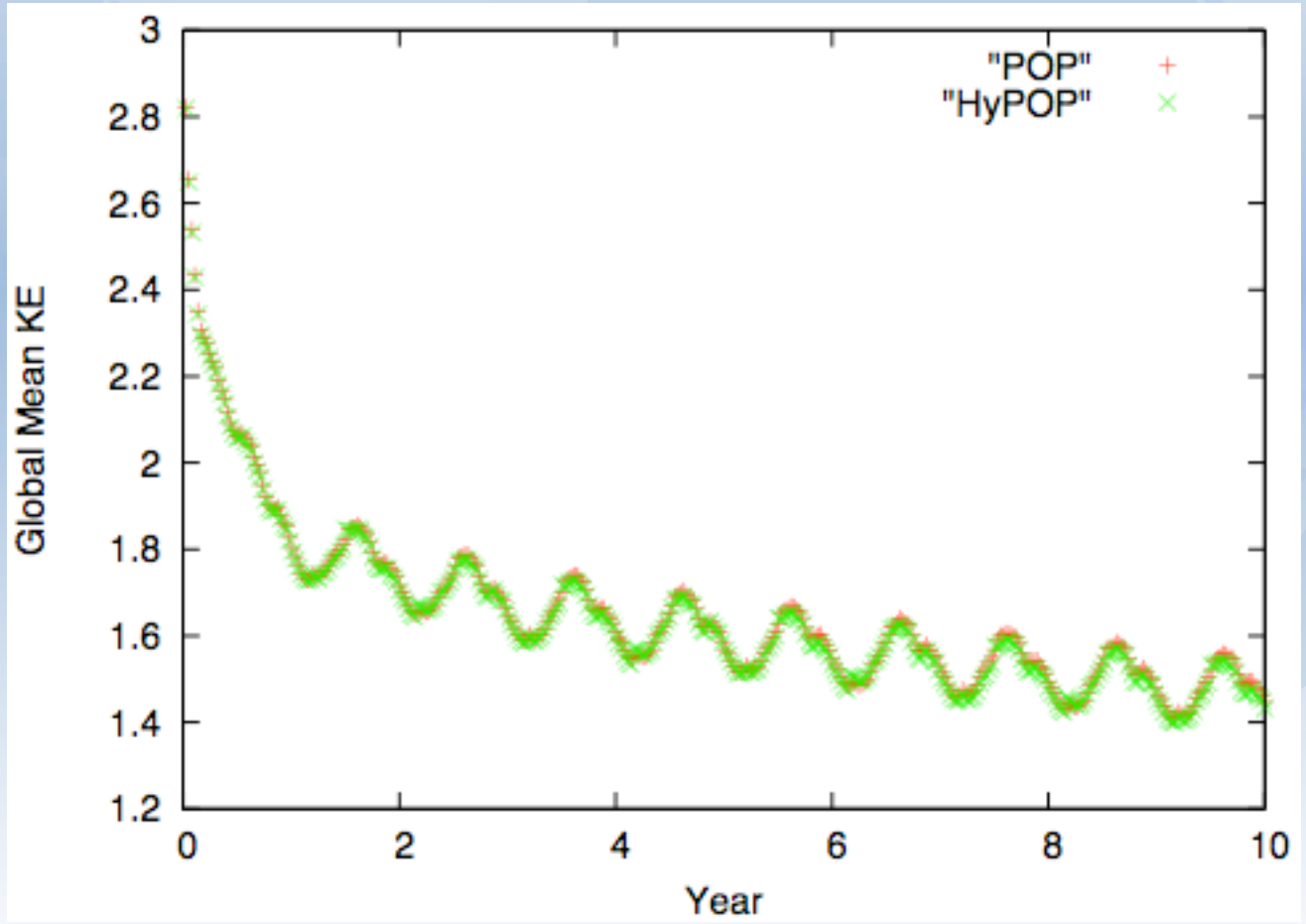
# POP/HYPOP Equivalence and Path Forward

# Equivalence of HyPOP and POP dynamic cores

- Test in 3 degree global configuration
- Demonstrate equivalence of core numerics
  - Here, just horizontal Laplacian mixings, monthly forcings.
  - Test of equivalence would be required for GM, latest viscosity, etc.

# Same Great Taste!
# gx3 mean KE: HyPOP dynamic core reproduces POP result



# HYPOP Performance Equivalence

- Benchmark setup w/KPP, centered, multi-processor, no I/O
- Some performance decline, but…
- Big hits are easy to fix
  - State calls and pressure argument
  - Interpolated advection
  - Interpolation adds little, but could be more
- Most other timers equivalent
  - Overall non-state performance hit 12%, but obvious optimizations available to reduce

# Other Developments Waiting

- Unstructured grids
  - high res and ocean-ice sheet work
- Refactoring for hybrid architectures
  - Increase compute intensity and parallelism
- 2-level time stepping and splitting
- new dynamics scheme
- HYPOP vertical grid
- Implicit model infrastructure
  - software reqs known, precond still required
- Higher-order schemes
- POP-alpha

# 6-Month Plan

- Prototype model in 6 months that merges developments
  - new infrastructure for unstructured grids and hybrid architectures
  - new time stepping
  - new dycore, transport schemes
  - HYPOP vertical grid infrastructure
  - infrastructure for implicit POP
  - POP-alpha
- It will have at least a POP-equiv mode
- Will provide tools to help current developers
  - Abstractions of operators and stencil operations
  - Analysis tools

# HELP WANTED

Ocean Modelers (2)
Inquire Within