

Recent results on the 3D quasi-geostrophic equation

Alexis Vasseur, The University of Texas at Austin

In oceanography, the motion of the atmosphere follows the so-called primitive equation. This corresponds to the 3D Navier-Stokes equation with the effect of the rotation of the earth (Rosby effect). At large scale, this Rosby effect is very important. Asymptotically, this leads to the so-called geostrophic balance which enforces the wind velocity to be orthogonal to the gradient of the pressure in the atmosphere. Asymptotic analysis can be performed to derive the quasi-geostrophic equation model (QG), which is not as complex as the primitive equation, and not as trivial as the geostrophic balance, and still captures the large scale motion of the atmosphere. This model is extensively used in computations of oceanic and atmospheric circulation, for instance, to simulate global warming. During this talk, we will present the 3D Quasi-Geostrophic equation and its mathematical treatment.