

## Satellite monitoring of the recent changes in the Arctic environment

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Arctic sea-ice extent is declining in response to the recent warming of the Arctic region. In particular, the sea-ice extent drastically reduced in late summer 2007 at an exceptional rate and reached to a new record minimum extent of 4.26 million square kilometer on 24 September 2007. Satellite observations revealed that the sea-ice was preconditioned by the rapid reduction of thick perennial ice in winter over the past few years which had led to thinning of the Arctic sea-ice. Furthermore, throughout summer 2007, exceptional high pressure patterns persisted over the Chukchi Sea and Beaufort Sea in the Arctic Ocean which led to long duration of clear sky and thus significant heating and melting of thick and thin sea-ice. Similar low cloudiness condition was also seen in summer (June-July) 2005 when the previous minimum record of ice extent was set. These anomalous clear-sky conditions seem to accelerate the melting of permafrost in the North Slope Alaska which was implied by increases of soil moisture around the North Slope in both 2005 and 2007. Due to the large scale loss of sea-ice in the summer 2007, the Arctic Ocean was largely opened and warmed by solar radiation, which prevented sea-ice from recovering to normal coverage condition in autumn. The reduction of multi-year ice seems to continue in winter 2008. Thus, a new record minimum might be set again in next September depending on the weather condition in summer.