

General comments

This paper investigates the impact of radiative cooling associated with East Asian cold air outbreaks (CAOs) on the modulation of the Northwest Pacific storm track using reanalysis data. Although the research topic is interesting, improvements are necessary regarding the definitions of terms, analytical methods, and physical interpretations. In addition, there are numerous errors in the figures, tables, captions, and figure numbering, which hinder a proper evaluation of the manuscript. Therefore, appropriate revisions are required.

Specific comments

- **Page 3, Line 82:** The definition of “The Japan Sea” is problematic. The CAO mask adapted from Schnyder and Riboldi (2026) refers to a domain encompassing the Sea of Japan, the East China Sea, and the Northwest Pacific as "the Japan Sea." Since this is geographically misleading, it should be revised to a term such as "the seas around Japan" or "the Japanese adjacent seas."
- **Figure 3:** The notation in the figure should be unified to t_{CAO} to match the main text. The same applies to Figure 7 and Figures S1, S2, and S3.
- **Figure 3:** In the caption, "(right)" should be corrected to "(center)."
- **Figure 4:** How was the box used to calculate the net radiation anomaly selected? If the goal is to investigate the effect of radiation on the formation of CAOs, the analysis should focus on the contribution of radiation along the BCAR traversed by each backward trajectory, rather than using a geographically fixed box.
- **Figure 5:** Explanations for panels (a) and (b) need to be included in the caption.
- **Page 11, Line 220:** It is unclear how many of the 237 cases corresponding to the 90th percentile of the EGR were accompanied by CAOs; because this correspondence is not provided, the results cannot be properly interpreted.
- **Page 11, Line 234:** The definition of "ADIAB" is unclear.
- **Figure 6:** Only panel (c) uses a different unit, making direct comparison difficult. The units should be standardized to $\text{hPa } 6\text{h}^{-1}$.
- **Page 15, Lines 292–294:** While this statement holds qualitatively, the quantitative extent to which it alters the circulation remains unclear. Therefore, this point should be examined in the Discussion section rather than presented in the Results section.
- **Page 15, Line 312, Table 1:** How was "after CAO" calculated for the random days? Furthermore, how were the random days selected?
- **Figure S5:** The figure and its caption are inconsistent with each other.

- **Page 20, Lines 410–412:** Isn't it expected (or obvious) that the land–sea thermal contrast itself is modulated by synoptic disturbances?