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Interactive comment on "Earth's rotation variations and earthquakes 2010–2011" *by* L. Ostřihanský

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I agree that tidal stresses are easily detectable by strain meters, gravimeters and tidal recorders. They are tidal stresses of semidiurnal 4 . 103 Pa and of biweekly 8 . 103 Pa (Bodri and Iizuka 1989). Theoretically LOD variations stresses are calculated only 0.1 Pa (Wahr, 1985, Gipson and Ma 1998, Wang et al. 2000). However Wang et al. (2000) further claims that observed LOD – correlated stress is of the order 104 – 105 Pa. Tidal stresses create only tidal wave moving over the Earth whereas LOD variations shake with the whole Earth body and the lithospheric plates exert torques in values proportional to the size of the plate. For example, considering stress 0.1 Pa, the continental plate thickness of 300 km and length 10 000 km situated on equator exerts variable torque $\approx$2 . 1020 N m. Both earthquakes Sumatra 2004 and 1985 in

the time span 19 years of Meton's cycle were triggered exactly in maximum Moon's declination and close to winter solstice when also the Sun's declination is high and in the full Moon when Sun, Earth and Moon were in line. Calculating effect of precession (Stacey, 1977; Brož et al. 2011) we receive that the Sun exerts torque Ms = 5.7 . 1021 N m and the Moon Mm = 1.2 . 1022 N m. Summation gives M = Ms + Mm = 1.8 . 1022 N m. From this is evident that external torques rectify the Earth's flattening to the plane of Moon's orbit and ecliptic and also move with the plates. Other important torque the tidal friction causes torque Ns = 8.9 . 1015 N m and Mm = 4.2 . 1016 N m. M = Ms + Mm = 5.09 N m (Burša 1987). Explanation offers consideration of other forces acting among plates, ridge push and slab pull (Forsyth and Uyeda 1975), i.e. hydrostatic pressure in mid-ocean ridges periodically opened by LOD variations and the fall by gravity of subducted plates.

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