RIsE OF IONS CREATED BY A SOURCE IN DRY AIR INto THE TROPOSHERE UNDER the INFLUENCE OF THE EARTH ELECTRIC FIELD

V.L. Bychkov, D.S. Maximov, \*N.P. Savenkova, and \*A.V. Shobukhov

Moscow Radiotechnical Institute RAS, Warsawskoe Shosses, 132, 117519 Moscow, Russia,
 bychvl@gmauil.com
\*Faculty of CS and Cybernetics, M.V. Lomonosov MSU, Leninskye gory, 119991 Moscow,
 Russia, cmc@cs.msu.ru

This paper deals with one-dimensional mathematical model simulating the ascending of ions O-, O2-, O3-, N2+, N4+, O2+, O4+ and electrons from the ground based emitter to the two kilometer height. This model takes into account diffusion, drift and plasma chemical processes.

We solved a system of nine equations: the Poisson equation for electric field and eight transport equations. Here one can see the general view of transport, which is common for all considered ion types and electrons:

 

 

Where N is ion concentration, D is diffusion coefficient, b is migration, member αN represent the plasmochemical reactions. Atmosphere electricity consists of two parts: Eatm – Earth’s natural electric field with a fine weather and  - ions input.

Our calculations gives us ions distribution versus height (see Fig. 1) and electric field distribution versus height (see Fig. 2). Basing on this results we will make conclusions about different processes’ influence on ion transporting.



Fig. 1 а Electric field distribution over altitude Fig.1b О3- concentrationdistribution

over altitude

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