



## CLIM Program Transition Workshop May 14-16, 2018

**Lecture:** *Estimating Oxygen in the Southern Ocean using Argo Temperature and Salinity*

**Speaker:** Donata Giglio

**Abstract:**

An Argo based estimate of Oxygen (O<sub>2</sub>) at 150 m is presented for the Southern Ocean (SO) from T/S, O<sub>2</sub> Argo profiles collected during 2008-2012. The method is based on supervised machine learning, i.e. Random Forest (RF) regression, and provides an estimate for O<sub>2</sub> on gridded Argo T/S fields. Results show that the Southern Ocean State Estimate (SOSE) and the World Ocean Atlas 2013 climatology may overestimate annual mean O<sub>2</sub> in the SO, both on a global and basin scale. A large regional bias is found east of Argentina, where high O<sub>2</sub> values in the Argo based estimate are closer to the coast compared to other products. SOSE may also underestimate the annual cycle of O<sub>2</sub>. Regions where the RF method does not perform well (e.g. eastern boundaries) are identified comparing the actual SOSE O<sub>2</sub> fields to the RF estimate from model profiles co-located with observations. The RF based method presented here has the potential to improve our understanding of O<sub>2</sub> annual mean fields and variability from available (sparse) O<sub>2</sub> measurements. Also, it may guide the design of future enhancements to the current array of O<sub>2</sub> profiling floats, and prove effective for other biogeochemical variables (e.g. nutrients and carbon).