

Arctic weather in 2012 summer and influences on Arctic Environment

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Arctic sea ice minimum since satellite observation start was recorded this summer. Expanded surface melting on Greenland ice sheet was reported in July. There are spreading anomalous events over Arctic regions. This presentation try to view eventual distribution of Arctic summer conditions in 2012, and also time sequential steps of the events.

As GRENE-Arctic Climate Research Project started its actual field observation campaigns in 2012 summer, many field reports became available and research groups start exchanging plan and on-going field activities. JAXA reported Arctic sea ice minimum in August (Fig. 1a).and expanded Greenland ice sheet melting in July.

Sea ice reduction was accelerated in August due to polar low formed in Siberian coast of the Arctic Ocean. Prior to this reduction, sea ice has seasonal maximum in the spring as ice drifted to the Chukuchi sector in previous winter. The ice remained in this sector has long time visible even in the ice melting season. Information on total sea ice coverage cannot indicate local patterns of sea ice, however ice chart shows separated ice distribution. Those winter drift, summer distribution off Alaskan coast and acceleration of sea ice reduction in August are connected the regional ice conditions off Alaska. On the other hand, early disappearance of sea ice around Severnaya Zemlya enables early opening of Northern Sea Route, where the passage was covered by sea ice even in 2007 minimum.

Heating of land has reported in various regions in this summer, but on the other hand, there were stormy weather in northern Alaska, northern Greenland and Arctic Ocean. East Siberia in July has experienced hot and dry conditions which caused forest fire remained long time, as much as previous event in 2005. With the warm land and cool ocean neighboring East Siberian coast, weather was instable. Cyclone activity in Fig.1a initiated in this zone.

Greenland had frequent bad weather in north and warm air cover over Greenland ice sheet. Blocking high was evidenced over Greenland (Figure 1b, c). Although global warming has dominant and widely-covering influence on the Arctic environment, regional weather intensity/frequency is substantial component to be understood. Field observations in 2012 offers chance to view regional events, and large scale correlations over Arctic (c.f.. AO, Fig. 1d).

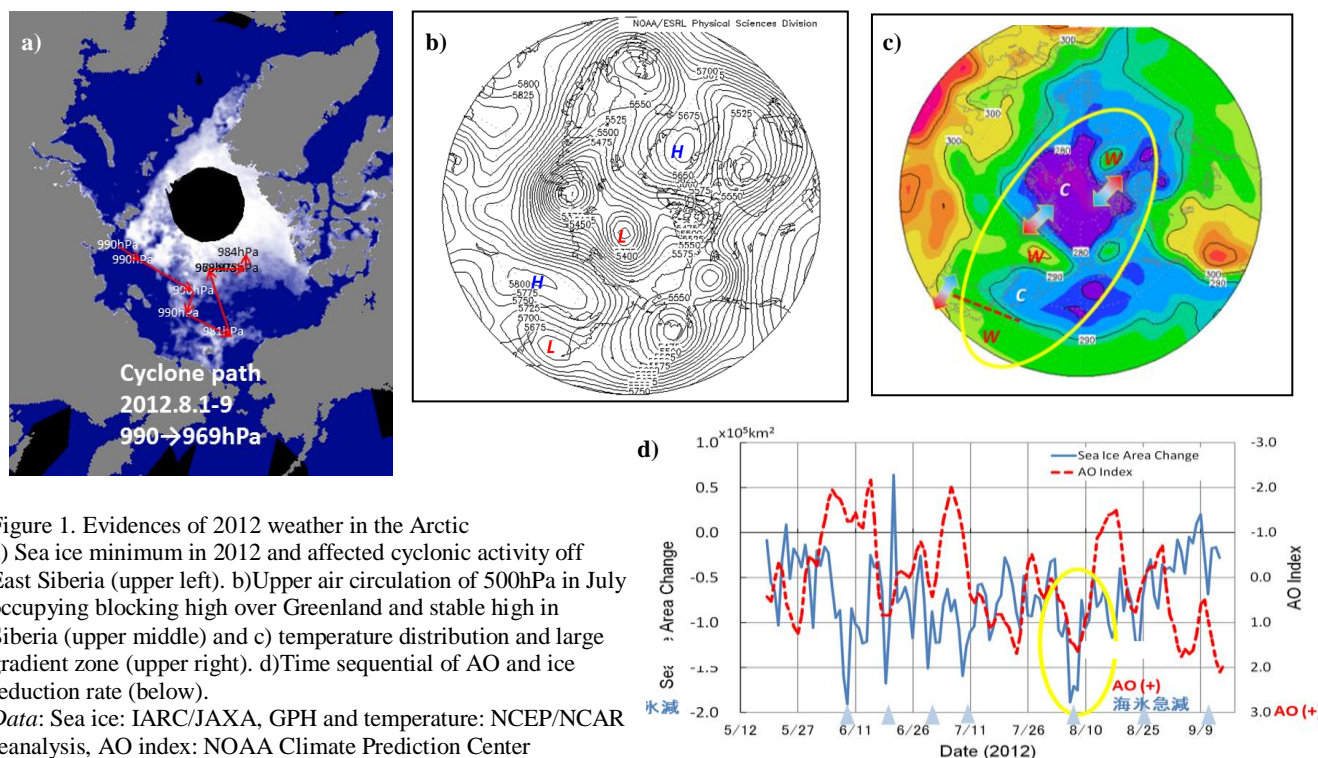


Figure 1. Evidences of 2012 weather in the Arctic
a) Sea ice minimum in 2012 and affected cyclonic activity off East Siberia (upper left). b) Upper air circulation of 500hPa in July occupying blocking high over Greenland and stable high in Siberia (upper middle) and c) temperature distribution and large gradient zone (upper right). d) Time sequential of AO and ice reduction rate (below).

Data: Sea ice: IARC/JAXA, GPH and temperature: NCEP/NCAR reanalysis, AO index: NOAA Climate Prediction Center