



## **Evidence for infragravity waves-tide resonance in deep oceans**

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Ocean tide refers to the oscillatory motion of seawater forced by the gravitational attraction of the moon and sun with periods of a half to a day and wavelengths of the semi-Pacific to Pacific scale. Ocean infragravity waves are sea-surface gravity waves with periods of several minutes and wavelengths of several dozen kilometres. We report the first evidence of the resonance between these two ubiquitous phenomena in deep oceans mutually very different in period and wavelength. The evidence comes from long-term, large-scale observations with arrays of broadband ocean-bottom seismometers located at depths of more than 4000 m in the Pacific Ocean. This observational evidence is substantiated by a theoretical argument that infragravity waves and the tide can resonantly couple and that such coupling occurs over unexpectedly wide areas of the Pacific Ocean. Through this resonant coupling, some of ocean tidal energy is transferred in deep oceans to infragravity wave energy.