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# THE INFLUENCE OF LOWER ATMOSPHERE DYNAMICS ON THE MID-LATITUDE SPORADIC E-LAYER

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## ABSTRACT.

The relationship between the occurrence of intense sporadic-E layers and features of tropospheric weather has been investigated. It has been found that, as certain features of the tropospheric pressure field (as identified from meteorological charts) develop over specific geographic regions, the probability of intense sporadic-E layers increases. Investigating the 500 mb chart has shown that the probability of occurrence of intense sporadic-E layers increases in response to distortion of patterns of zonal westerly flows.
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## INTRODUCTION.

The absence of a direct dependence of frequency parameters of sporadic-E on solar activity suggests that the significant diurnal and seasonal variations of these parameters may be explained by the effects of various meteorological processes and phenomena. For example, we might consider the effects of planetary and upward-propagating gravity waves excited, for example, in the strato-troposphere (Kazimirovsky and Kokourov, 1995). These upward-propagating waves may generate wind shears in the region of sporadic-E formation. Hence the sporadic-E probability should be associated with the amplitude and frequency of occurrence of these waves. Their generation will depend itself on a synoptic conditions in the lower atmosphere (Holton, 1975). The influence of synoptic tropospheric conditions on the occurrence probability of intense sporadic-E has therefore been investigated. It has been found that when specific synoptic features occur over a certain regions, there is an increase of occurrence of intense sporadic-E layers.

## RELATIONSHIP BETWEEN BARIC SYSTEMS IN LOWER TROPOSPHERE AND MID-LATITUDE SPORADIC-E.

To determine days with the most durable and intense sporadic-E layers, the parameter ⟨δfoEs⟩ was analyzed. This parameter equals a daily mean, over one month, of the difference between hourly values of the sporadic-E layer limiting frequency foEs, and hourly medians of the E-layer critical frequency foEme. A parameter, such as intensity, will characterize the daily mean of excess of sporadic electron density over the background E-region. The values of ⟨δfoEs⟩ were calculated from a four-year data-base of observations (1986-1989) by the ionosonde in Gorki (56°N, 44°E).

A study of the effect of the atmospheric pressure at ground level on sporadic-E has shown that in non-summer months (mainly, in winter) very low and high values of pressure often accompany the occurrence of intense (in respect to a winter scale) sporadic-E. This increase of sporadic-E intensity appears to be more associated with rapid changes of surface pressure, than with low and high pressure values. The