

# CGD SEMINAR



**DATE:** Tuesday, May 8, 2018

**TIME:** 11 a.m.

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

**TITLE:** Importance of the ocean general circulation to Southern Ocean mixed layer formation

**SPEAKER:** Justin Small, NCAR

## ABSTRACT:

Deep mixed layers ( $O(100\text{m})$ ) form in relatively few locations of the world ocean during hemispheric winter, including isolated regions of the Labrador Sea and Greenland-Iceland-Norwegian Seas. In the southern hemisphere they cover a large zonal extent of the Southern Ocean, but are confined in the meridional direction. Most climate models, including the Community Earth System Model (CESM), have problems simulating sufficiently deep mixed layers in the Southern Ocean. The same models often have other deficiencies in this region, such as too-strong leakage of Agulhas waters into the Atlantic. This is associated with sea surface temperature (SST) and salinity biases in the Indian and Pacific Oceans, close to the Agulhas Return Current and Antarctic Circumpolar Current. In this talk I will describe the link between ocean circulation errors and the shallow mixed layer bias. This is done by exploring the sensitivity to ocean model resolution, and to nudging the ocean currents towards observed values. Two key processes lead to improved mixed layer depths when the ocean general circulation is more realistic: i) the response of the net surface heat flux to changes in SST and ii) the poleward transport of subtropical water with high salinity. Finally I will discuss whether these results have relevance to other regions such as North Atlantic mode water region and Labrador Sea convection.

**Live webcast:** <http://ucarconnect.ucar.edu/live>

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