Institut für Geophysik

Geophysikalisches Kolloquium
Sommersemester 2020

Montag, 14. Juni 2021

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Tectonic Reconstructions of Past Sea Level: Dynamic Topography and the Deep Water Cycle

Sea level has changed by 100s of meters during the Phaernozoic, moving vertically relative to the land surface and inundating or exposing vast continental areas in the process. The largest sea level changes (up to ~200 to ~300 m) result from changes to the volume of Earth's mid-ocean ridges, which grow or shrink due to tectonic changes to the length and width of ridges. Such changes can be inferred from tectonic reconstructions of past plate motions, which now extend backward in time through the Cretaceous and earlier. Here I will additionally discuss how we can additionally use tectonic reconstructions to estimate the influence of two other mechanisms for sea level change. First, tectonic reconstructions provide estimates of past rates of subduction and seafloor spreading, which control rates at which water is injected into, or released out of, Earth's deep interior. Any imbalance between these rates results in sea level change, and can be estimated from tectonic reconstructions. Second, we have developed a method for relating past plate motions to broad-scale patterns of mantle flow within Earth's deep interior. From these we can infer patterns of mantle upwelling and downwelling, which dynamically deflect Earth's surface upwards or downwards. Changes to this dynamic topography can cause net changes in the volume of the ocean basins, affecting sea level, but can be inferred from patterns of tectonic plate motions. We find that dynamic topography and the deep water cycle have produced sea level changes of ~50 to ~100 meters since the Cretaceous, thus contributing significantly to the overall sea level budget. This better understanding of these processes will help us to improve our interpretation of sedimentary observations of sea level change, and allow us to infer a hydrological structure for the mantle interior.

Das Kolloquium findet um **16 Uhr c.t.** als Zoom-Videokonferenz statt. Der Link dazu wird auf der Homepage und per eMail rechtzeitig mitgeteilt.
Alle an dem Thema Interessierten sind hierzu herzlich eingeladen.

Die Dozenten des Instituts für Geophysik