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Global kinematics in the deep vs shallow hotspot reference frames

M. Cuffaro (1) and C. Doglioni (1)

(1) Department of Earth Sciences, University of Rome La Sapienza, Italy
(marco.cuffaro@uniroma1.it/Fax: +39 06 4454729)

Plume tracks at the Earth's surface probably have various origins such as wet spots, simple rifts and shear heating. Since plate boundaries move relative to one another and relative to the mantle, plumes located on or close to them cannot be considered as reliable for a reference frame. Using only relatively fixed intraplate Pacific hotspots, plate motions in two different absolute reference frames, one fed from below the asthenosphere, and one fed by the asthenosphere itself, provide different kinematic results, stimulating opposite dynamic speculations. Plates move faster relative to the mantle if the source of hotspots is taken to be the middle-upper asthenosphere because hotspot tracks would not then record the entire decoupling occurring in the low velocity zone. A shallow intra-asthenospheric origin for hotspots would raise the Pacific deep-fed velocity from a value of 10 cm yr^{-1} to a faster hypothetical velocity of about 20 cm yr^{-1}. In this setting, the net rotation of the lithosphere relative to the mesosphere would increase from a value of 0.4359 $^{\circ}$ Ma^{-1} (deep-fed hotspots) to 1.4901 $^{\circ}$ Ma^{-1} (shallow-fed hotspots). In this framework, all plates move westward along an undulated sinusoidal stream, and plate rotation poles are largely located in a restricted area at a mean latitude of 58°S. This reference frame seems more consistent with the persistent geological asymmetry that suggests a global tuning of plate motions related to Earth's rotation. Another significant result is that along E- or NE-directed subduction zones, slabs move relative to the mantle in the direction opposed to the subduction, casting doubts on slab pull as the first order driving mechanism of plate dynamics.