



Upward liquid migration as underlying process in earthquake precursor's origin

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There is general consensus that majority of earthquake precursors, both seismic and electromagnetic, are connected with water/gas migration in the lithosphere and its release at the ground surface. Reason for such a migration is not clear since discovery that essential stress accumulation and dilatancy is absent in the presesimic period. We suggest the migration begins from the Earth interior in the depth at least 600-700 km. Mogi [1,2] have assumed some connection between several pairs of the large deep and crustal earthquakes (EQs) with time delay 2-15 years but he could not say neither on mechanism of the connection nor its reliability. We analyze EQ depth-time distribution in the nine subduction zones of Pacific region using USGS catalog in the period from 1973 to 2008 and in the five depth layers since 670 km to the crust. Total number of EQs used in each zone is more 5000 and time sampling of EQ energy release is 0.5 year. Method of computation was published recently [3]. We have found definite and statistically proved migration of EQ hypocenters with averaged velocity 70-130 km/year in the 5 zones: Kurile-Kamchatka, Japan, Chile, Bougainville and Tonga North, while the migration in other 4 zones: Mariana, Philippine, Sunda and Tonga South is not evident and do not pass the test on statistical reliability. We believe the migration is initiated by stress-deformation wave in the asthenosphere but it is amplified by heat flux in the lithosphere which transported by hot gas/water quasi-bubble ensemble. Evidence of such a heat flux influence on the climate in the Pacific area was recently published.

[1]Mogi K.: Relationship between shallow and deep seismicity in the western Pacific region, *Tectonophys.*, 17,1-22, 1973.

[2] Mogi K., Deep seismic activities preceding the three large "shallow" earthquakes, *Earth Planets Space*, 56, 353-357, 2004.

[3] O.A. Mochanov and S. Uyeda, Upward migration of earthquake hypocenters in Japan, Kurile-Kamchatka and Sunda subduction zones, *Physics and Chemistry*, 34, 423-430, 2009.

[4] O. Mochanov, About Climate-Seismicity coupling from correlation analysis, *NHESS*, (in press), 2010.