Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PPS03-P04 会場:コンベンションホール 時間:5 月 20 日 18:15-19:30

Luni-Solar Tides in the Earth Atmosphere
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The gravitational tides in the atmosphere are recorded as the waves with the periods close to one day and its subharmonics. Some of them are usually interpreted as the proper atmospheric modes. They commonly have either the amplitude or the frequency modulations. A new explanation of the quasy-diurnal and quasy-semidiurnal tides lines in the spectrum of the atmospheric angular momentum (AAM) and other atmospheric characteristics is proposed. The role of gravity tides in the dynamics of the atmosphere and the ocean is underestimated. The reasons of a wrong estimation of a role of the tidal phenomena in geophysics are explained.

We have calculated the power spectrum of the complex series h1+ih2. The resulting spectrum has been analysed. . The most striking detail of the spectrum of h1 + ih2 is a blurred maximum of the spectral density at ?0.85 cpd. Its height is indicative of a high power of h1 and h2, and the width shows considerable ?uctuations of the period. What lies behind this phenomenon and why does the atmospheric circulation produce strong noise in this frequency range? Due to our discovery, it becomes clear why the role of gravity tides in the dynamics of the atmosphere and the ocean is underestimated. The fact is that all hydrometeorological and hydrophysical characteristics are measured at moments of mean solar time, which is the hour angle of the Sun determined by the Earth diurnal rotation and annual revolution. That is, by default, a frame of reference tied to the Sun (referred to hereafter as the solar frame) is used in this case. In this frame, the apparent velocity of a tidal wave is the sum of its proper velocity and the translational velocity. The latter arises due to the Earth diurnal rotation and the Earth annual revolution around the Sun. Its magnitude is very high compared with the proper velocities of tidal waves Therefore, in the solar frame we deal only with quasi-diurnal tidal waves and their subharmonics. In the spectral (or Fourier) analysis of observations, the low-frequency waves of gravity tides are di?cult to distinguish from the harmonics of diurnal or annual thermal tides and are nearly imperceptible for study. Hydrometeorologists construct synoptic maps or time-coordinate sections with a ?xed geographical grid of parallels and meridians. That is, by default they use a frame of reference tied not to the Sun, but rather to the stationary Earth surface. In this frame, the Earth diurnal rotation and orbital revolution are eliminated, while the proper motion of tidal waves is only present. Hydrometeorologists give attention only to fast quasi-diurnal tidal waves predicted by the theory. The proper motion of tidal waves remains unnoticed. All slow waves moving over the Earth surface, including tidal waves, are interpreted as usual atmospheric or oceanic waves. To detect low-frequency tidal waves in spectral analysis, we have to eliminate the e?ects of the Earth rotation and revolution demodulate measured time series. For this purpose, it is su?cient to ?x the time of measurements (one measurementa day to eliminate the Earth diurnal rotation or one measurement a year to eliminate the Earth annual revolution). As a result, weekly and semimonthly lunar tidal waves were detected in the spectrum of the atmospheric angular momentum. This method opens up new opportunities for studying the e?ects of lunisolar tides and functions of the Sun barycentric motion.

キーワード: Luni-solar gravitational, The gravitational tides
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