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Title: Interannual variations of the Labrador Current and sea level off the eastern Canada

Abstract: The TOPEX/Poseidon altimeter data over the period from 1992 to 2002 have been analyzed to investigate interannual variations of the Labrador Current and sea level off the eastern Canada. The annual cycle and residual tides (including the semi-annual cycle) are removed using a modified orthogonal response analysis. The altimetric data reveal significant interannual sea level variability of magnitude of 5-10 cm over the shelves for the study period, falling to the lowest in 1994, then rising to the highest in 1997-98 and falling again afterwards. The second sea level fall shows an overall equatorward propagation. The altimetric results are supported generally by coastal tide-gauge observations after the land subsidence being accounted for. The altimetric currents also show prominent year-to-year changes in the surface Labrador Current and its extension. Using numerical model results and statistical methods we examine and discuss possible relationship of the Atlantic Oscillation, the shelf/slope water front, Gulf Stream position, wind stress curl associated with Icelandic Low, fresh water runoff, air temperature, and the Labrador Current with the sea level changes. The interannual sea level variability is thought to be forced by fluctuations of the Gulf Stream position which seems to be related to the North Atlantic Oscillation and of the baroclinic Labrador Current transport.

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