

The influence of meteorological processes on propagation of radio waves in South Caucasus territory

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South Caucasus is complicated region in terms of physical-geographical point of view. Therefore it is important that influence of meteorological-climatic conditions on propagation of ultra short radio waves is studied, because such circumstances are irregular and cause unforeseen changes in propagation of radio waves.

Meteorological parameters (P,T,e), orographical conditions and character of spreading surface render influence on refraction index (N) change. Ground air layers with different dielectrical permeability values are formed, which causes change of refraction parameter.

The aim of the study is to detect changes in refraction index in consideration of meteorological factors in South Caucasus region. According to the data from many years of observations of meteorological stations (P,T,e), refraction index is calculated and Radio Climatic maps are created: 1. According to average data from many years of research; 2. During the synoptical process (influence of cold air masses from the West). G gradient of refraction index is calculated and terms of radio wave refraction is determined.

Analysis of the study shows that according to average data obtained from many years of research, range of refraction index meaning is 300÷350 unit, and during the synoptical process it is 307÷325 unit. During the process minimal meanings of refraction coefficient was only slightly changed, but maximal meanings changed considerably. These factors cause unforeseen changes of refraction index gradient that creates different refraction conditions which considerably changes character of the connection.

According to the study it is determined that:

- Maximal meanings of refraction index are detected in the coastal zone of Black and Caspian seas (where elasticity of water vapor is maximum) and minimal meanings are detected in mountain regions (where there is no mountain glaciers)
- Difficult physical-geographical and meteorological characteristics of the region cause changes in refraction index conditions. Gradient of refraction index (gN) changes accordingly $gN = -16.0 \div +12.8$ unit/100m (positive, negative, over refraction that cause changes in conditions of radio transitions).
- Synoptical process effects the profile of refraction coefficient, therefore (gN) changes in range of $gN = -9.3 \div +8.7$ unit/100m, that changes refraction conditions.

With the help of refraction index gradient, radio wave transmission conditions are determined in south Caucasus region.

Meanings of refraction index tend to change considerably with the influence of orographic and meteorological processes that cause creation of separate micro zones with different refraction index values.