



Abnormal winter weather in Japan during 2012 controlled by large-scale atmospheric and small-scale oceanic phenomena

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Negative Arctic Oscillation (AO) and Western Pacific (WP) pattern indices persisted from October through December 2012. For the first time both the monthly AO and WP were negative for three consecutive months. Although negative AOs and WPs make Siberia, Eastern Asia, and Japan abnormally cold, Japan was warm in October 2012. The temperature of the Sea of Japan was a record-breaking high in October 2012. Heating by these very warm waters overwhelmed the cooling effect of the negative AO and WP in October, even though the Sea of Japan is small. Linear regression analyses showed that Japan tends to be warm in years when the Sea of Japan is warm. Consequently, the temperature over Japan is controlled by interannual variations of small-scale oceanic phenomena as well as by large-scale atmospheric patterns. Previous studies have ignored such small-scale oceanic influences on island temperatures.