



Seasonal march of the daily development of the Siberian high associated with the storm track there from autumn to early winter

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In East Asia the seasonal cycle shows much variety, strongly influenced by the Asian monsoon system. For example, the winter type pressure pattern already prevails around the Japan Islands in November due to the early development of the extremely cold air mass (the Siberian air mass) together with the Siberian high. Although we can find the development of the Siberian high and the Siberian air mass in the climatological monthly mean fields from October to November, their seasonal evolution processes have not been clarified yet. Thus the present study will examine such seasonal evolution with special attention day-to-day to the relationship between seasonal extension of the significant cold area in the time mean field and variation of the pressure and the temperature fields. The NCEP/NCAR re-analysis data and the daily weather maps (JMA) for 1971-2000 were used for the present study and the detailed analyses were made for 1983/84 winter, one of the coldest winter around Japan after 1971.

The extremely cold area surrounded by -10C isotherm at 850hPa averaged for 1971-2000 expanded from October to November in Eastern Siberia with the very stable stratification in the lower layer. In addition, horizontal temperature gradient was relatively large around the southern edge of that cold area then. According to the case study for 1983, the similar results on the evolution of time mean fields were found to those for the climatological ones, and thus we carried out detailed analyses for early winter of 1983. Referring to the daily weather maps, it is interesting that the surface anticyclone with rather high sea-level pressure (SLP) (e.g., higher than 1030hPa) began to appear frequently around the Lake Baykal (~55N/110E) already in October, just after the eastward movement of the extra-tropical cyclone there. In other words, the “daily Siberian high” developed as an anticyclone periodically on the storm track there. It is also noted that the storm track seems to be associated with the southern edge of the mean cold area and the extremely cold air could be advected after the passage of a cyclone there, resulting in the daily development of the surface high.