

A Causal Relationship between Barents-Kara Sea Ice Concentration and Wintertime Surface Air Temperature Variability in East Asia

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The causal relationship between Barents-Kara sea ice concentration (B-K SIC) and East Asia surface air temperature is investigated by applying the two sets of Granger causality test on station data. A Granger causality test is first performed for three-month lag regression. It shows that a reduction of B-K SIC in early winter is closely linked to a cold temperature in East Asia in late winter. Since B-K SIC and East Asia temperature variability have different time scales, the causality test is further conducted with different time lags by taking Hsiao's approach. It turns out that the relationship between B-K SIC and East Asia temperature anomalies is maintained from February to April with a month lag. This result suggests that B-K SIC is an essential factor that determines late-winter surface air temperature in East Asia.

Key words: causal relationship, Granger causality test, Barents and Kara sea ice concentrations, temperature variability in East Asia