

Changes in chemical composition and electron density over day and night polar regions during SPE of July 2000

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Simulations of the response of the neutral and ionized composition in the middle atmosphere (D-region for ions) to the July 14, 2000 solar proton event (SPE) are used to find its spatial and temporal structure near both polar regions. It was important for such study to take into account a natural difference between Northern pole (day conditions) and Southern pole (night conditions) – incoming solar electromagnetic radiation. Two 1D photochemical models /1,2/ (for neutral and ionized species) connected via ionization rates caused by solar protons, and via neutral component variability, are used for the study. The results of computations showed that ozone over Northern pole was strongly reduced after SPE due to the increased amount of NO and OH compounds caused by increased ionization of the atmosphere by solar energetic particles. At the same time, a weak effect in ozone was found over Southern polar region. It was found also that the electron density over N.P. was more increased in comparison with S.P. The response of other ionized species has been calculated also.

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