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Presentation Type: In Person, Oral

Topic: Recent ocean salinity science advances

Title: Spatial Scales of Sea Surface Salinity and Temperature Variability in the Beaufort Sea

Abstract: As part of the SASSIE (Salinity and Stratification at the Sea Ice Edge) program in the Beaufort Sea, we examined scale-dependent spatial differences of surface temperature (SST) and salinity (SSS) in the late melting/early freezing season of 2022. The scales examined were between 50 m and 20 km. The differences were measured using a "salinity snake", an underway system deployed from a research vessel to measure temperature and salinity of the near surface layer. Using the ship's S-band radar, we differentiated between times when the ship was in the marginal ice zone (MIZ) and when it was in nearby open water. Differences were also computed for the transit leg of the expedition, well away from the ice. We find that differences depend strongly on the scale at which they are measured: the larger the scale, the larger the median difference (as expected from theory). Differences also depend on whether they are measured within the MIZ vs. in open water. Differences within the MIZ are significantly larger for both SST and SSS than in open water at all scales.

Within-MIZ and nearby open water differences are larger than those measured during the transit at all scales. For context, we compared results from the salinity-dominated Arctic with a mainly temperature-dominated mid-latitude dataset collected off the coast of California at almost the same time.

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