Subseasonal Variability of the WNPSH and Its Relationship with Intrasesonal Oscillation of East Asian Summer Monsoon.

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The north Pacific subtropical high (NPSH, hereafter) plays major role in East Asian summer climate. The northward shift of the NPSH is closely related to the onset and withdrawal of the East Asian summer monsoon. Meanwhile, the westward extension of the NPSH influences the transport of water vapor into East Asia, which results in heavy summer rainfall in East Asian region. This westward extension of NPSH forms another high over the western North Pacific and the high is called western North Pacific subtropical high (WNPSH). There are many previous studies about the WNPSH; however, the mechanism related to the formation of the WNPSH remains unsolved. Moreover, most of studies have keep focused on the JJA-mean state of WNPSH, but the observational evidences show that the variation in the WNPSH differs among the summer months of June, July, and August.

In this study, the cause for westward extension of NPSH is investigated using observation data. The hypotheses about development and maintenance of WNPSH have studied; convection over the warm pool (Lu and Dong, 2001), remote El Nino forcing (Wang and Zhang, 2002), Indian Ocean-western Pacific warming (Zhou *et al*., 2009), and propagation of stationary Rossby waves along the Asian jet (Enomoto *et al.*, 2003). The responses of the above-mentioned forcings on the WNPSH vary within summer months. The different responses are expected due to the difference of mean climatological fields among June, July, and August. In order to investigate these responses we define the monthly WNPSH index using the anomaly of geopotential height at 850hPa averaged over the WNPSH region. Using this index, we investigate the subseasonal variability of the WNPSH and find the factors controlling WNPSH variability. Also we study the relationship with the intraseasonal oscillation of the East Asian summer monsoon.

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Acknowledgments

This work is funded by the Korea Meteorological Administration Research and Development Program under Grant CATER 2006-4205.The research was also supported by Brain Korea 21 Project in School of Earth and Environmental Sciences of Seoul National University.