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Effect of Coriolis force on edge waves (I) Investigation of the normal modes

by Robert O. Reid

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EDITOR'S COMMENTARY

In the oceanographic literature, there are not too many publications so clearly ahead of their time as is this one. Reid starts out by asking about the effect of Earth's rotation on edge waves. Edge waves are essentially long gravity waves found over the continental shelf and up onto the beach. They are topographically constrained to propagate strictly alongshore, but in either direction. By the mid-1950s, interest in this was growing as people realized that edge waves are more than a mathematical curiosity. Rotation was expected to be important for long, low frequency (periods of tens of minutes, out to hours) waves, so the contribution was timely.

What makes this article shine, however, is the discovery of trapped disturbances at longer periods (days to many days) that require the existence of Earth's rotation; these are now called continental shelf waves. These waves can only propagate alongshore in one direction (northward off California, for example) and typically have alongshore scales of hundreds to thousands of kilometers.

Reid went on to explore the important role that these low frequency waves have in the ocean's response to wind forcing. Since no one had seen anything like this in nature, the shelf wave aspect of the article was evidently forgotten for some time. Then, in 1962, Bruce Hamon (1962, 1963) published an insightful analysis of observed sea level fluctuations at the Australian coast and at a nearby island. This got people interested and led to Allan Robinson's (1964) paper in which he announced continental shelf waves as a proposed explanation of Hamon's observations. After that, the flood gates opened. For about 15 years, shelf waves were studied intensively and, not inaccurately, were called a "cottage industry."

—Kenneth H. Brink

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