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Domain structure of the continental lithosphere

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Angular rotation velocity is the main characteristic of the rotational motion of a solid body. In plate tectonics, it is estimated not very accurately and is based on the assumption that every continent is a hard slab carried by asthenospheric circulation. Calculations of the instantaneous angular rotation velocities (ω) of the Eurasian domains based on GPS-networks disprove this concept, help better understand the structural hierarchy of the Earth and interaction between the continental lithosphere and the lower mantle. The central block of the modern rotation of Eurasia seems to be located in the Eastern Himalayas with the approximate coordinates E98˚N31˚±4˚. But Eurasia does not have the main property of a rotating solid body and is actually not a hard plate. Within the continent ω changes several times, increasing in absolute value from the periphery of the continent, (1.2-1.4)$\cdot10^{-16}s^{-1}$ for European stations, to the central domain where it reaches (26-29)$\cdot10^{-16}s^{-1}$. The real values of ω are somewhat smaller because there is a permanent constituent of the E-SE Eurasian drift. Thus, the continent has a complex structure whose domains have a differentiated rotational drift. This conclusion has been drawn from interpretation of a linear velocity field by the Central Asia GPS-network and by recent movements in platform areas of Europe. Based on palaeomagnetic data, similar and new patterns of the wrench tectonics of the continental lithosphere can be recognized in the Earth's history. Interestingly, differential rotations, slow for ancient Europe (Baltia) and fast for Siberia, had existed in Early Silurian time, and after the Late Carboniferous collision and can presently be observed showing that the average values of ω depend primarily on the dimensions and geographic position of continental domains. The central domain of Mesozoic Eurasia was located in the Northern Hemisphere at the temperate latitudes. From the beginning of Triassic time during 160 Ma the average values of ω were $3.0\cdot10^{-16}s^{-1}$ for the West Siberian plate, $2.5\cdot10^{-16}s^{-1}$ for the Altai-Sayan folding

area and $2.0 \cdot 10^{-16} s^{-1}$ for the Urals. As a whole, these velocities were much higher than modern ones. It seems to be connected with a drift of both Eurasia and its central rotation domain toward southern latitudes after consolidation of Eurasia with the Indian plate and with the historical decrease of the mantle ω. Besides, the results of the palaeomagnetic study of Precambrian-Palaeozoic rocks from the ancient domains of Eurasia support the assumption that a change in the rotation of Baltia on intersecting the equator is a general historical pattern of rotational continental drift. This testifies to the active rotation dynamics of continents and can be used to determine the polarity of paleopoles on APWP unambiguously.