Abstract View

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The Formation of Labrador Sea Water. Part I: Large-Scale Processes

R. Allyn Clarke

Atlantic Oceanographic Laboratory, Bedford Institute of Oceanography, Dartmouth, N.S., Canada B2Y 4A2

Jean-Claude Gascard

Laboratoire d'Océanographie Physique du Muséum National d'Histoire Naturelle, 75231 Paris, France

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ABSTRACT

Data obtained in the western Labrador Sea during March 1976 by *Hudson* are analysed to show that new Labrador Sea Water was being formed at this time. On the basis of hydrographic and moored current-meter data, it is hypothesized that a 200 km scale cyclonic gyre forms in winter in the western Labrador Sea and that this gyre retains the developing deep mixed layers in this general area long enough for the transformation to Labrador Sea Water to take place. Using a model, it is demonstrated that water columns found along the western boundary of the Labrador Sea can be modified by cooling, evaporation and mixing to form deep mixed layers with the properties of Labrador Sea Water.

Approximately 10^5 km^3 of new Labrador Sea Water was formed in 1976, an estimate that is consistent with earlier estimates of mean annual production rates. This water, 2.9°C, 34.84‰, is some 0.6°C cooler and 0.06‰ fresher than that defined by Lazier (1973) from his data collected in 1966. The variation of Labrador Sea Water and its rate of production over the last 50 years is discussed.