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Analysis of North Pacific high variability using GK-2A data

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The activity of North Pacific high is closely linked to East Asian summer monsoon variability. We analyze the classification of North Pacific high activity and associated summer monsoon characteristics using satellite data from the 2020 summer monsoon season. The period analyzed is the 2020-2022 summer season for which satellite data are available, and ERA5 reanalysis data for the 1991-2022 period are used for comparison. Four modes of variation were extracted from the empirical orthogonal function analysis of the East Asian cloud amount. The first mode was associated with the interannual variability of the East Asian summer monsoon, the second with the influence of the tropics, the third with the influence of the high latitudes, and the fourth with the influence of synoptic scale circulation. In particular, the second mode was associated with the northward movement of the precipitation band over East Asia due to the westward expansion and intensification of the western Pacific subtropical high pressure. The first and third modes preceded the second mode by 5 and 8 days, respectively, indicating a lagged relationship between these variations. Analysis of the ERA5 reanalysis data showed that the first mode of the satellite data did not appear, and the second mode of the satellite data emerged as the first mode. This study suggests that the GK-2A satellite data can be used to diagnose changes in the East Asian summer monsoon.

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