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Ocean Science
Discussions

Interactive comment on "Long Island Sound Temperature Variability and its Associations with the Ridge-trough Dipole and Tropical Modes of Sea Surface Temperature Variability" *by* Justin A. Schulte and Sukyoung Lee

Anonymous Referee #2

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In this paper, the authors performed a statistical analysis to show that Long Island Sound (LIS) surface temperature is linked to mid-tropospheric geopotential height difference between the US east coast and Alaska, which is referred to as ridge-trough dipole in this study. By performing composite analysis, they further argue that the dipole is forced by sea surface temperature anomalies in the central equatorial Pacific.

From Figure 2, it is quite clear that LIS surface temperature is determined by the meridional shift of the atmospheric jet and the associated winter storm track across the US east coast. For instance, a northward shift of the storm track will warm up the subtrop-

ical North Atlantic and the mid-Atlantic bight, and cool the subpolar North Atlantic. The associated increase in the subtropical high will further increase the trade wind cooling the tropical North Atlantic. This is a well-known process, also known as North Atlantic tripole SST mode, which can be well observed in Figures 7 and 8. The North Atlantic tripole SST mode can be triggered by NAO, ENSO teleconnection and PNA, which is also very well known (e.g., Deser & Blackmon, 1993). Therefore, it is difficult for me to justify the publication of this manuscript in Ocean Science. I also feel that it is not well justified in the introduction why we need to study LIS surface temperature variability.

Additionally, I am not convinced that the geopotential anomaly over Alaska is anything to do with LIS surface temperature. The atmospheric circulation anomalies linked to LIS surface temperature anomalies shown in Figure 3 does not appear to be one of the leading modes of NH atmospheric variability (Wallace & Gutzler, 1981) or typical ENSO teleconnection patterns. The East Pacific - North Pacific (EP- NP) pattern, which is inactive in boreal winter, does not look like Figure 3 either. I am also confused why the authors use a numerical model data instead of observations for the LIS surface temperature. And, it is not clear what depth is at "the first vertical level". There are also many statements that do not match with the corresponding figures. I am sorry that I cannot be more positive.

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