Abstract View

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Modeling Interpretation of Mesoscale Meanders of the Ice Edge off the Labrador Coast Observed in NOAA Satellite Imagery

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ABSTRACT

NOAA satellite visible images exhibit two alternative ice-edge patterns off Labrador; one is a straight pattern, and the other is a large-meander pattern with alongshore wavelengths of 200–300 km and offshore extensions corresponding to banks over the continental shelf. As strong northwesterly wind events occurred, the straight patterns changed into the large-meander patterns. Assimilating results from both a continental shelf model driven by alongshore wind and a reduced gravity model constrained by a vertical wall with alongshore variation, this progression is interpreted as follows: the strong wind induces downwelling and a resultant alongshore flow over the shelf break, and then, the intensified Labrador Current interacts with alongshore variation in the shelf break more effectively than the weak one does. The topography produces propagating meanders of the Labrador Current and is enhanced by offshore and offshore extensions corresponding to banks and saddles, respectively, several days after the wind event. The ice edge, following the Labrador Current, comes to have the large-meander pattern. Heat fluxes due to warm Labrador Sea water carried by the shoreward meanders may be important to a heat balance over the shelf in winter.