



## Microplate motions in the hotspot reference frame

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We computed plate and microplate motions in the hotspot frame, using the PB2002 database. That model gives fifty-two new plate boundaries in digital form, and relative plate and microplate motions are referred to an arbitrary Pacific plate fixed, some coming from the literature, others newly interpreted. Ten of the total relative plate motions, Africa, Antarctica, Arabia, Australia, Cocos, Eurasia, India, Nazca, North America and South America come from the NUVEL-1A, there we obtain the HS3-NUVEL1A results; for the other plates and microplates, we obtain new angular velocities and Euler poles. Moreover, using updated plate boundaries for the Present, we have computed new geometrical factors for plates and microplates, useful for kinematic calculations and to obtain the net-rotation of the lithosphere and plate velocities in the mean-lithosphere reference frame.

Our results show that when we include microplate data, and rank all plates by their areas, this makes evident the groupings by plate size. There is a clear partition of the plates into three groups: large, middle and small. No continuum or gradational distribution of plate size exists. The seven large plates (Pacific, Africa, Antarctica, North America, Eurasia, Australia, South America) comprise 81.0% of the Earth's surface and dominate with 85.3% of the net-rotation velocity computation. Next, the seven middle plates (Somalia, Nazca, India, Sunda, Philippine Sea, Amuria, Arabia) cover 14.0% of the surface area, contributing 9.8% of the velocity computation. The remaining thirty-eight plates account for 4.9% of the total area and 5.2% of the total net-rotation.

The large-sized lithospheric plates cover most of the Earth's surface. Middle-sized plates are equatorially-grouped together, whereas most of the small plates lie on the interfaces of the large plates, suggesting that some might be interpreted as parts of the diffuse margin of the two large plates. Plate angular velocities generally increase with

decreasing plate area reaching the highest values for some of the smallest plates. Additional patterns emerge concerning the absolute motions of the plates based on their groupings by size. The Euler poles for large plates concentrate near a mean latitude of 60°S; the locations of the rotation poles encompass a restricted area, less than 10% of a hemisphere. However, the Euler poles for middle-sized plates are generally more equatorial in distribution, and these scatter more, about 20% of a hemisphere. The rotation poles of the small plates generally show considerable scatter, though curiously pole locations avoid the regions populated by the poles for the large and middle-sized plates.