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Ocean is a major source of waves in the thermosphere: evidence provided by Dynasonde and DART observations

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Recent theoretical analysis by Godin et al. [2015] led to suggestion that infragravity waves (IGWs, i.e. surface gravity waves in the ocean with periods longer than 30 s) can radiate acoustic-gravity waves (AGWs) and account for a significant part of the wave activity observed in the thermosphere with periods between about 5 min and 3 h. In this paper, we report a strong experimental demonstration of thermospheric waves being driven by the ocean using data from two Deep-ocean Assessment and Reporting of Tsunamis (DART) stations located off the US East Coast and Dynasonde radar system located at Wallops Island, Virginia. Over a 9-month observation period, variations of IGW and AGW spectral amplitudes demonstrate large, statistically significant correlation in a broad range of frequencies (0.2–3.2 mHz) and altitudes (140–190 km). Peak correlation values ($\sim$0.46) indicate that waves radiated by the ocean represent a major constituent of the thermospheric wave activity.