

MAR15-2014-020383

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

A look at two disparate limits of the climate system: oceanic sub-mesoscales and global energy balance¹
BALU NADIGA, LANL

A common theme underlying this journey across scales is that of energy balance. The first topic considers scales from a few tens of meters to a few tens of kilometers and grapples with a fundamental question that concerns energetics of ocean circulation: how does ocean circulation equilibrate in the presence of continuous large-scale forcing and a tendency of geostrophic turbulence to confine energy to large and intermediate scales. In particular, interior instabilities are shown to provide an energy pathway between the largely-balanced, energetic oceanic mesoscales and smaller unbalanced scales (J. Fluid Mech. (2014), vol. 756, pp. 965-1006; doi:10.1017/jfm.2014.464). The second topic zooms out to the global scale and considers global warming from an energy balance perspective. With the global ocean sequestering in excess of 90% of the recent warming due to energy imbalance at the top of the atmosphere, sensitivity of warming and depth of penetration of warming are characterized in a probabilistic fashion.

¹Supported in part by the LDRD program at LANL (project number 20110150ER)