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Well balanced numerical schemes for the equatorial wave guide

Because of the vanishing Coriolis force at the equator. This latter acts as a waveguide for a large spectrum of waves that are trapped in its vicinity and propagate in the zonal (east-west) direction. The so-called equatorially trapped waves are observed to play a key role in the large-scale organization of convection and other storms in the tropics. They include both dispersive and non-dispersive waves, which interact nonlinearly with each other, with the small scale convective processes, and with the planetary-barotropic Rossby waves. This latter mechanism is believed to be key for tropical and extra-tropical energy-exchanges; means by which the midlatitude weather is influenced by tropical climate-variability. In this talk, we shall discuss some simple-idealized models for the tropical climate and waves using state-of-the-art well-balanced numerical techniques to capture some of balanced dynamics (between the Coriolis force and the meridional gradient of pressure) and various nonlinear wave-interactions.