

Radio occultation methods for monitoring atmosphere and ionosphere of the earth

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The remote sensing satellite radio occultation method elaborated for monitoring of the earth's atmosphere and ionosphere with a global coverage is described. Comparison of theoretical results with experimental observations of radio wave propagation effects in the earth's atmosphere and ionosphere in the communication links satellite-to-satellite is provided. Directions in application of the radio occultation method are discussed: measuring vertical gradients of the refractivity in the atmosphere and electron density in the lower ionosphere, determination of the temperature regime in the stratosphere and troposphere, investigation of the internal wave activity in the atmosphere, and study of the ionospheric disturbances on a global scale. The radio occultation technique may be applied for investigating the relationships between processes in the atmosphere and mesosphere, study of thermal regimes in the intermediate heights of the upper stratosphere-lower mesosphere, and for analysis of influence of space weather phenomena on the lower ionosphere. Radio-holographic methods are considered as a tool for determination of the altitude profiles of temperature, pressure, refractivity, internal wave activity in the atmosphere, and electron density in the ionosphere with usage of the radio links satellite-to-satellite. Results of radio occultation measurements of the atmospheric and ionospheric parameters are described. Comparative analysis of effectiveness of the radio occultation and other remote sensing methods is conducted.