

Sea Ice and Sunlight in a Changing Arctic

**Don Perovich
Thayer School of Engineering
Dartmouth College
Hanover NH, USA**

There have been major changes to the Arctic sea ice cover in the past decade. Melt seasons are longer, ice is thinner, summer ice extent is less, and what was once a predominantly multiyear ice cover is now mainly first year ice. The sea ice mass balance is the great integrator of heat and provides insights into the nature of these changes. In situ ice mass balance measurements in the central Arctic show large interannual variability in surface and bottom melting, but no strong trends. Results from the Beaufort Sea show significant ice losses due in large part to substantial increases in bottom melting. Ocean heat fluxes tend to be near zero for much of the winter, increasing in the summer. Summer ocean heat fluxes are typically tens of W m^{-2} , however can exceed 100 W m^{-2} in areas of low ice concentration due to solar heating of the upper ocean. The changes in the state of the ice result in an increase of solar energy absorbed in the upper ocean. The ice albedo feedback is contributing to the increased bottom melting.