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Plate tectonics conserves angular momentum

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Abstract. A new combined understanding of plate tectonics, Earth structure, and the role of impulse in deformation of the Earth's crus presented. Plate accelerations and decelerations have been revea iterative filtering of the quaternion history for the Euler poles that absolute plate motion history for the past 68 million years, and pro unprecedented precision for plate angular rotation variations with 2-million year intervals. Stage poles represent the angular rotatior plate's motion between adjacent Euler poles, and from which the n velocity vector for a plate can be determined. The consistent maxin velocity variations, in turn, yield consistent estimates of plate acce and decelerations. The fact that the Pacific plate was shown to acc and decelerate, implied that conservation of plate tectonic angular momentum must be globally conserved, and that is confirmed by tl results shown here (total angular momentum $\sim 1.4^{+27}$ kg m^2 s^{-1}). Accordingly, if a plate decelerates, other plates must increase thei momentums to compensate. In addition, the azimuth of the maxim velocity vectors yields clues as to why the "bend" in the Emperor-H seamount trend occurred near 46 Myr. This report summarizes pro results for 12 of the 14 major tectonic plates of the Earth (except f Juan de Fuca and Philippine plates).

Plate accelerations support the contention that plate tectonics is a of torques that most likely are sustained by the sinking of positive anomalies revealed by geoid anomalies of the degree 4–10 packet Earth's spherical harmonic coefficients. These linear positive geoid anomalies underlie plate subduction zones and are presumed due phase changes in subducted gabbroic lithosphere at depth in the u lower mantle (above 1200 km depth). The tectonic plates are pulle by the sinking of these positive mass anomalies, rather than movi near constant velocity on the crests of convection cells driven by ri heat. The magnitude of these sinking mass anomalies is inferred a sufficient to overcome basal plate and transform fault frictions. The results imply that spreading centers are primarily passive reactive and fracture zones (and wedge-shaped sites of seafloor spreading adjustment zones that accommodate strains in the lithosphere. Fu the interlocked pattern of the Australian and Pacific plates the pas Million years (with their absolute plate motions near 90° to each o taken as strong evidence that large thermally driven "roller" conve cells previously inferred as the driving mechanism in earlier interpr

of continental drift and plate tectonics, have not been active in the mantle the past 42 Million years, if ever.

This report also presents estimates of the changes in location and magnitude of the Earth's axis of total plate tectonic angular momer the past 62 million years.

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