

# Relations of the total rate of Global Plate Motions to the frequency of Geomagnetic Polarity Reversals and Sea Level change

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Relative motions of 10 major Plates were calculated in 5myr intervals, based on the total finite rotation along major mid-oceanic ridges, fixing Tristan Hotspot for the last 85myr. The reconstruction gives Hawaii Hotspot trace along Hawaii Islands and Emperor Seamounts.

Global areas of spreading and subduction were calculated, using the 5myr relative motions along the all Plate boundaries. The differences of the areas of spreading and subduction are limited within 5%. The areas represent renewal rate of ocean floor and total rate of global plate motions. The calculated renewal rates of ocean floor are 3.2 km<sup>2</sup>/yr of the maximum for 10-15Ma and 1.4 km<sup>2</sup>/yr of the minimum for 75-85 Ma. The range of the renewal rates is more than factor 2, and the aerial distribution drastically changed. Stage division is proposed based on the aerial distribution and renewal rate of spreading and subduction, into Atlatntic, Inidian and Pacific stages.

Big discussions have been made on Pulse of ocean floor spreading (Larson & Pitman, 1972), which noticed 2.5 times higher spreading rate in the magnetic quiet stage of Late Cretaceous. But the higher rate was disappeared by revision of geomagnetic polarity time scale.

The range of more than twice for the calculated renewal rate of ocean floor asks to revive the big discussions in the constructing stage of Plate Tectonics. We will be able to make more quantitative discussions, based on the renewal rate.

The higher rate of spreading causes increase in the volume of mid-oceanic ridges and higher Sea Level. The Sea Level was 350m higher than Present of the maximum for 85-90Ma and decreased to the Present. The maximal appeared at 10-15 Ma, 38 Ma and 58 Ma, and the minimal at 30 Ma, 48 Ma and 63 Ma (Hallam, 1992 in GTS2004).

Larson & Pitman (1972) estimated that the higher spreading rate accelerated ocean floor subduction and activated plutonism and orogeny. The higher Sea Level increases area of coverage of sea water with large heat capacity, and realized mild climate, which should cause the changes in the faunal and floral facies.

The maximal of the calculated renewal rate of ocean floor appears for 10-15 Ma, 35-40 Ma and 65-70 Ma, and minimal for 25-30 Ma, 40-60 Ma. The Sea Level is correlated with the renewal rate, especially in the last 40 myr.

The frequency of the Geomagnetic polarity reversals is well correlated with the renewal rate. The lowest frequency just after the magnetic quiet stage of Late Cretaceous correlates with the minimum rate of renewal. The highest of frequency at 10 Ma also correlates with the maximum rate of renewal.

Plate motion is cooling mechanism on the view of thermodynamics. Higher renewal rate realizes cooler condition of the Earth Interior. If the higher renewal rate might cause the higher frequency of reversal, the reversal frequency would be increased under the cooler Core-Mantle Boundary.

If the reversal frequency and renewal rate might be the results of common thermal condition of the Earth Interior and Plate motion might be negative feed back mechanism, the higher renewal rate should be induced under the hotter Earth Interior and reversal frequency should increase for the higher temperature of Core-Mantle Boundary.

