

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Approximate Deconvolution Large Eddy Simulation of Atmospheric Turbulence in Spectral Space LEILA NASR AZADANI, ANNE STAPLES, Virginia Tech — Numerical simulations of geophysical turbulence are best performed by large eddy simulation (LES) in which large geophysical scales are solved numerically and effect of physical and dynamical processes accruing at small scales are modeled. Most LES closure models are based on the forward energy cascade from the large scales to the small scales in three-dimensional turbulence. Since, under most conditions, geophysical flows are considered to be approximately two-dimensional turbulent flows, it is questionable to apply these closure models for LES of geophysical flows. Here we present the approximate deconvolution (AD) closure model as a purely mathematical approach, not based on any physics modeling, for LES of turbulent flows. The AD model employs repeated filtering of the filtered variables to obtain an approximation of the unfiltered variables. We apply the AD closure model in the LES of the barotropic vorticity equation on the sphere in spectral space.

Leila Nasr Azadani
Virginia Tech

Date submitted: 02 Aug 2013

Electronic form version 1.4