Cold wave over the Eurasian Continent in December 2012

28 December 2012
Tokyo Climate Center, Japan Meteorological Agency

1. Overview

Since the end of November 2012, the Eurasian continent from northern East Asia to Western Russia has experienced significantly lower-than-normal temperatures due to strong cold-air inflow.

2. Climate conditions

Temperatures have been more than 6°C below normal from Central Siberia to northeastern China since the end of November. The influence of cold air has extended to Central Asia and Western Russia (Table 1 and Figure 1). Figure 2 shows daily temperatures at major meteorological stations in affected countries.

Table 1 Weekly extreme low temperature events

Period	Areas	Events
28 Nov. – 4 Dec.	Northeastern China	Daily minimum temperature was below -25°C on 3 Dec. at Tailai, China.
5 – 11 Dec.	From around Lake Baikal to western Japan	Daily minimum temperature was below -24°C on 8 Dec. at Shenyang, China.
12 – 18 Dec.	From southern Central Siberia to around the Caspian Sea	Daily minimum temperature was below -40°C on 15 and 17 Dec. at Astana, Kazakhstan.
19 – 25 Dec.	From northeastern China to western Russia	Daily minimum temperature was below -25°C on 24 Dec. at Moscow, Russia.

3. Characteristics of atmospheric circulations

Since mid-December, many areas over Eurasia have experienced significantly low temperatures due to the expansion of the Siberian High toward northwestern Russia, which has brought cold air mass over southern Siberia into Central Asia to western Russia.

In December, the jet stream tended to meander southward over East Asia and cold air over the high-latitude areas frequently moved in. In the latter half of the month, the enhanced Siberian High contributed to strong cold-air inflow over the area (Figure 3).

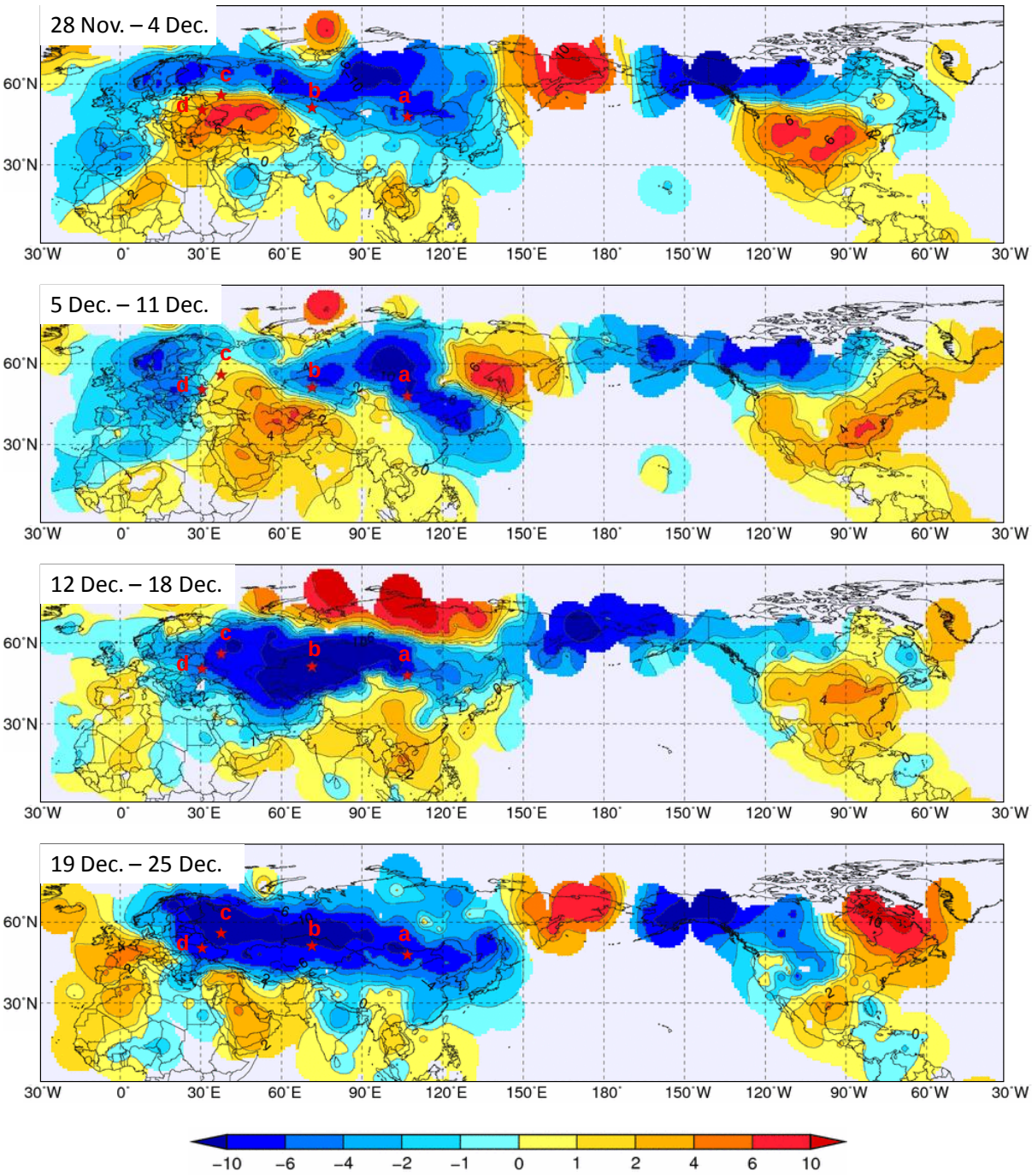

Figure 1 Weekly temperature anomalies in the Northern Hemisphere from 28 November 2012 (Unit: °C, Based on SYNOP reports)

Daily temperature data at (a) Ulaanbaatar (Mongolia), (b) Astana (Kazakhstan), (c) Moscow (Russia) and (d) Kiev (Ukraine) on the maps are shown in Figure 2.

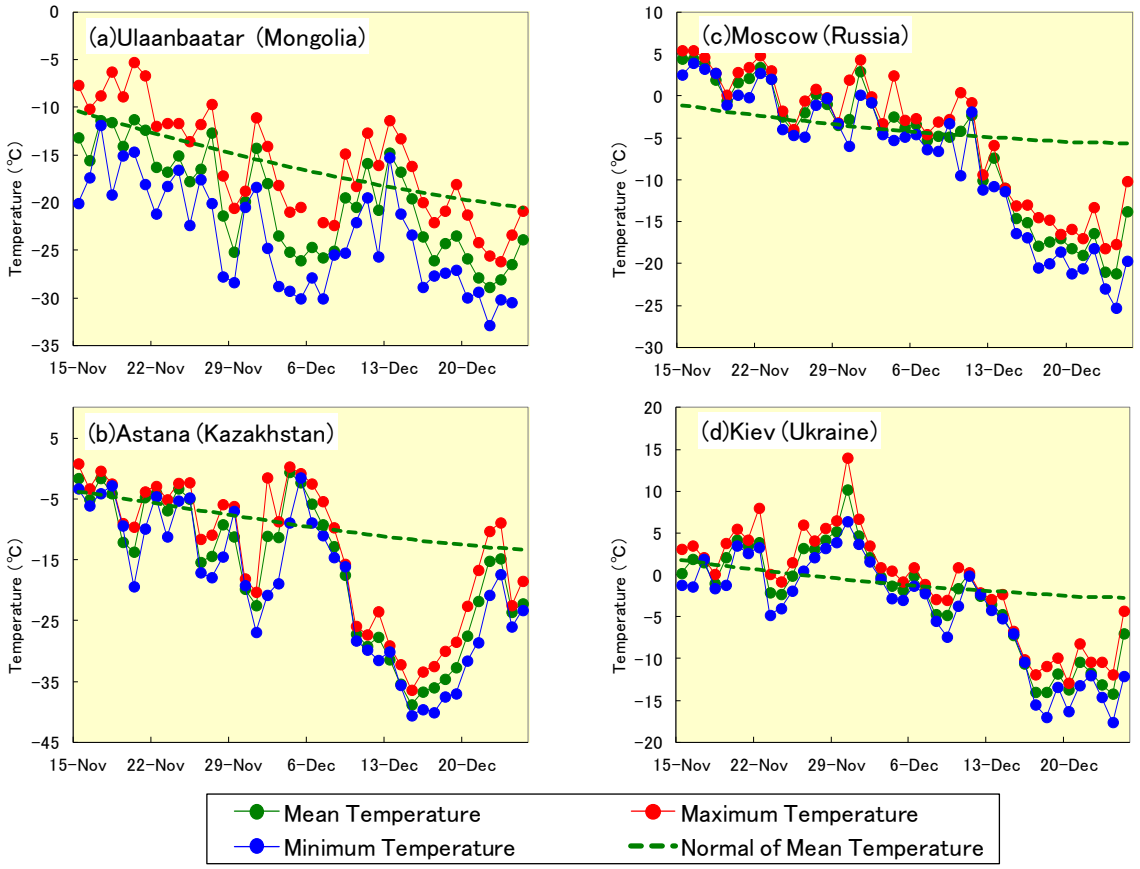

Figure 2 Daily maximum, mean and minimum temperatures (°C) at four stations from 15 November to 25 December 2012 (Based on SYNOP reports)

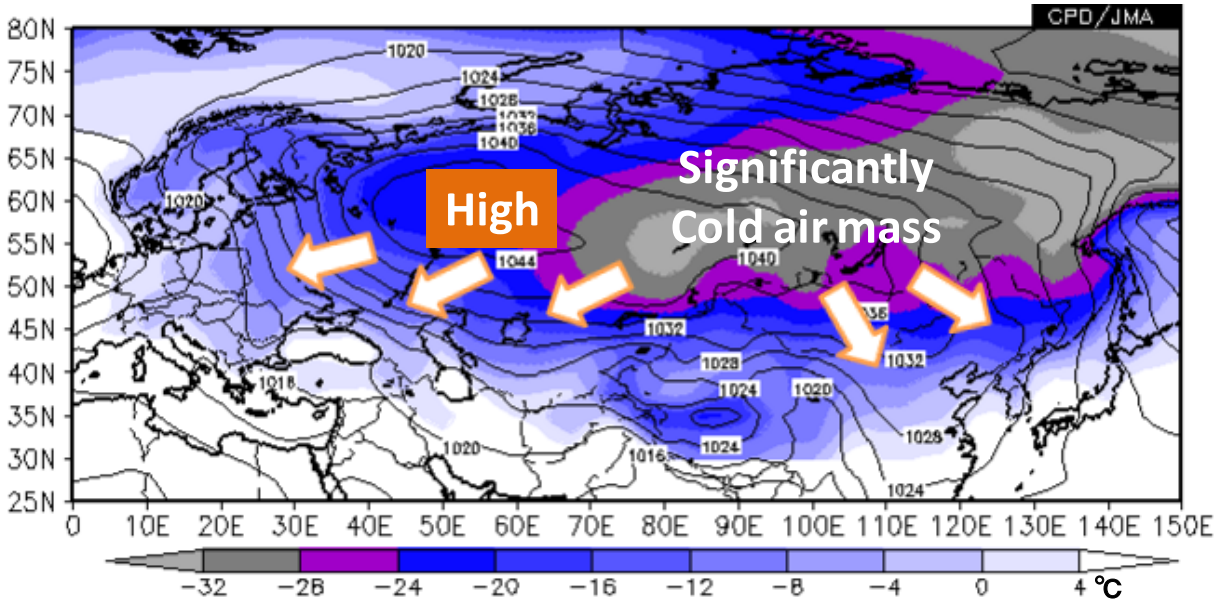

Figure 3 Sea level pressure and surface air temperature (11 – 24 December 2012)

The contours indicate sea level pressure (hPa), and the cold shading denotes 2 m temperature (°C).