

1046-86-1056

Donald K Perovich* (donald.k.perovich@usace.army.mil), ERDC-CRREL, 72 Lyme Road, Hanover, NH 03755. *Sunlight, water, and ice: The sea ice-albedo feedback in a changing climate.*

Climate change is a complex and crucial environmental issue. General circulation models indicate that the Arctic is a region where a warming signal will be the strongest. The sea ice cover of the Arctic Ocean is a grand integrator of heat and thus plays a key role as an indicator of climate change. Over the past few decades the Arctic sea ice cover has decreased both in areal extent and in thickness. These changes have altered the partitioning of solar radiation in the Arctic atmosphere-ice-ocean system. Calculations indicate an increase in the solar energy deposited in the upper ocean over the past few decades. The largest increases in total annual solar heat input, as much as 4% per year, occurred in the Chukchi Sea region. In the summer of 2007, there was an extraordinarily large amount of ice bottom melting observed in the Beaufort Sea region. An increase in the open water fraction resulted in a 500% positive anomaly in solar heat input to the upper ocean. The melting in the Beaufort Sea has elements of a classic ice albedo feedback signature: more open water leads to more solar heat absorbed, resulting in more melting and more open water. The ice albedo feedback can serve as an amplifier of climate change accelerating the ongoing reduction in Arctic sea ice. (Received September 14, 2008)