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Study on Interdecadal Variability of Air-Sea Interaction in the North Pacific using Wind Anomaly Index

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The air-sea interaction is one of important factors not only to determine the development of synoptic system at the Northeast Asia where the pacific jet is located but also to modulate the global climate system (Alexander et al., 1992). The atmospheric variation (as like Pacific Decadal Oscillation) effects on maritime resource (Mantua et al., 1997). In general strong surface wind cools SST and mixing layer becomes deeper. But if wind direction is northerly, SST cooling is more because of incoming cold air and mixing layer is deeper. On the other side, blowing strong and relatively warm southerly surface wind holds back SST cooling. As a result mixing layers did not become deeper. In this study it is attempted to explain variability in the North Pacific with a newly defined index, Wind Anomaly Index (WAI). WAI has been introduced to consider interaction between the atmospheric circulation and sea surface temperature (SST) anomalies. So we have considered this mechanism using following hypotheses:

H1. Easterly and Westerly: SST cooling (velocity effect) + No direction effect

H2. Southerly: SST warming (direction effect) + SST cooling (velocity effect)

H2. Northerly: SST cooling (direction effect) + SST cooling (velocity effect)

Air-sea interaction is well represented by WAI. Using this index we can get information about variability of mixing layer depth and upwelling.
We have performed periodic analysis on WAI to study climatic variations. We have also compared WAI with other indices such as the Southern Oscillation Index and Pacific Decadal Index.

Keywords: WAI; Air-Sea Interaction; Interdecadal Variation

References

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