



High temperatures in the Barents Sea in 2013

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During this past summer SST in the Barents Sea of the Eurasian Arctic reached its highest value since satellite infrared measurements began in 1981, with multi-satellite Pathfinder anomalies exceeding 4°C (3.5°C if a temporal warming trend is removed). The anomalies which began to develop in the Barents Sea in May and gradually expanded into the Kara Sea during the summer, largely subsided by November. This warming of the Eurasian side of the Arctic is in striking contrast to the pattern of warming in 2007 when the Pacific side of the Arctic was warm and the Barents Sea was cool. The shift of SST anomalies across the Arctic has potentially important consequences for meteorological conditions in this region. Indeed atmospheric conditions this past summer were also anomalous, with unusually clear skies and August surface winds shifting from the expected northerly direction to westerly.

The causes of the summer 2013 anomalous warming are complex. In the seasonal heat budget of the Barents Sea convergence of heat is important due to the eastward advection and surfacing of warm, salty Atlantic Water, and is balanced by surface cooling in winter. In spring of this year the Barents Sea ice retreat came early in the north and east, one impact of which was a greater opportunity for high solar absorption into the surface ocean (ice-albedo feedback) and high air humidity. To quantify the net surface heating contribution we present results from the NCEP and ERA Interim atmospheric reanalyses, and scatterometer winds, while to estimate the potential ocean contribution we examine ocean heat convergence in ocean models. The current results suggest that the anomalous conditions were forced by both anomalous surface fluxes, particularly net solar radiation, and ocean heat convergence due to anomalous transport of Atlantic Water.