



The Tidal Dynamics and Energy Balance of the Red Sea

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The semidiurnal tides of the Red Sea have been mapped as a classic half-wavelength standing wave. Because of the earth's rotation, the pattern is actually composed of an ingoing Kelvin wave, with maximum amplitude found in the northern eastern side along the Saudi Arabia coastline, and a reflected south-going Kelvin wave along the southern African coastline. The result is tidal rotation around a central amphidrome; this amphidrome, because of energy losses in the reflected wave, is nearer to the African side close to Port Sudan. The movements of this amphidrome can be mapped through a spring-neap tidal cycle to show how the tidal energy is dissipated through the Red Sea. There are suggestions that that Red Sea tides are entirely due to direct internal tidal gravitational astronomical forcing; this is an alternative to the model of energy flux from the Gulf of Aden tides in the Indian Ocean, through the entrance at Bab el Mandeb. These alternative energy sources will be investigated in the project.