

Session: OS-7 Atmosphere-Ice-Ocean interactions in the Polar Regions
OS-6 Polar Ocean Dynamics

Polar program: None

Title: PIPERS: Ocean observations during an anomalous autumn-winter in the Ross Sea

Author(s): Sharon Stammerjohn¹ (sharon.stammerjohn@colorado.edu), Stephen Ackley², Ted Maksym³, Peter Sedwick⁴, Brice Loose⁵, Jean-Louis Tison⁶, Bruno Delille⁷, Guy Williams⁸, Madison Smith⁹, Sam Gartzman⁵, Sarah Seanson¹⁰, Mike Williams¹⁰, Lynne Tally¹¹, Chris Zappa¹²

Institute(s): ¹Univ of Colorado, Boulder, United States, ²Univ of Texas San Antonio, Snow and ice Geophysics Laboratory, San Antonio, United States, ³Woods Hole Oceanographic Institution (WHOI), Woods Hole, United States, ⁴Old Dominion Univ, Norfolk, Virginia, United States, ⁵Univ of Rhode Island, Rhode Island, United States, ⁶Université Libre de Bruxelles, Glaciology, Bruxelles, Belgium, ⁷Université de Liège, Chemical oceanography Unit (COU), Liège, Belgium, ⁸Univ Tasmania, Institute of Marine and Antarctic Studies, Hobart, Australia, ⁹Univ of Washington, Seattle, Washington, United States, ¹⁰NIWA, Wellington, New Zealand, ¹¹Scripps, La Jolla, California, United States, ¹²Columbia Univ, New York, New York, United States

Text: There are very few ocean observations during autumn-winter south of the Antarctic ice edge, particularly as far south as the coastal polynyas. In the Ross Sea alone, we know of only three prior autumn-winter U.S. oceanographic expeditions. In 2017 the PIPERS (Polynyas, Ice Production and seasonal Evolution in the Ross Sea) project conducted an oceanographic expedition to the southwestern Ross Sea aboard the RVIB Palmer during April-June. Its main objective was to assess the local/large-scale controls on sea ice production, water mass transformation, and carbon/trace metal inventories during an autumn-winter transition. In contrast to the strong positive sea ice trends observed over 1979-2015, the PIPERS ocean observations were acquired prior to, and during, very anomalous air-sea-ice conditions in the Ross Sea. These hydrographic observations extended from north of the ice edge, to the advancing ice edge, and along south/north transects to/from the coastal polynyas under an anomalously thin ice cover. Extensive observations were collected in Terra Nova Bay before/after several strong katabatic wind events, as well as in front of the Ross Ice Shelf under milder katabatic conditions. These ocean observations (water mass types, mixed layer evolution, heat/salt inventories) will be discussed within the context of the anomalous air-sea-ice conditions that occurred prior to and during PIPERS, as well as to the few autumn-winter ocean observations available for the Ross Sea.

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