

## **WHAT IS THE RELATIONSHIP BETWEEN RIFT PROPAGATION, EUSTASY AND ISOSTASY?**

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There is a close relationship between eustasy and isostasy. Eustasy is controlled by volumetric capacity of oceanic and continental basins. Its measurement is related to the vertical fluctuation of water level related to the center of the Earth. Birth or death of basins depend on isostatic movement of the upper mantle and crust. Wegener started the discussion about the relationship between continental rifting and isostasy. He published the idea about horizontal movement linked with vertical one, using this hypothesis: if the shortness of continental crust implies a rising on vertical height of mountains and their roots penetrate deep, into paramorphic zone (asthenosphere), its viscous fluid escape to both sides, in horizontal movement, and should take away light fragments of crust, creating depressed basin in the back. According to the Plate Tectonic paradigm, orogenic times are related with increase of oceanic basin volumetric capacity. During this times occurs: (a) negative eustasy; (b) decrease of volumetric capacity of continental basins; (c) positive eustasy of continental waters. In times of orogeny deviatoric horizontal stress is created. When it surplus the horizontal compressive tectonic stress, continental stretching, rifting and birth of interior oceanic floor like the Atlantic occur. Maximum subduction of oceanic floor and reduction of volumetric capacity of oceanic basin occur during rifting, simultaneously with positive eustasy, negative continental water eustasy and increase in volumetric capacity of continental basins. It is also a time when the rising of oceanic waters surplus the height of continents. Times of continental stretching are related with global marine transgressive sedimentation over continents. It is time of negative isostasy when the continental mean height is reduced. When positive sea eustasy surplus negative continental isostasy the oceanic water, in catastrophic movement, cover large continental lands like epeiric seas. It happens because the rifting is an abrupt activity of large continental stretching. When the sea waters penetrate in the largest rift basin an instantaneous negative eustasy occurs like those shown by Vail and colleagues in their second and third order eustatic chart. Based on the assumptions above, there are two different times for negative and positive eustasy: the former occurs during orogeny and maximum spreading of interior ocean basins; the latter, during taphrogeny and times of maximum sea floor subduction.