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Regularizations for Fluid Models with Applications to Geophysical Flows.

Recently, the Voigt-regularization, which is related to the alpha-models of turbulent flows, has been investigated as a regularization of various fluid models. It overcomes many of the problems present in other alpha-models; for example, it is well-posed in bounded domains, and, in periodic domains, it is globally well-posed even in the case of zero viscosity. Moreover, in studying the limit as the regularization parameter tends to zero, a new criterion for the finite-time blow-up of the original equations arises. I will discuss recent analytical and numerical work on the Voigt-regularization for the Navier-Stokes equations for fluid flows, and Boussinesq Equations equations for ocean flows. Time permitting, I will also discuss a new regularization called the entropy viscosity model. (Received September 11, 2012)