

**Abstract Preview - Step 3/4**- print version -

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

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**Title: Early Winter Sea Ice Dynamics and Ice Production in the Ross Sea during PIPERS**Author(s): [Ted Maksym](mailto:tmaksym@whoi.edu)<sup>1</sup> (tmaksym@whoi.edu), Steve Ackley<sup>2</sup>, Sharon Stammerjohn<sup>3</sup>, Jean-Louis Tison<sup>4</sup>, Kathrin Hoepfner<sup>5</sup>*Institute(s):* <sup>1</sup>Woods Hole Oceanographic Institution, Woods Hole, United States, <sup>2</sup>University of Texas at San Antonio, San Antonio, United States, <sup>3</sup>University of Colorado Boulder, Boulder, United States, <sup>4</sup>Universite Libre de Bruxelles, Bruxelles, Belgium, <sup>5</sup>German Aerospace Center (DLR), Wessling, Germany

**Text:** The Ross Sea sea ice cover is one of the few regions of the cryosphere that have been expanding in recent decades. However, 2017 saw a significantly delayed autumn ice advance and record low early winter sea ice extent. To better understand the causes and impacts of this variability on sea ice production, we present a suite of in situ and satellite observations made during the PIPERS (Polynyas, Ice Production and its seasonal Evolution in the Ross Sea) cruise in April-June 2017. To assess the relative role of sea ice dynamics and thermodynamics in sea ice production, four arrays of GPS and ice mass balance buoys were deployed in the outflows of the Ross Ice Shelf and Terra Nova Bay Polynyas. High-resolution synthetic aperture radar imagery are used to provide regional context. Despite high rates of ice production in the polynyas, the ice remained thin due to rapid export and northward drift. Compared to the only prior winter observations made in 1995 and 1998, the ice was thinner, with less ridging and snow cover, reflecting a younger ice cover. Surprisingly, granular ice was less prevalent in 2017, particularly in the outer pack, due to less snow ice formation and less pancake ice formation at the advancing ice edge. We discuss the relative roles of ice dynamics and thermodynamics in both the polynyas and the main ice pack, and the dynamic interactions between these regions in governing total sea ice production.

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