

2004 Ocean Sciences
Meeting
Search Results

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HR: 0830h
 AN: **OS31E-13**
 TI: **Maintaining an up-to-date efficient adjoint for ocean state estimation in the the ongoing MIT general circulation model development.**
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 AB: Recent results by the ECCO consortium (Stammer et al., Lee et al.) have demonstrated the power of the adjoint (Lagrange Multiplier) method for use in model vs. data synthesis, referred to as state estimation / data assimilation. The computational technology that underpins these efforts is generation of the adjoint and tangent linear of the parallel MIT general circulation model (MITgcm) by means of automatic differentiation (AD). Here, we describe a systematic basis in which AD plays a key role for maintaing an up-to-date differentiable general circulation modeling system. The context is that of rapid algorithmic evolution of the underlying modeling system such as improvement of MITgcm's dynamical kernel, its adaptation to new grids, in particular the horizontal expanded spherical cube, the improvement and addition of new parameterization schemes which are crucial for improving the state estimation system and may enable the inclusion of new data types. This approach has enabled us to incorporate various new 'packages' into the derivative code, and extend its application to a variety of configurations and applications. Newly differentiated packages include the Gent/McWilliams

parameterization, a bulk formula parameterization and a new sea ice model which is coupled to the MITgcm. Among the new configurations are those which take advantage MITgcm's recently acquired capacity of simulating the atmospheric dynamics, such as a Held-Suarez type calculation. A setup for the expanded spherical cube enables adjoint calculations in a truly global configuration.

UR: <http://mitgcm.org>

DE: 4532 General circulation

DE: 4599 General or miscellaneous

SC: OS

MN: 2004 Ocean Sciences Meeting

New Search

