IMAGe-CGD Seminar

Institute for Mathematics Applied to Geosciences at NCAR
& Climate & Global Dynamics Division

Kelvin waves on the sphere: Two centuries of Laplace's Tidal Equation

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Abstract:

Atmospheric and ocean waves can be modeled by the nonlinear shallow water equations, known in linear form as Laplace's tidal equations. Although only two-dimensional (latitude and longitude), the physics of waves as described by this model is still but imperfectly understood. We describe the history from Laplace himself to the present, concentrating especially on the Kelvin wave. This, the gravest slow mode, is a major driver for the semiannual oscillation in the tropical mesosphere and the quasi-biennial oscillation in the equatorial stratosphere. It plays an important role in the dynamics of the tropical atmosphere. An eastward-propagating Kelvin wave is the engine of El Niño, the sudden warming off the coast of Central America that triggers torrential rains all along the coasts of the Americas, simultaneously with the drought in Australia that the locals call The Great Dry. The speaker's thirty-year quest to understand Kelvin waves will be brought up to date.

Mesa Lab- Main Seminar Room
Thursday, November 16, 2006
2:30pm (Refreshments served at 2:15pm**)**

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