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Environmental Impacts of a Shrinking Arctic Sea Ice Cover

MARK C. SERREZE[1], University of Colorado at Boulder

Arctic sea ice extent at the end of the summer melt season has declined sharply over the period of satellite observations and is projected to disappear entirely as concentrations of atmospheric greenhouse gases continue to rise. The extreme seasonal ice extent minima of September 2007 and 2008 serve as exclamation points on the downward trend and have fueled concern that rapid transition to a seasonally ice-free state may be imminent. While the factors forcing this trend have and will continue to be widely studied, less attention has been paid to the environmental impacts of current and future sea ice loss. Ice loss is already promoting increased wave action and coastal erosion and is resulting in strong rises in atmospheric temperature during autumn, not just at and near the surface, but extending through a considerable depth of the atmosphere. Through atmospheric transports, this strong warming, known as Arctic amplification, is starting to extend well beyond areas of ice loss, and will eventually influence Arctic land areas, glaciers, ice caps and the Greenland ice sheet. Though altering horizontal temperature gradients, continued loss of the ice cover is in turn likely to impact on patterns of atmospheric circulation and precipitation not just within the Arctic, but into middle latitudes. This talk addresses these and other emerging environmental impacts of Arctic sea ice loss.

[1]Director, National Snow and Ice Data Center, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder. CO.