Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

AAS23-P05 Room:Convention Hall Time:May 22 17:15-18:30

Interdecadal variability of western North Pacific summer monsoon through the PJ pattern

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Pacific-Japan (PJ) pattern is known as a basic pressure pattern during summer over the western North Pacific and is correlated to hot and cold summer in Japan (Nitta 1987, Koasaka and Nakamura 2006). PJ pattern is also known as a remote response from interannual variability of warm anomaly of summer Indian Ocean after the El Nino which suppresses the convection over Philippines and enhances Baiu/ Meiyu activity (Xie et al. 2009). In this study, we defined new PJ pattern index using station data and reproduced PJ pattern from 1897 to 2009, and investigated the interdecadal variability of summer monsoon activity over the western North Pacific.

The first mode of EOF analysis using 850hPa vorticity during summer and PJ pattern using the difference of both major pressure seesaw points of Yokohama and Hengchun during summer are correlated well of 0.80. Therefore PJ pattern is defined as a difference of surface pressure data between Yokohama and Hengchun.

PJ pattern and the preceding ENSO have high correlation after 1970s. However this correlation becomes unclear before 1970s. It is interesting to convey that the correlation between PJ pattern and ENSO is also high before 1910. The relation with PJ pattern and summer temperature in Japan and summertime tropical cyclone activity will be also discussed.

Keywords: monsoon, interdecadal variability, western North Pacific