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Arctic sea ice loss amplifies local evaporation influence on water vapor isotopes: insights from cruise observations

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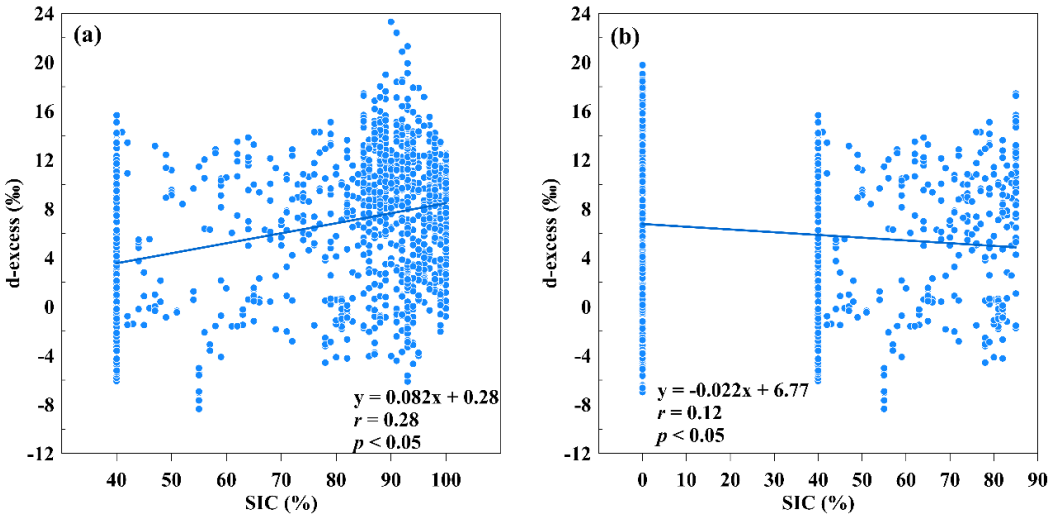

Figure S1. Relationship between d-excess and sea ice concentration for different sea ice regimes. (a) Ice-free and Transition regions; (b) Transition and Sea Ice regions.

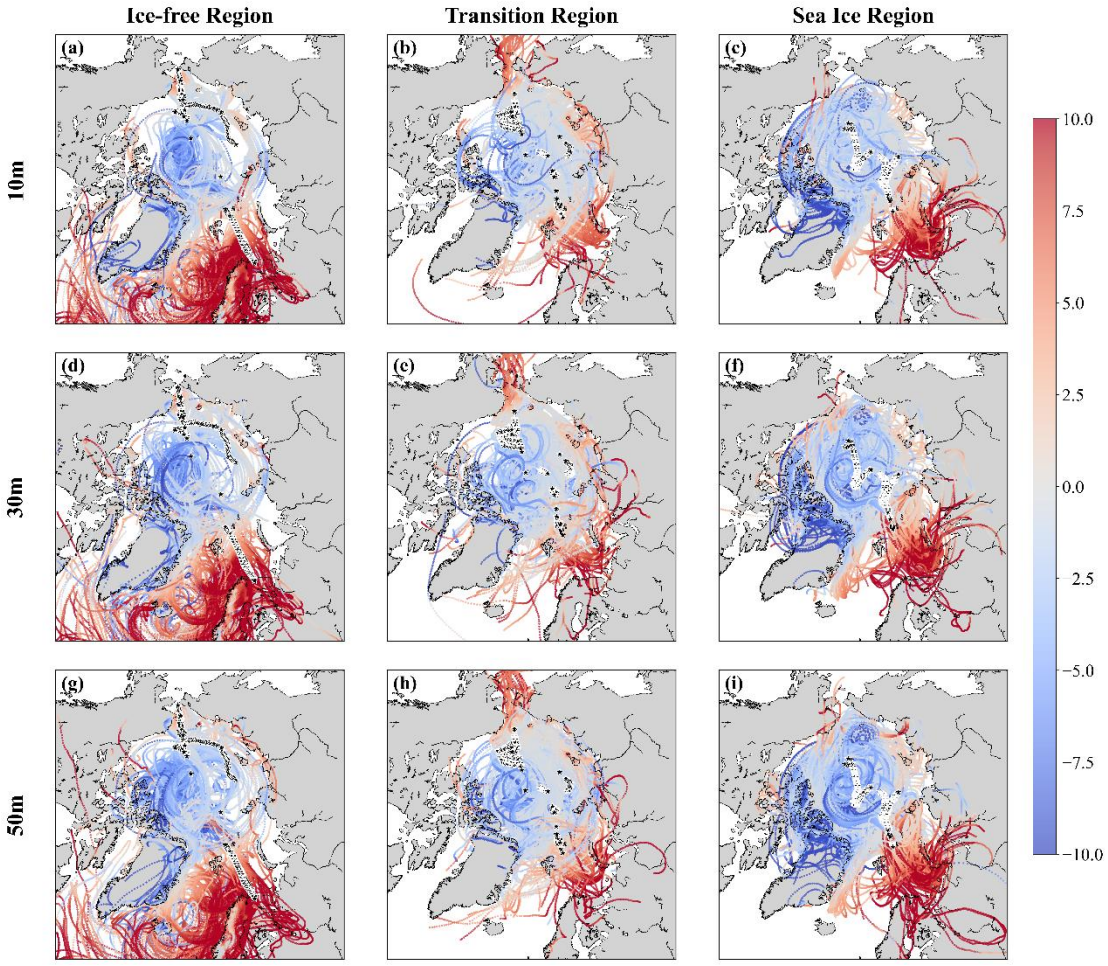

Figure S2. 10-day HYSPLIT backward trajectories color-coded by air temperature (°C). Columns represent the three sea ice regimes (ice-free, transition, and sea ice). Rows show trajectories initialized at different arrival heights: (a–c) 10 m, (d–f) 30 m, and (g–i) 50 m altitude.

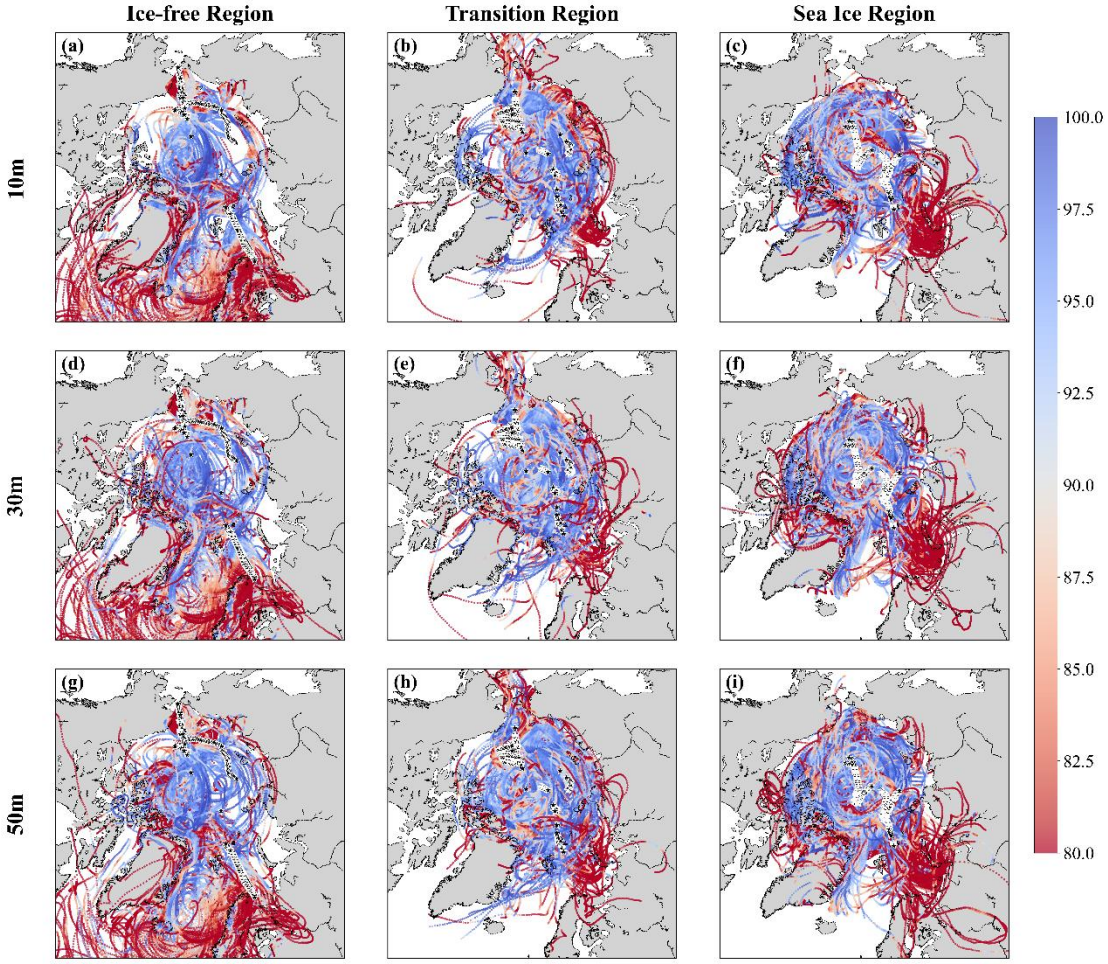

Figure S3. Same as Fig. S2, but for relative humidity (%).

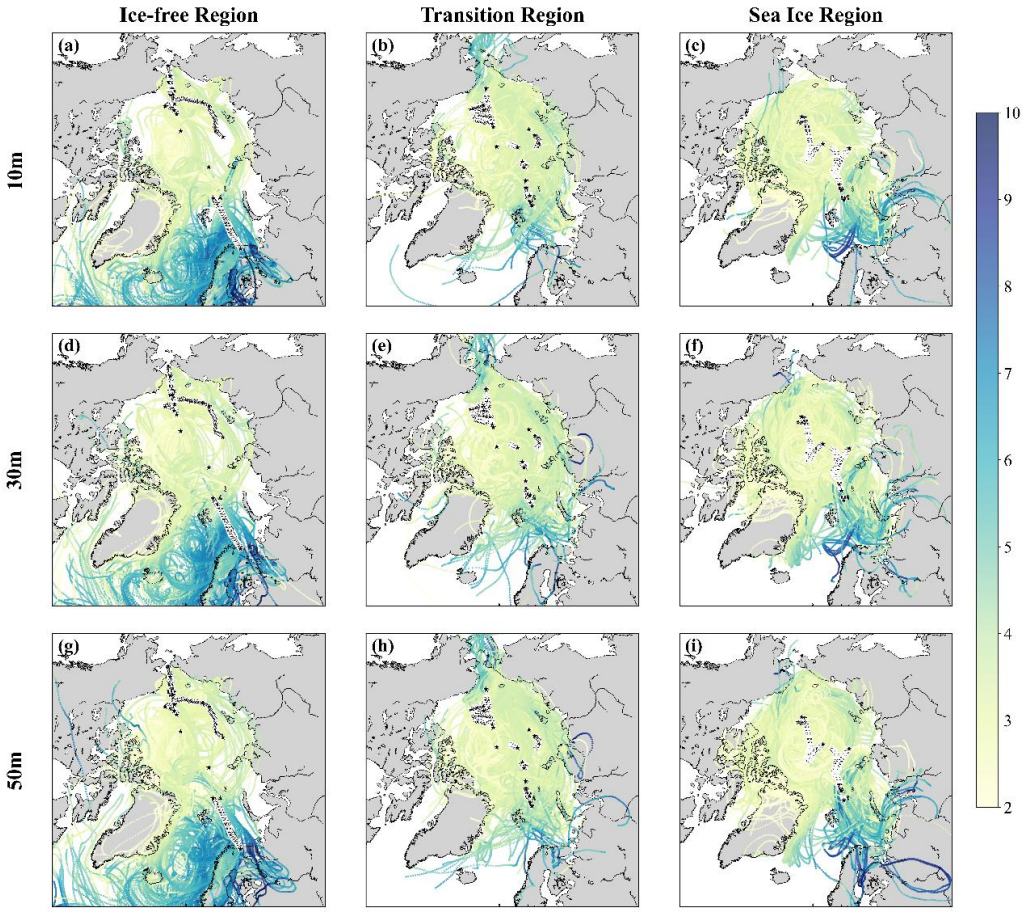

Figure S4. Same as Fig. S2, but for specific humidity (g kg^{-1}).

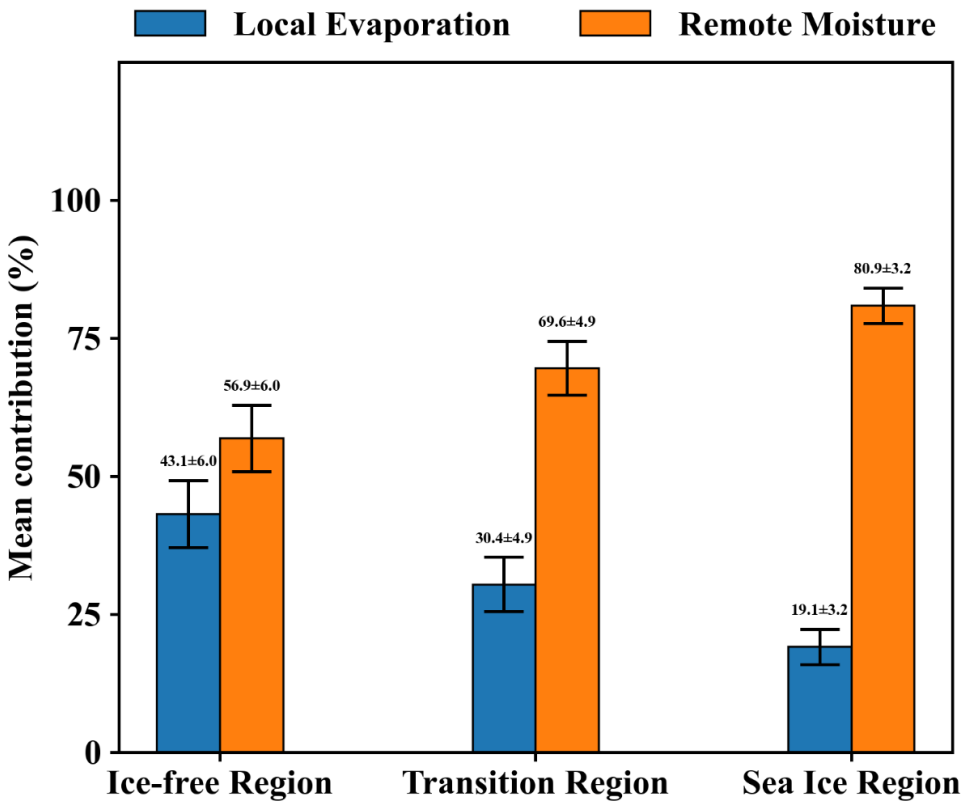

Figure S5. Sensitivity analysis of the MixSIAR model to endmember uncertainty. The isotopic compositions of both source endmembers were randomly perturbed by ±20%, and the MixSIAR model was run 1,000 times. The distributions of the resulting mean source contributions are shown.

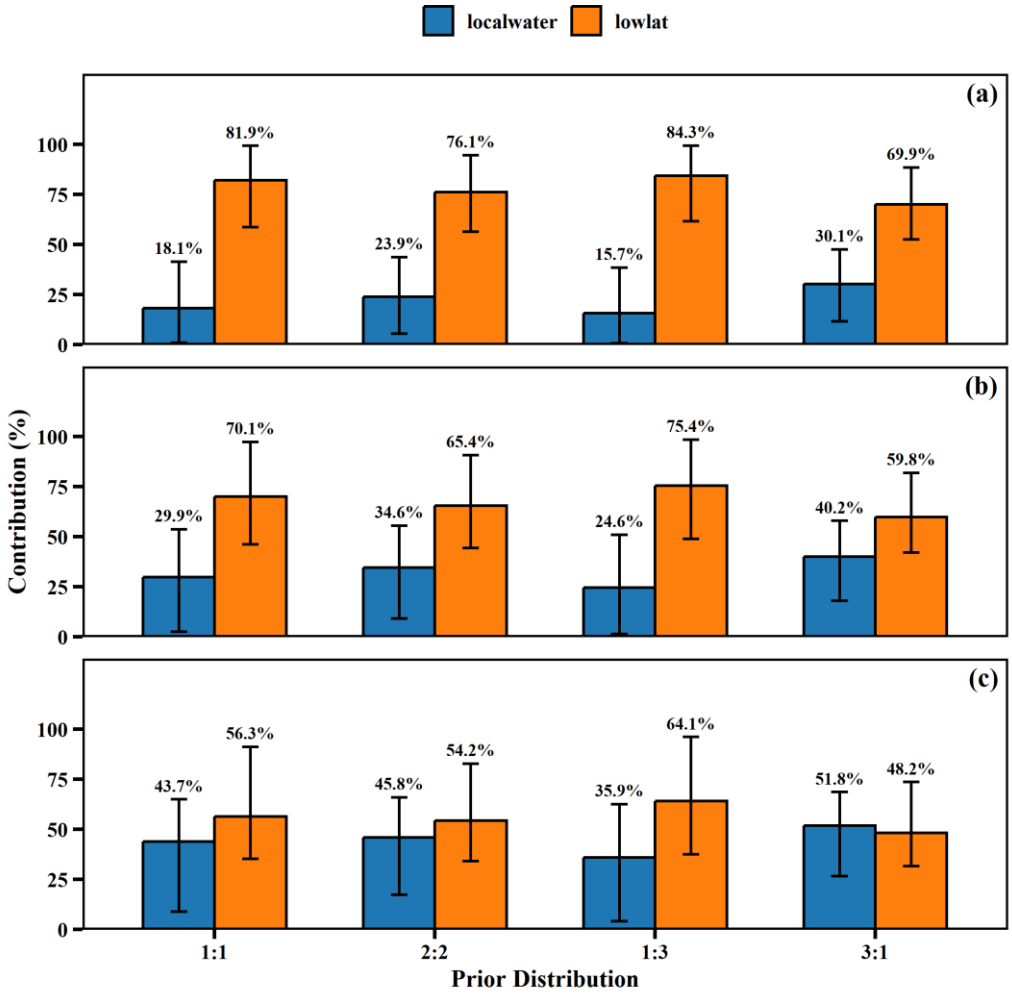

Figure S6. Prior sensitivity analysis of MixSIAR model estimates for the three study regions: **(a)** Sea Ice Region, **(b)** Transition Region, and **(c)** Ice-free Region. Bar heights represent the mean posterior contribution (%) of local evaporation (blue) and remote moisture advection (orange), with error bars indicating 95% credible intervals (CI). The x-axis shows the tested prior distribution.

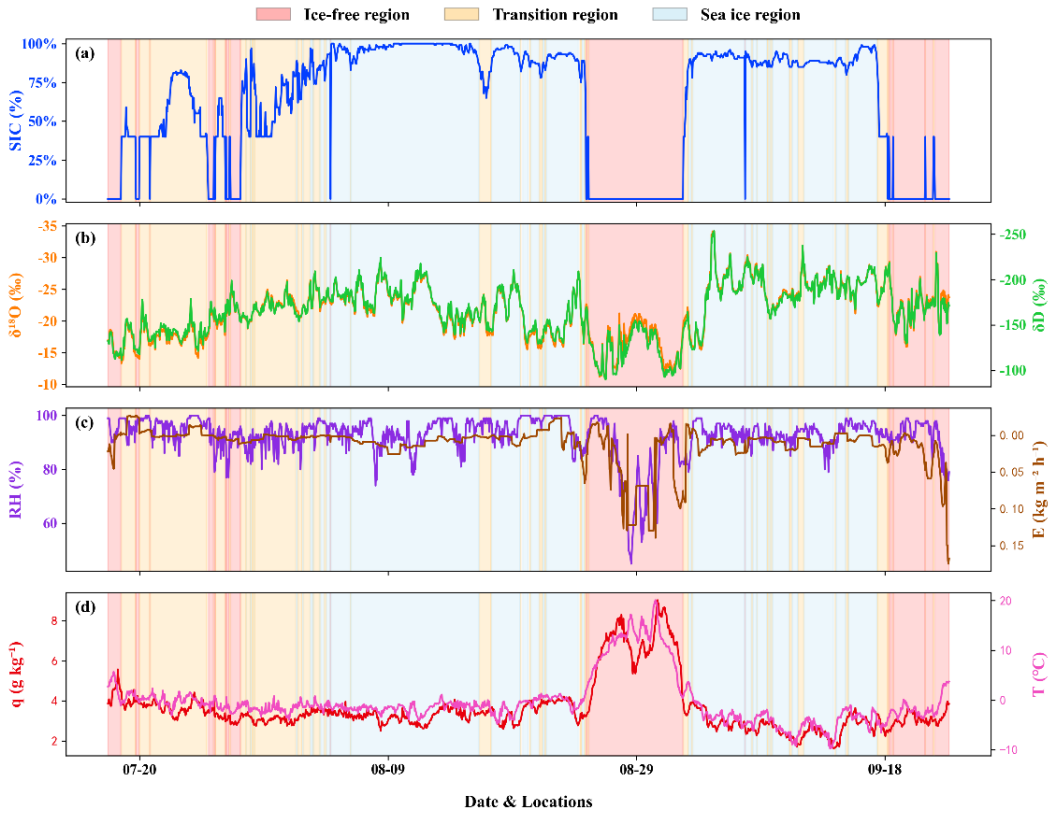

Figure S7. Time series of $\delta^{18}O$ and δD during the observation period.