Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PPS03-05 会場:A03 時間:5 月 28 日 15:15-15:30

Nature of contrasting changes in sea level in the northern and southern hemispheres of the Earth

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S/N oceanic secular tide. South-north a ocean secular tide in the present epoch has been found in 2007 and was analytically described the quasi-static approximation by the author (Barkin, 2011). This tide of a different nature compared with the lunar-solar tides. It is caused by the gravitational attraction of Earth's core shifting to the north.

Displacement of the core (and as consequence of the center of mass of the Earth) relative to its mantle generates a slow tide of oceanic and atmospheric masses from the southern hemisphere to the northern (Barkin, 2011). Similar phenomena are also observed on Mars, Titan and other bodies of the solar system. Along with the fundamental core of the tide, we studied other phenomena that determine the secular changes in sea level. Deformation changes the Earth's surface that are installed on the GPS satellite observations. The role of the asymmetric arrangement of the continents in relation to the northern and southern hemisphere. The modern thermal factors of the ocean volume and its thermal expansion. All these factors, taken together, made it possible to explain the observed increase in global average sea level. The result revealed contrasting changes its average levels in the northern and southern hemispheres. In the northern hemisphere the average sea level increases at a rate of about 2.45 ± 0.32 mm / year, and in the southern hemisphere, the average sea level rises with a much lower average rate of 0.67 ± 0.30 mm / yr (Barkin, 2011). I.e. the contrast change NS levels of ocean is 1.78 mm / year.

Confirmation of S/N tide. Revealed asymmetric ocean tide towards south-north also has obtained a clear confirmation in modern observations on the coastal tidal stations in the past 30 years (Evreeva et al., 2007). The theoretical value of the rate of rise of the global sea level was 1.61 ± 0.36 mm / yr (Barkin, 2011). This value agrees well with the modern determinations of its characteristic obtained from the coastal tidal observations at stations including taking into account the vertical geodetic displacements of coastal tide stations. In a recent paper Woppelman et al. (2014), this effect was more evidence. Contrast rates of change mean sea level over the past 100 years was approximately 0.9 mm / year. The authors used data from tide gauges and GPS data to identify the vertical displacements of coastal stations themselves. As a result, by strict selection criteria have been studied in detail data on 76 stations. Estimates of the average velocity change in sea level have been obtained for the entire 20th century. For the northern and southern hemispheres, they amounted to (2.0 ± 0.2) mm / year and (1.1 ± 0.2) mm / year (Woppelmann et al., 2014). In my work in 2007 were received related values (2.45 ± 0.30) mm / year and (0.67 ± 0.30) mm / yr (Barkin, 2011). This match could be more expressive if the studies undertaken to take into account data on some tidal stations located at higher latitudes 60 - 90o in the southern and northern hemisphere. In the paper (Barkin, 2011) we have considered a shorter time interval of about 30 years, at which the contrast of mean sea levels in S/N hemispheres is represented by more expressive. We also note that according to our research post glassial rebound effects and the effects of vertical displacement observation stations (in average sense) do not provide a significant contribution to the parameters studied changes in sea level (Shen et al., 2015). Studies of South - northern secular tide require additional intensive research. The work was accepted by grant of RFBR N 15-05-07590 A.

キーワード: sea level increase, Southern-northern secular ocean tide, moving core
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