

Quantitative Analysis of the Causes of 2020 July rainfall in South Korea by GloSea6

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In the summer of 2020, East Asia experienced record-breaking monsoon rainfall, leading to significant social and economic damage. Identifying the key causes of such extreme atmosphere events is crucial for improving forecasting. During that year, the warming of the Indian Ocean (Indian Ocean Dipole, IOD) and the reduction of sea ice in the Kara-Laptev Sea in the Arctic were notable. These phenomena altered the position of the Western Pacific Subtropical High and weakened the jet stream, causing atmospheric instability over East Asia, which prolonged the monsoon.

This research aims to quantitatively evaluate the impact of equatorial and Arctic regions, including the Indian Ocean and the Arctic, on the July 2020 monsoon rainfall in South Korea using the Global Seasonal forecasting system version 6(GloSea6). The Replay method, utilized in this research, simulates past atmospheric conditions to track how subsequent atmosphere patterns developed. This approach allowed for a quantitative analysis of the causes of July 2020 rainfall on the Korean Peninsula. The results revealed that both equatorial and Arctic regions had significant impacts, with the Arctic playing a more dominant role.

Key words: GloSea6, Monsoon, Indian Ocean, Arctic

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