



Seismic Effects on the Secular Drift of the Earth's Rotational Pole

Changyi Xu (1,2) and Benjamin Fong Chao (1)

(1) Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (xuchangyi86@gmail.com), (2) Institute of Earthquake Forecasting, China Earthquake Administration

Earthquake-induced mass redistribution in the Earth excites the polar motion; its cumulative co-seismic effect has been found to cause a secular polar drift (SPD) towards $\sim 140^{\circ}$ Longitude with strong statistical tendency. Here we find numerically the cumulatively co-seismic effect in SPD since 1952 to be at the rate of ~ 0.75 mas/year (or ~ 2.3 cm/year), amounting to nearly 20% of the observed SPD that points to the opposite geographical direction and hence is significant in the pursuit of understanding the source budget of SPD. We further argue on theoretical and observational ground that such behavior reflects that of the overall plate-tectonic motion, and in fact accounts for a fraction of the latter over long term. The exact amount of the fraction is indeterminate until mass-transport models of plate-tectonics prove adequate. This viewpoint is in contrast to that of Cambiotti et al. (2016) which required the co-seismic effect to get annihilated completely by the inter-seismic effect under their earthquake-cycle decomposition of the velocity field at the faulting system.