



Late Neogene changes in North America and Antarctica absolute plate motions inferred from the Mid-Atlantic and Southwest Indian Ridges spreading histories

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Reconstructions of absolute plate motions underpin our understanding of the plate torque balance, but are challenging due to difficulties in inferring well-dated rates and directions of plate movements from hot spot tracks. Useful information about plate dynamics can be inferred from rapid absolute plate motion changes, as these are linked only to the torque(s) that changed. Here we infer late Neogene changes in the absolute motions of North America and possibly Antarctica from changes in the easier-to-determine relative plate motions recorded along the Arctic, northern Mid-Atlantic and Southwest Indian Ridges. We show that Eurasia/North America and Nubia/North America motions changed by the same amount between 8 and 5 Ma, as may have Nubia/Antarctica and Somalia/Antarctica plate motions. By considering additional, independent constraints on Somalia/India plate motion, we argue that a scenario in which North America and Antarctica absolute motions changed is the simplest one that explains the observed changes in relative motions. We speculate that these changes are linked to the late Neogene dynamics of the Pacific plate.