1173-60-4 **Nathan Glatt-Holtz** (negh@tulane.edu), Department of Mathematics, Tulane University, 6823 St. Charles Ave, New Orleans, LA 70118, **Roger Temam** (temam@indiana.ed), Rawles Hall, Indiana University Bloomington, Bloomington, IN 47405, and **Chuntian Wang*** (cwang27@ua.edu), Department of Mathematics, The University of Alabama, Tuscaloosa, AL 35487. *Time Discrete Approximation of Weak Solutions to Stochastic Equations of Geophysical Fluid Dynamics and Applications.*

As a first step towards the numerical analysis of the stochastic primitive equations of the atmosphere and the oceans, the time discretization of these equations by an implicit Euler scheme is studied. From the deterministic point of view, the 3D primitive equations are studied in their full form on a general domain and with physically realistic boundary conditions. From the probabilistic viewpoint, this paper deals with a wide class of nonlinear, state-dependent, white noise forcings which may be interpreted in either the Itˆo or the Stratonovich sense. The proof of convergence of the Euler scheme, which is carried out within an abstract framework, covers the equations for the oceans, the atmosphere, the coupled oceanic-atmospheric system as well as other related geophysical equations. The authors obtain the existence of solutions that are weak in both the PDE and probabilistic sense, a result that is new by itself to the best of our knowledge. (Received April 17, 2021)