

1032-35-138

**Alexandre Dutrifoy, Andrew Majda and Steven Schochet\***, School of Mathematical Sciences, Tel Aviv University, 69978 Ramat Aviv, Israel. *A simple justification of the singular limit for equatorial shallow water dynamics.*

The long wave limit of the equatorial shallow water equations is a singular limit involving large variable-coefficient terms. The well-known Klainerman-Majda theory of hyperbolic singular limits does not apply to such systems. Nevertheless, Dutrifoy and Majda recently showed that solutions exist for a time independent of the wave length and converge to solutions of the equatorial long-wave system. Results for the viscous case were then proven by Gallagher and Saint-Raymond. Both papers expanded solutions in series of parabolic cylinder functions. We give an elementary direct proof of the basic result, in the spirit of the classical theory of singular limits, by exploiting the special structure of the Hermite raising and lowering operators. (Received August 19, 2007)