THE APPLICATION OF IMPLICIT TECHNIQUES IN OCEAN MODELING

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In most ocean models, such as MOM, POP and MICOM, explicit time stepping methods are used. Explicit techniques are relatively easy to implement but have several drawbacks, the most important one being that the time step is determined by numerical stability limitations. The use of fully implicit techniques in ocean modeling is relatively new and the full potential of this methodology is not clear at the moment. While the time step in these ocean models is not limited by numerical stability, the drawback of these methods is that large systems of non symmetric linear systems have to be solved. In this presentation I will give an overview on the state-of-the-art of implicit ocean model techniques and their application to (i) bifurcation problems of ocean flows, (ii) shortening of the spin-up time of explicit ocean models, and (iii) to problems involving variational data-assimilation.