

A MODELING STUDY ON THE EXISTENCE OF  
THE NORTH HAWAIIAN RIDGE CURRENT

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By

Deborah A. Koh

Thesis Committee:

Bo Qiu, Chairperson  
Eric Firing  
Pierre Flament

## ABSTRACT

Long-term observations confirm the existence of a mean boundary current along the windward side of the Hawaiian Islands, known as the North Hawaiian Ridge Current (NHRC). The northwestward current originates from the impinging mean NEC, extends from Hawaii to Kauai, and veers westward north of Kauai. Typically  $\sim 100km$  wide, the current has speeds ranging from  $\sim 10 - 20\frac{cm}{s}$ .

With a 1.5 layer reduced gravity model, we were able to create a realistic representation of the NHRC. In the model, the current's formation depends primarily on mean wind forcing. The NHRC transport is shown to be the difference between the total meridional transport east of the Hawaiian Islands and the latitudinally-dependent, Sverdrup transport east of the islands. Using time-independent, basin-scale theory, the transport of the mean model ridge current is predicted to within  $\sim 20\%$ . Rossby wave rectification, which Mysak and Maggaard (1983) proposed as the mechanism of NHRC formation, does not seem to play a significant role in creating the ridge current.