Plate Motions deduced from Trench Geometry

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Forsyth and Uyeda, 1975 measured relative importance of the driving forces of the plate motion, and concluded that the length of trench is the most important factor on the speed of the plate motion among length of ridge, trench and transform fault. Solomon & Sleep, 1974 and Gordon et al., 1978 calculated plate motion directions assuming that only end points of the trench locations are needed to locate the Euler pole of the effective plate rotation.
We show this assumption is not good enough for complicated shapes of the actual trench locations, and present new alternative method of calculation Euler poles of plate motion using actual geometry of the trench locations.

The newly determined Euler poles of the plate motions are largely coincide with other Euler poles such as NNR-NUVEL-1A model or observed GPS determined Euler poles of the plate motions. This indicates that directions of plate motion are also explained by the geometry of trench locations, and slab pull force is the main factor on the plate motion. We also noted that Euler poles of smaller plates have larger misfit with those of GPS and NNR-NUVEL-1A model.
This suggests that other driving forces are prevailing in the case of motions of small plates.