The response of sea ice and high salinity shelf water in the Ross Ice Shelf Polynya to cyclonic atmosphere circulations

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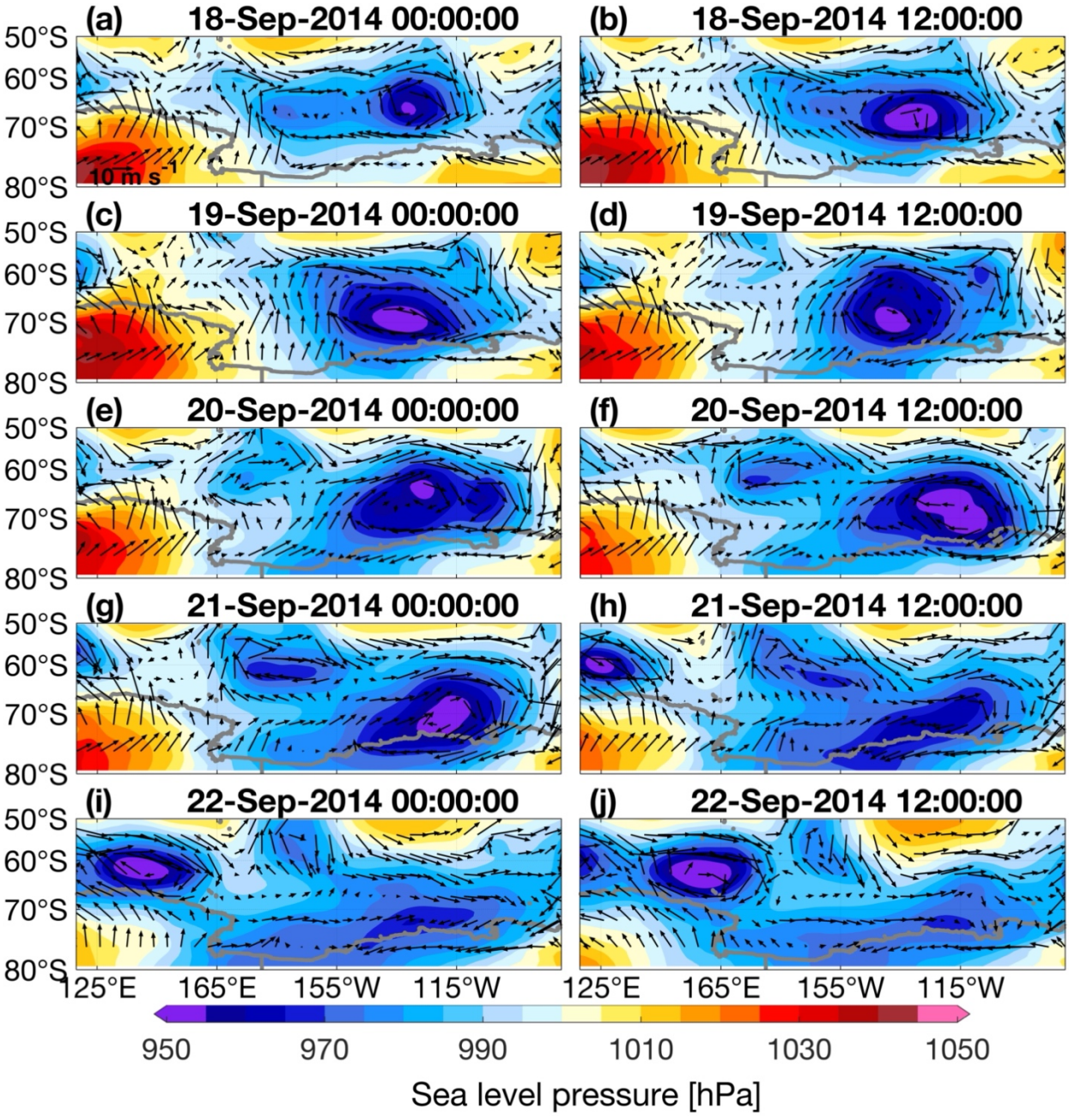


Figure S1. (a–j) Spatial distributions of 12-hour-average sea level pressure (color shading) and 10-m wind vectors (black arrow) in the Ross Sea and surrounding regions over 18–24 September 2014.

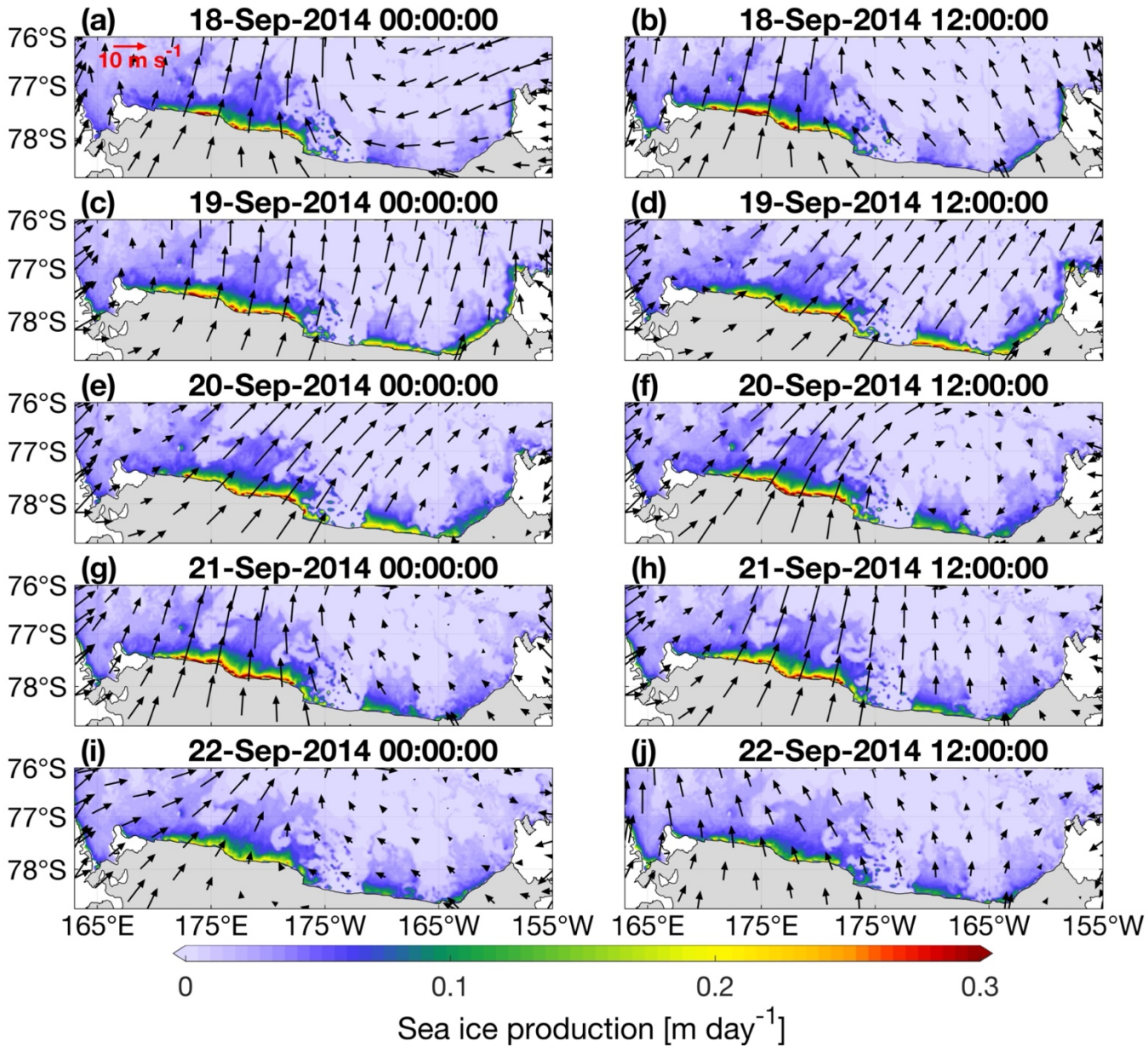
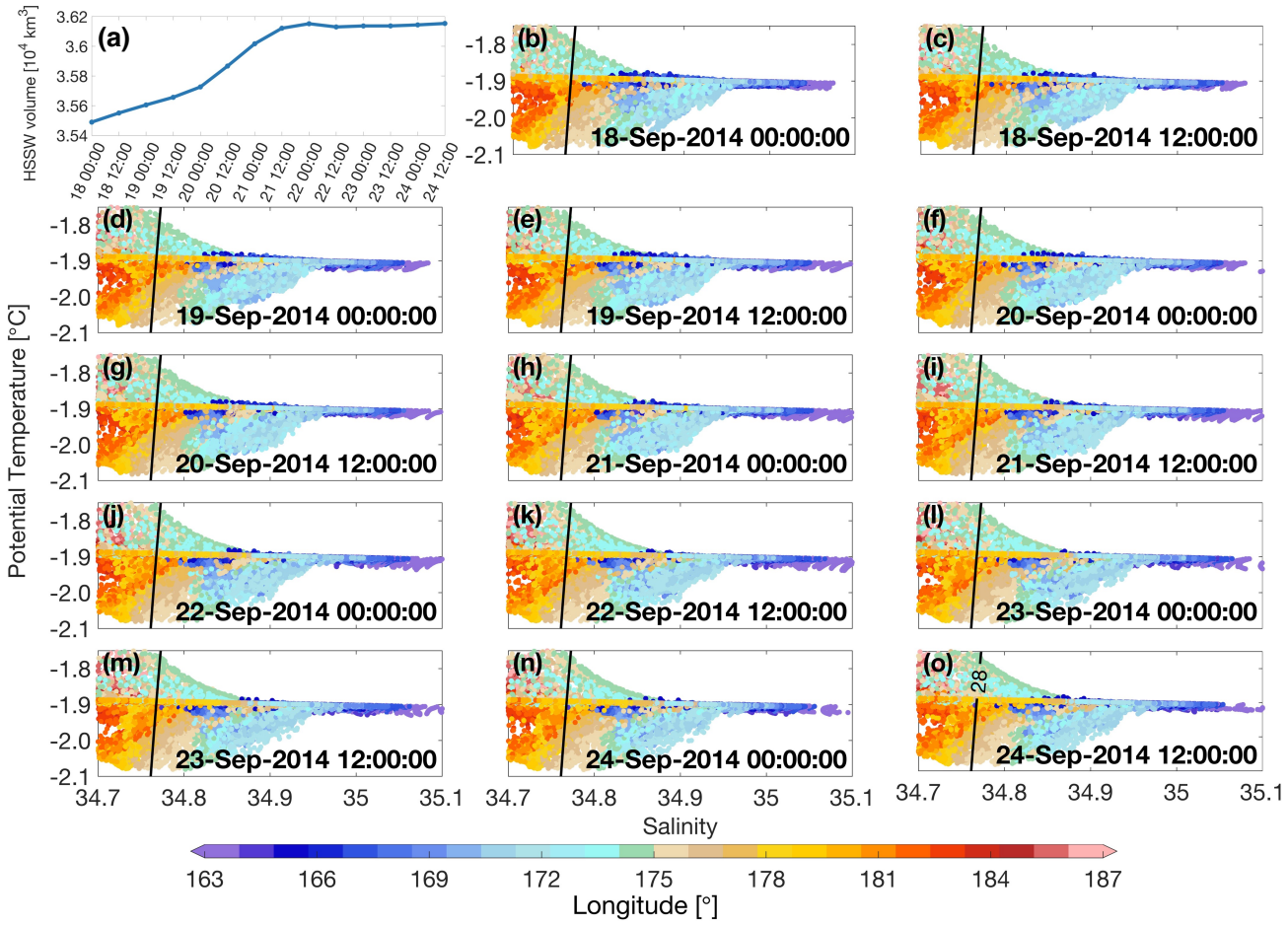


Figure S2. (a–j) Spatial distributions of 12-hour-average wind vectors and sea ice production (color shading) in the Ross Ice Shelf Polynya over 18–24 September 2014.



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26 **Figure S3.** (a) Time series of HSSW volume over the RISP from 18:00 of September 18 to 12:00 of
27 September 24 2014. (b–o) Temperature–salinity (T–S) diagrams for the RISP region shown in Fig. 2a.
28 The T–S dots are color-coded with longitude. The black isoline denotes the potential density contour
29 of 28 kg m^{-3}. T–S diagrams are bounded by the purple box shown in Fig. 6a and represent values
30 during the SYNO2 event from September 18–24 of 2014.

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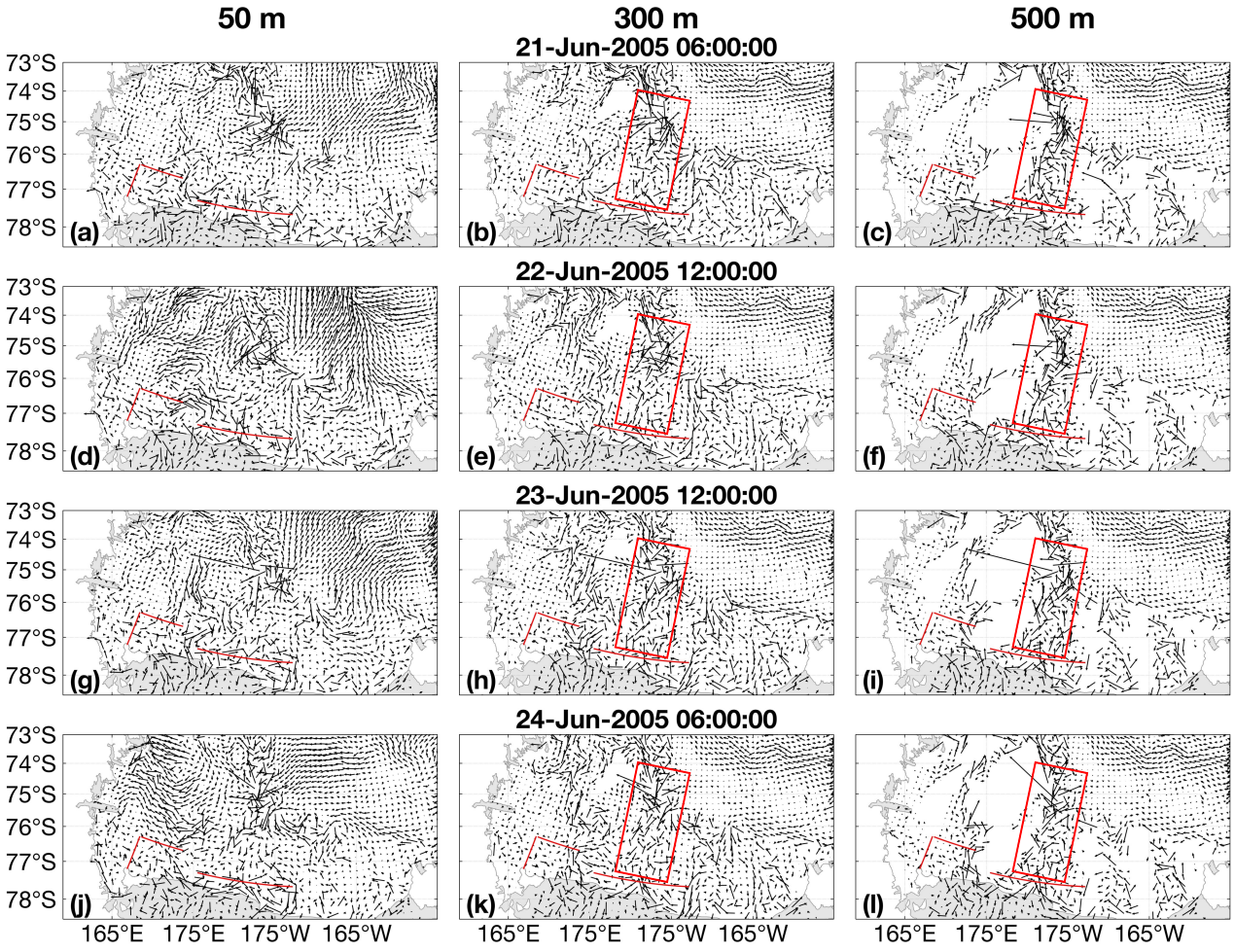

Figure S4. Spatial distributions of ocean currents at the depth of (a, d, g and j) 50 m, (b, e, h and k) 300 m and (c, f, i and l) 500 m at four selected time points (06:00 am of June 21, 12:00 am of June 22, 12:00 of June 23 and 06:00 of June 24). The red lines are the S1, S2, and S3 sections defined in Fig. 1b. The red boxes indicate the areas where outward (northward) flow is significantly present.