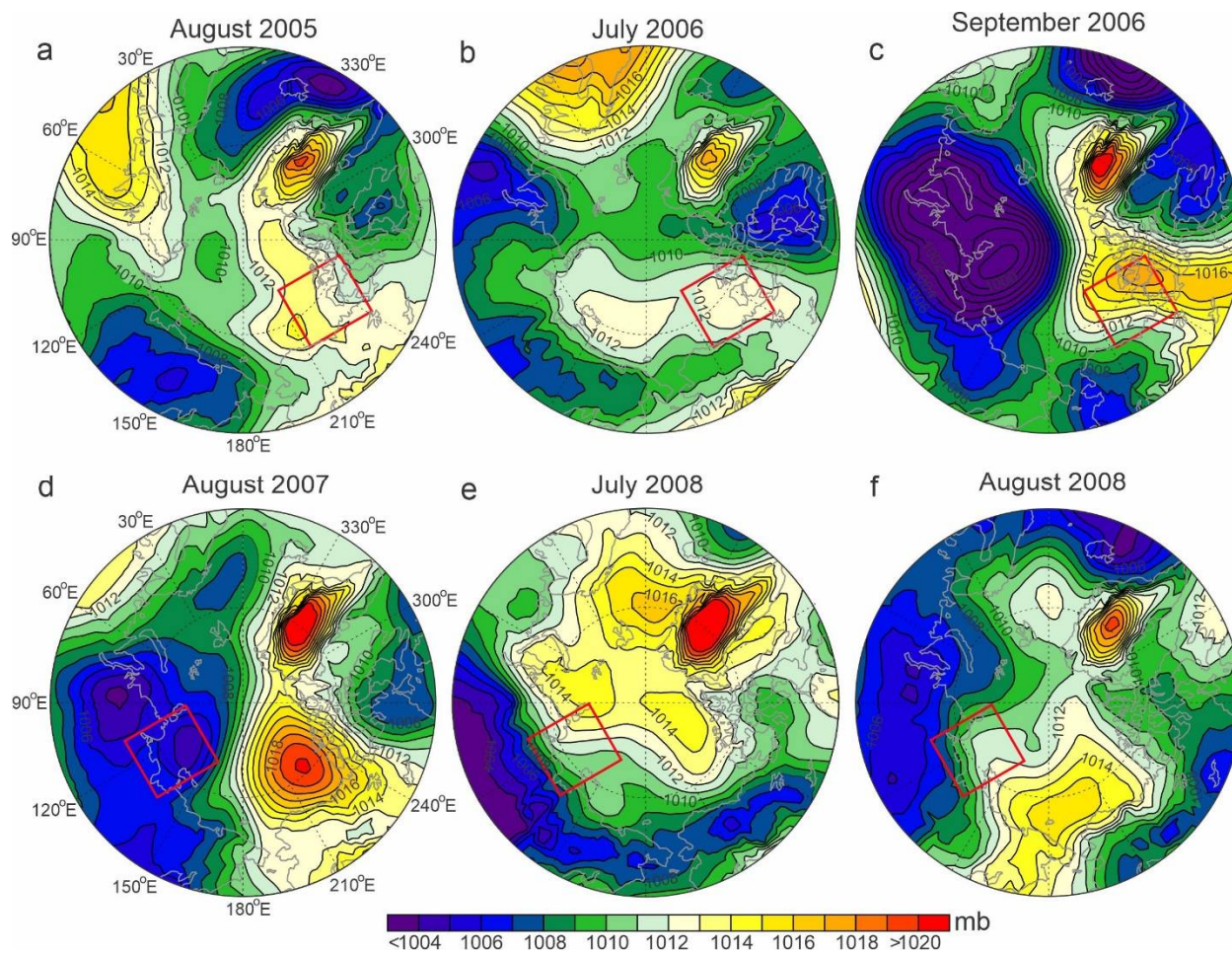
1   **Supplementary Figures**

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7   **Figure S1**: Sea-level atmospheric pressure (mb) derived from ERA5 reanalysis for (**a**) August 2005, (**b**) July 2006,

8   (**c**) September 2006, (**d**) August 2007, (**e**) July 2008, and (**f**) August 2008. The red rectangle encloses the Beaufort

9   Sea (top) and the Laptev Sea (bottom). The black dashed lines depict meridians and parallels.

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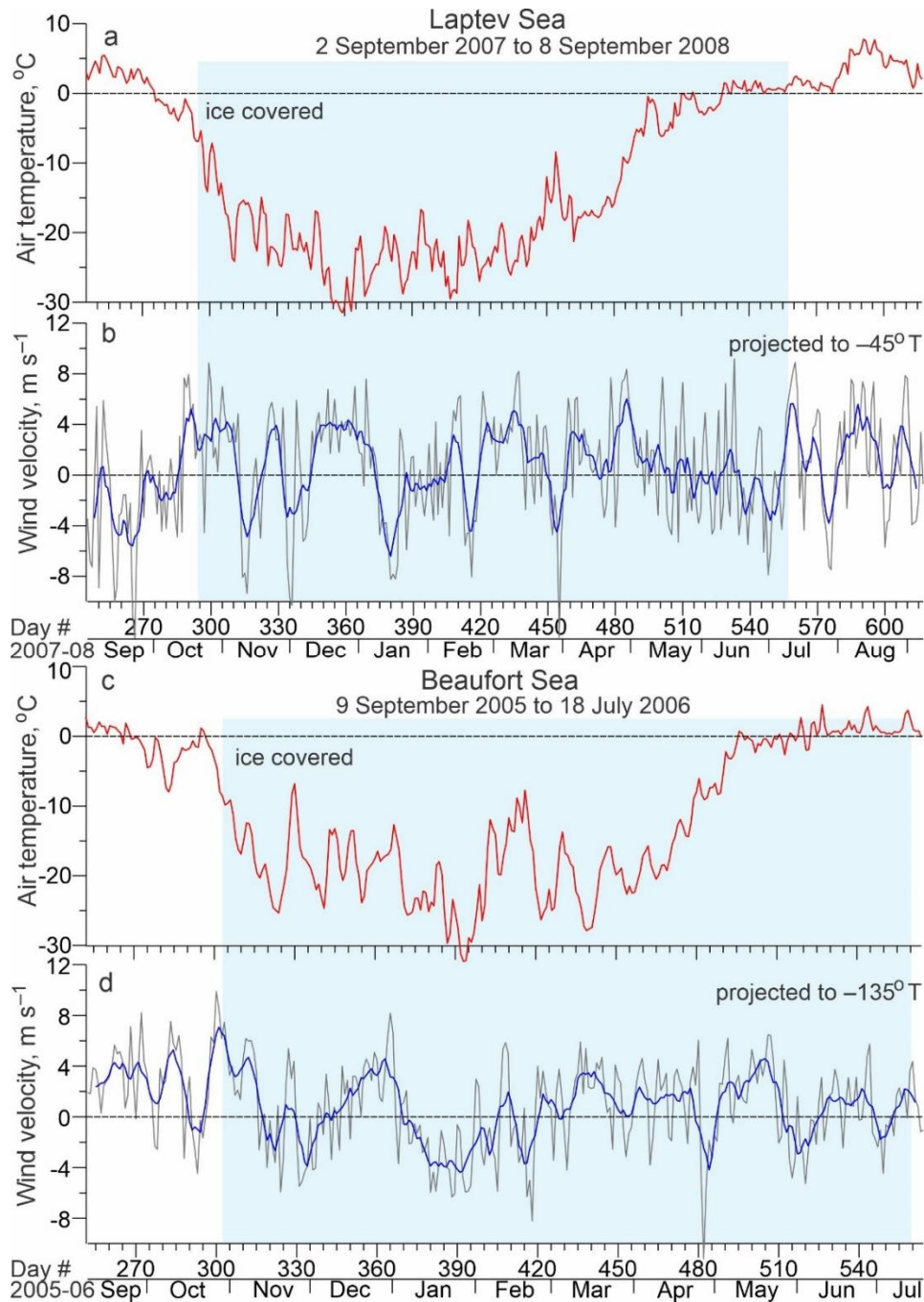
Figure S2: Time series of daily mean (**a, c**) 2-m air temperature (red line, °C) and 10-m wind (gray line, m s^{-1}) projected to (**b**) –45°T and (**d**) –135°T (°T – the direction measured with reference to the true north). Time series derived from ERA5 for (**a, b**) the southeastern Laptev Sea at 74.5°N, 127°E and (**c, d**) the southeastern Beaufort Sea at 71°N, 233°E. The location of these nodes in the Laptev and Beaufort Seas is depicted with blue crosses in Figures 2 and 3, respectively. (**b, d**) Positive values correspond to wind patterns favorable for a polynya opening. Blue lines show the 7-day running mean. Blue shading highlights sea-ice cover exceeding 90%.

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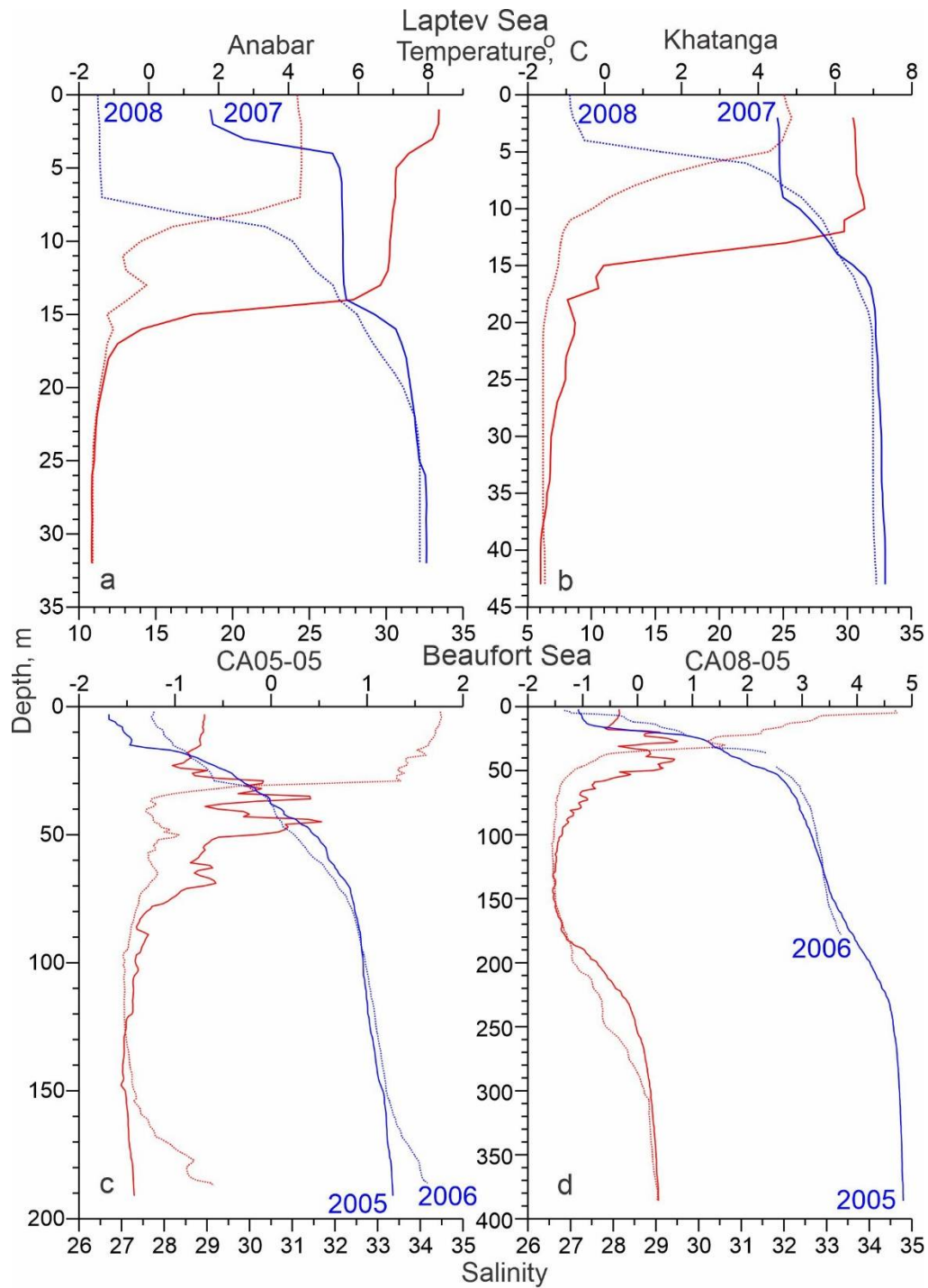
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21   **Figure S3**: Vertical profiles of salinity (blue) and temperature (red, °C) taken at mooring deployment (solid
22   line) and recovery (dotted line) in (top) the Laptev Sea in September 2007–08 and (bottom) the Beaufort
23   Sea in September 2005 and October 2006. Profiles occupied at moorings (**a**) Anabar, (**b**) Khatanga, (**c**)
24   CA05-05 and (**d**) CA08-05.

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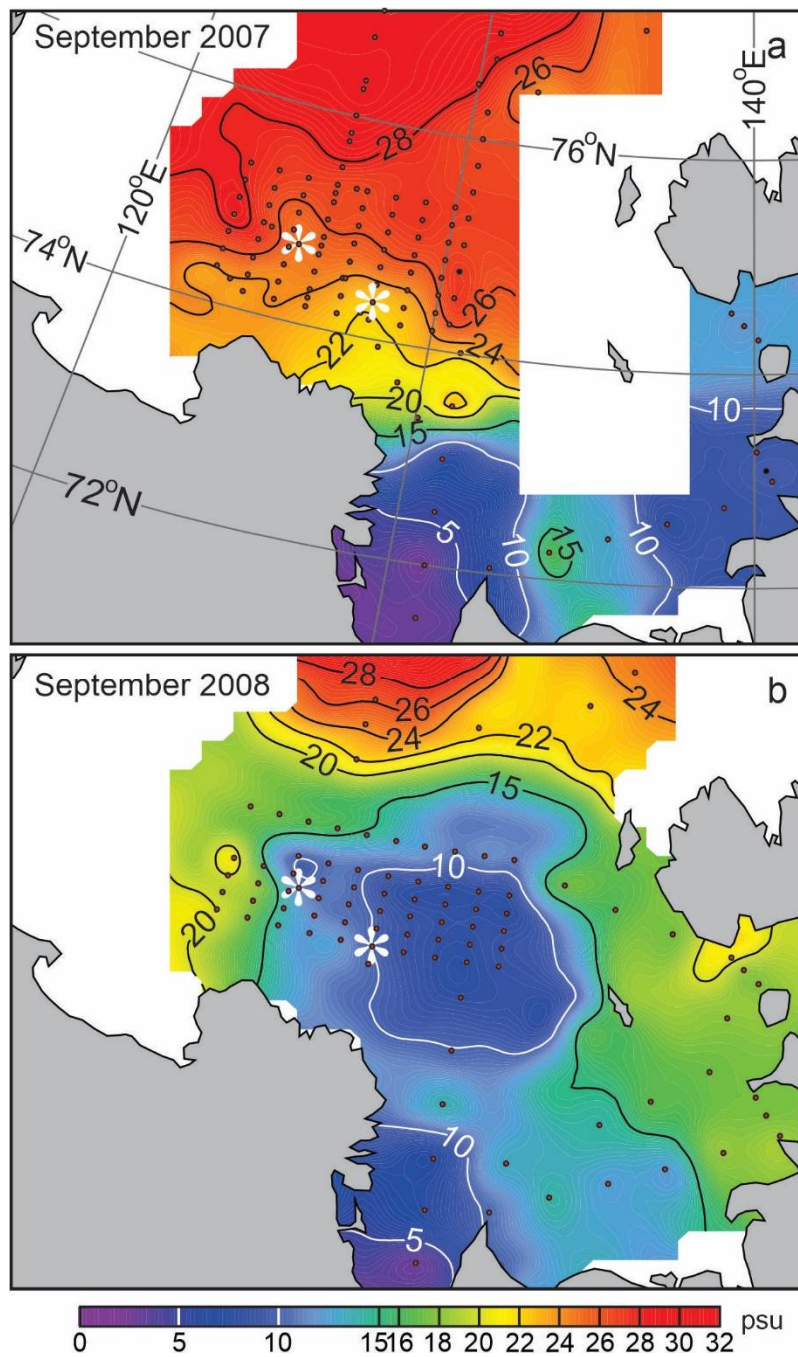
Figure S4: Sea-surface (~2 m depth) salinity over the southeastern Laptev Sea shelf in (**a**) September 2007
and (**b**) September 2008 adopted from Dmitrenko et al. (2010). Red dots indicate CTD stations. White stars
mark moorings Khatanga and Anabar.

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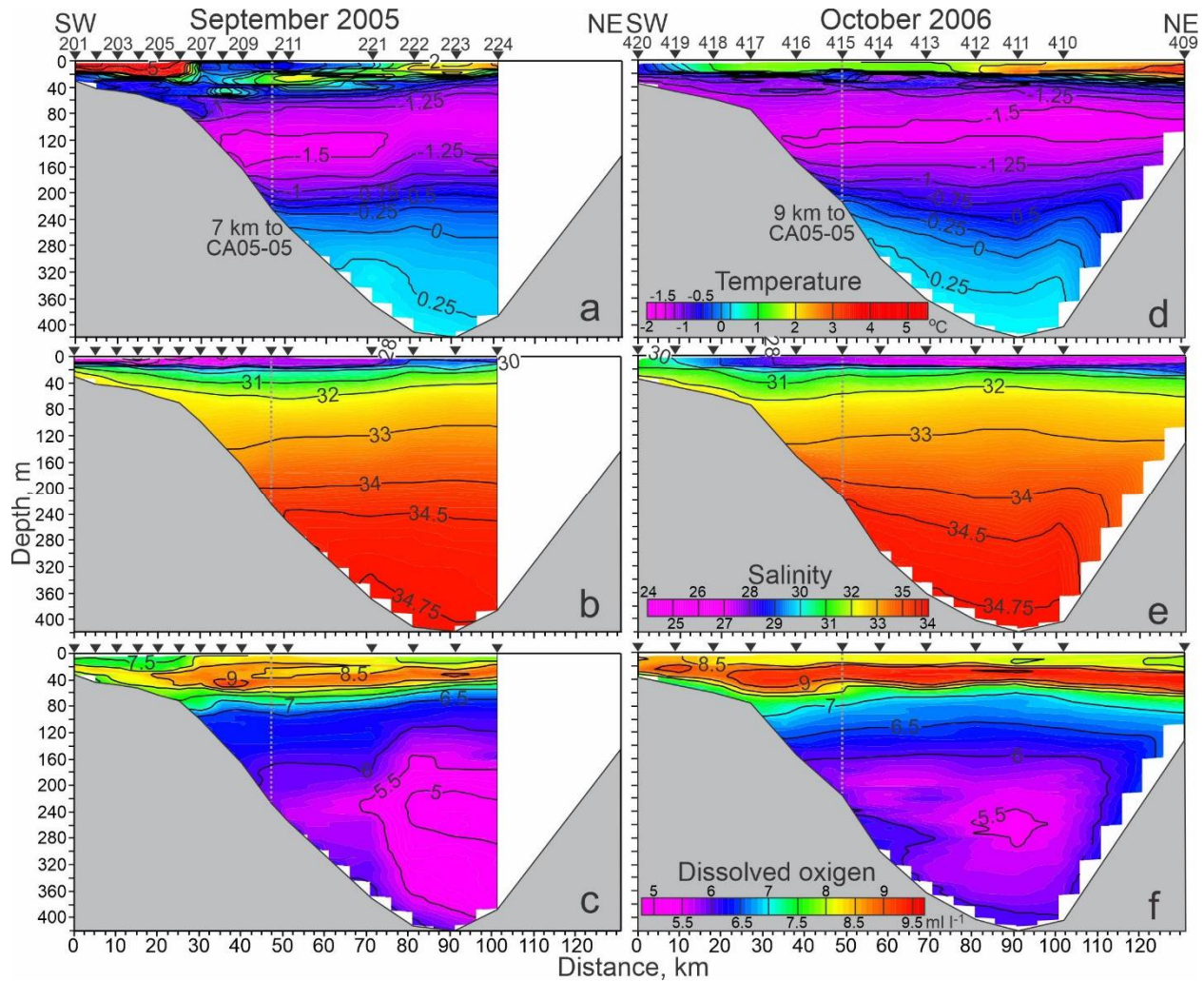
Figure S5: Sections of (**a, d**) temperature (°C), (**b, e**) salinity and (**c, f**) dissolved oxygen (ml l⁻¹) taken in (left) September 2005 and (right) October 2006 across the entrance to the Amundsen Gulf (for section location see Figure 1b). Blank areas represent missing data. Triangles on the top identify positions of CTD stations with their reference numbers. Stations # 201 – 211 and # 221 – 224 occupied on 2 and 8 September 2005, respectively. Stations # 409 – 420 were taken from 4 to 6 October 2006. Dashed gray lines indicate stations nearest CA05-05.