

CGD SEMINAR



DATE: Monday, 6 March 2017

TIME: 11 a.m.

LOCATION: NCAR, 1850 Table Mesa Drive
Mesa Lab, Main Seminar Room

TITLE: Overturning the circulation of the
ocean

SPEAKER: Ali Mashayek, MIT

ABSTRACT:

It has been an open question whether turbulent vertical mixing across density surfaces is sufficiently large to play a dominant role in closing the deep branch of the ocean meridional overturning circulation. This talk will consist of four parts: (I) By means of a cascade of observationally-tuned nested high resolution realistic numerical simulations of turbulent mixing of tracers in the Southern Ocean I will show that the fast vertical spreading of tracers occurs when they come in contact with mixing hotspots over rough topography. The sparsity of such hotspots is made up for by enhanced tracer residence time in their vicinity due to diffusion toward weak bottom flows; (II) I will further show that the net vertical mixing in energetic turbulent zones is the residual of interior sinking (contrary to the commonly assumed interior upwelling induced by breaking internal waves) and larger boundary upwelling; (III) I will show that the global implication of these findings is to reshape our understanding of abyssal circulation in a way that may explain the large vertical fluxes of heat and salt required to close the global abyssal circulation; (IV) I will finish by discussing some ongoing work focused on exploring climatic implications of the aforementioned findings.