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Abstract Title

Horizontal plates movements could be explained by redistribution of geological masses to have diagonal values of inertia tensor

Abstract Text

Plates movements originates from following: lithosphere masses, stratified and available for drift, moves in a direction, which maximize values for main inertia moment and zero values for tangential parts of inertia tensor relatively to current position of rotation axis. That means general trend of masses moving to be running to the equator and distributing homogeneously around it. Modern asymmetrical distribution of the surface masses could imply nontrivial trajectories for masses to come into diagonal condition of inertia tensor. This state could also be accessed by shift of rotation axis position. It is believed that both two mechanisms do exists. The modeling of this process was done in two steps. First approach estimates the axis position, which brings inertia tensor into specified condition. Variation of axis position with 0.1 arc degree step was done calculating of inertia moment for all surface masses for each new axis position. It gives the result of 72.5W 15.6N for the axis position bringing inertia tensor of crust masses to diagonal view. It is approved by known data of polar wander 10 cm/year drift along this value of longitude. Another step makes variation of masses movements for each 1 arc degree cell of surface around circle with 5 degree step and detecting of the direction, which brings the total inertia to the state specified above. This modeling gave the result for movement vectors which generally match to the GPS data for the North and South America, North-Eastern Eurasia, Oceania and Pacific subduction ring. It doesn't match to GPS data at Africa, Europe and Southern Eurasia – the areas located above African Super Plume. It is reasonable for that area to compute later the superposition of movements originated from inertia justifying and Plume spreading. It mean that horizontal tectonic component could be explained without mantle convection – only by superposition of two specified above agents. The ridge axis fabric will have in this case the same geology but resulted from passive compensation of space left after active continental masses drift. The subduction arc areas will also have the same geology but resulted from thrusting of active continents onto passive oceanic lithosphere. This mechanism vitally needs in alteration of rotation axis position in geological time. It is known (Avsyuk, 2001) that

axis position in the Earth body moves significantly and periodically (~200 Ma) due to complicated interaction of Moon, Earth and inner core in liquid core. That means that the target for Earth surface masses movement was permanently changing its position, so the process didn't stop while reaching necessary configuration once in time. This idea is supported by changing of newly born oceans azimuth in time and phase shift of their stages – while latitudinal ocean is closing the longitudinal ocean is opening and visa versa. The investigation will be continued to calculate the movements for significant geological epochs.

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