Adding a Passive Tracer Module to POP

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There are three ways to add a passive tracer to POP: modify an existing tracer, add a tracer to an existing module, and add a module. I chose to add a passive tracer module because I plan to create several tracers and use them together for my scientific problem. In order to create a module, files in multiple POP folders need to be modified. These modified files can be stored in *SourceMods/src.pop* except for *bldcpp* which must be changed in *cime_config* within the code source. The necessary files from *bld* are *build-namelist*, *namelist_defaults_pop.xml*, and *namelist_definition_pop.xml*, with the latter two in the subdirectory *namelist_files*. Other necessary files are: *bldcpp* from *cime_config*; *ocn.modulename.tavg.csh* from *input_templates*; and *passive_tracers.F90* and *modulename_mod.F90* from *source*. Also *test_pop_in* (add default use_modulename=false line).

The required changes in the build, cime, and template files are mainly to be make POP aware of the new module's existence. These include adding the number of tracers in the module and a variable for whether the model is on. The *ocn.modulename.tavg.csh* file needs to be added, but may be copied from another passive tracer module, with names changed as appropriate. If you took the path of adding another tracer to an existing module, the only change in these files would be the number of tracers in the module.

The source file *passive_tracers.F90* needs to be adjusted to include the subroutine calls for the new tracer module: initializing the values, surface fluxes, time-changes in the interior, and resets. These subroutines will be written in *modulename_mod.F90*.

Further adjustments need to be made to have multiple tracers in the module (or to add a tracer to an existing module). For *modulename_mod.F90*, consider holding local copies of each tracer as separate variables in functions where they are needed (rather than trying to use the higher-dimension tracer or tracer flux arrays). Then, *ocn.modulename.tavg.csh* changes must be made so that the tracers you have created are available to save out. Finally, change the tracer count in *bldcpp* and set a variable name and file name for each tracer in *namelist_defaults_pop.xlm*.