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1 Trunk Testing Plan

1.1 Purpose

To create a standard test to be executed every time the ocean core trunk is modified.

1.2 Evaluation criteria

1. **Stability** Model should run from typical initialization for a long duration without crashing.
2. **Accuracy** Statistics should be a bit-for-bit match to previous test, unless documented as a non-matching commit.
3. **Convergence** Time-stepping schemes should converge with the expected order.
4. **Realism** Namelist flags should be representative of standard settings. Some runs must include topography and complex boundaries.
5. **Simplicity** The above criteria should be met with as few tests as possible.
6. **Automation** Full suite of tests should be setup, submitted, and evaluted with simple script commands.

1.3 Proposed Test Suite, high priority

1. **Global 120km, six months.** Full topography, z-level, 3rd order advection, jm eos, split explicit with dt=3000s. Write stats daily, compare global avg KE to reference value.
2. **Global 30km, 15 days.** Full topography, z-star, flux corrected transport advection, jm eos, split explicit with dt=800s(?). Write stats daily, compare global avg KE to reference value.
3. **Baroclinic Channel, 320s** Flat bottom, z-star, flux corrected transport advection, linear eos. Convergence study of timestepping schemes: RK4, unsplit, split explicit with 1 subcycle, split explicit with 20 subcycles. Timesteps of 5, 10, 20, 40, 80, 160 seconds compared to reference case of RK4 with dt=1s. Measure convergence rates of KE, divergence, vorticity, temperature, compare to reference convergence rates.
4. **EOS unit test** as a module that can be run with the normal executable, with pass/fail result.

1.4 Proposed Test Suite, lower priority

1. **Isopycnal test**
2. **Advection test** rotating disk
3. **Baroclinic Channel, 320s** Flat bottom, z-star, flux corrected transport advection, linear eos. Convergence study of timestepping schemes: RK4, unsplit, split explicit with 1 subcycle, split explicit with 20 subcycles. Timesteps of 5, 10, 20, 40, 80, 160 seconds compared to reference case of RK4 with dt=1s. Measure convergence rates of KE, divergence, vorticity, temperature, compare to reference convergence rates.
4. **All other unit tests** vertical mixing, i/o, halo update, namelist read, etc