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Downslope Windstorms and Morning Glories: Analogues from the Coastal Ocean

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Internal waves are implicated in a wide variety of atmospheric phenomena including the downslope windstorms often observed in the lee of high topography, events that involve wave breaking and intense wave, mean-flow interaction. Equally notable in the atmosphere are the “morning glory” solitary wave related structures that are observed to form and propagate on low level atmospheric inversions in a wide variety of geographical locations although they have been most famously described in the atmosphere above the Gulf of Carpentia in Australia. Although much more difficult to observe, identical internal wave related processes occur in the stably stratified coastal ocean environment. These analogies are especially interesting as a means of better understanding the forcing responsible for the excitation of these wave mechanical processes. In this paper we will explore these oceanographic analogues through the application of direct numerical simulation techniques and compare the results to acoustic Doppler derived observations from the Knight Inlet of coastal British Columbia, Canada.