

Using an algorithm to estimate heat loss from the 36GHz polarization ratios of AMSR-E, Martin et al. [2007] found that the combined ice production from three largest coastal polynyas in the Ross Sea was ~500 km<sup>3</sup>y<sup>-1</sup>. They also showed that the polynya ice production approximately equaled the ice export. Using the same approach, we investigate the ice production of polynyas in the southern Weddell Sea. Previous studies which restricted themselves to the southern Weddell Sea found that the Ronne Shelf Polynya produced ~100 km<sup>3</sup>y<sup>-1</sup> and accounted for a small percentage of the Weddell Sea ice export. We confirm the ice production of the Ronne polynya but find that it contributes only 18-35% of the total Weddell production, with 45-67% of the total being produced in the eastern polynyas along the Coats Land coast. Using a flux gate that parallels the 1000m isobath, we also find that the total net ice export approximately balances the polynya ice production.





The ice production and transport in the Ross and Weddell seas depend on the mean winds. The left-hand figure shows the mean winter ECMWF geostrophic winds and 2-m air temperatures (days 90-300) in the two seas for the years under study; for the two seas, the right-hand figure superimposes the winter mean surface pressures (April-November) for 2003-2006 with ice drift derived from the 89-GHz channel of AMSR-E. These patterns provide insight into the differences between the two seas. In the Ross, strong cold winds coming off the Ross Ice Shelf maintain the persistent Ross Shelf Polynya. In the Weddell, the strongest winds occur adjacent the eastern coast of the sea, and not off the ice shelves. This results in mostly weak sporadic polynyas distributed along the coastline, primarily along the eastern, Coats Land coast. Comparison of the right-hand figures show that the ice drift near the ice front of the Ross Ice Shelf is much larger than that off the Filchner and Ronne Ice Shelves. The polynya coverage is correlated to the strength of the ice drift. The sea ice export is much higher from the Ross than the southern Weddell Sea. In the Ross Sea, Martin et al. [2007] show that the ice volume export is comparable to the ice production in the Ross polynyas, as we show below, if the Coats Land polynyas are included, this is also true in the Weddell Sea.

## Variability of sea ice production in the Weddell and Ross Seas polynyas from AMSR-E observations, 2003-2007 Robert Drucker, Seelye Martin, University of Washington; Ronald Kwok, JPL



# and Weddell polynyas



those in the Ross.

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