that fell in a grid cell that was sourced from the Upper Rockies region, you would add:

PRECRC_UPRTr + PRECRC_UPRGr + PRECRC_UPRCr + PRECRL_UPRTR + PRECRL_UPRGR + PRECRL_UPRCR + PRECSC_UPRTs + PRECSC_UPRGs + PRECSC_UPRCs + PRECSL_UPRTS + PRECSL_UPRGS + PRECSL_UPRCS

A quick way to determine how much precipitation is sourced from land versus ocean is to take advantage of the "LND" RegionName. This variable includes all precipitation sourced from the land surface. You can subtract it from the full precipitation variable (PRECC + PRECL; the standard CESM convective and stratiform precipitation variables) to get the amount sourced from all the oceans.