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Flexural gravity waves on the Ross Ice Shelf

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The long-period ocean waves (e.g. tsunamis, infragravity waves) impact the Ross Ice Shelf and excite flexural gravity waves propagating though the ice-shelf/sub-ice-shelf cavity system. Numerical results of a three-dimensional model simulating propagation of the flexural gravity waves in the Ross ice-shelf/sub-ice-shelf cavity demonstrate that the geometry of the ice-shelf cavity (its bathymetry and the ice-shelf draft) controls the wave propagation and the amplitude of the ice-shelf flexure. The asymmetry of the RIS cavity - the eastern part is much shallower than the western part - results in substantially different flexural stresses in the eastern and western parts of the RIS. Computations of the normal modes of the ice-shelf/sub-ice-shelf cavity system reveal that high eigenfrequencies are in the range of the infragravity wave frequencies and potentially could be excited by the incident ocean waves.