1135-35-2562 **Mary P Thomas** (mthomas@mail.sdsu.edu), 5500 Campanile Drive, San Diego, CA 92024, and **Mariangel Garcia** and **Neelam Patel*** (neelam_patel1990@yahoo.com), 5500 Campanile Drive, Encinitas, CA 92024, and **Manuel Valera** and **Jose E Castillo**. *Development and optimization of a PETSc-based parallel GCCOM model.*

The General Curvilinear Coastal Ocean Model (GCCOM) is a high-resolution (sub-km), non-hydrostatic, large eddie simulation CFD model that uses a full, 3D curvilinear coordinate system. This results in increased accuracy, resolution, and reduced times to solution. GCCOM is a petascale model: it requires significant memory (over 100 double precision arrays); communication along all 3 dimensions at each iteration; and simulations generating TBytes of data. The MPI-based parallel model needed improvements in the libraries used for the multi-grid pressure solver used in the serial model. The PETSc scientific programming package was chosen because it has a rich suite of non-linear solvers, and the PETSc Data Management Distributed (DMDAs) have build-in communication and halo cell management. The performance improvement of the pressure solver offset the level of effort required to port the model to the PETSc framework: the entire model needed to be migrated to using all PETSc objects. In this talk we discuss our experiences in developing and testing the PETSc-based model, the parallel framework developed for automating test case jobs, and present results that validate model results and demonstrate scaling of the model. (Received September 26, 2017)