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Role of the basin boundary conditions in gravity wave turbulence MICHAEL BERHANU, MSC, CNRS, Universite Paris Diderot, LUC DEIKE, Scripps Insitution of Oceanography, University of California San Diego, BENJAMIN MIQUEL, University of Colorado at Boulder, PABLO GUTIERREZ, DFI-FCFM-Universidad de Chile, TIMOTHEE JAMIN, MSC, CNRS, Universite Paris Diderot, BENOIT SEMIN, LPS, Ecole Normale Superieure, ERIC FALCON, MSC, CNRS, Universite Paris Diderot, FELICIEN BONNEFOY, LHEEA, Ecole Centrale de Nantes — Gravity wave turbulence is studied in a large wave basin where irregular waves are generated unidirectionally. The role of the basin boundary conditions (absorbing or reflecting) are investigated. To that purpose, an absorbing sloping beach opposite to the wavemaker can be replaced by a reflecting vertical wall. The wave field properties depend strongly on these boundary conditions. Unidirectional waves propagate before to be damped by the beach whereas a more multidirectional wave field is observed with the wall. In both cases, the wave spectrum scales as a frequency-power law with an exponent that increases continuously with the forcing amplitude up to a value close to -4. We have also studied freely decaying gravity wave turbulence in the closed basin. No self-similar decay of the spectrum is observed, whereas its Fourier modes decay first as a time power law due to nonlinear mechanisms, and then exponentially due to linear viscous damping. We estimate the linear, nonlinear and dissipative time scales to test the time scale separation. Using the mean energy flux from the initial decay of wave energy, the Kolmogorov-Zakharov constant of the weak turbulence theory is evaluated experimentally for the first time.

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