

Development of virtual auroral system

Yusuke Ebihara[1]; Takeshi Murata[2]; Akira Kadokura[3]; Natsuo Sato[3]; Makoto Taguchi[3]; Masaki Okada[3]; Asanobu Kitamoto[4]; Genta Ueno[5]; Shigeru Fujita[6]; Takashi Tanaka[7]

[1] Nagoua Univ., IAR; [2] CITE, Ehime University; [3] NIPR; [4] NII; [5] ISM; [6] Meteorological College; [7] Kyushu University

For the purpose of understanding the large-scale structure of auroras, we have developed a virtual auroral system that enables us to visualize the magnetospheric topology associated with the formation of the auroras in an advanced and sophisticated manner. A global magnetohydrodynamics (MHD) simulation provides the topology of the magnetosphere where Earth's magnetic field governs, depending on the solar wind and interplanetary magnetic fields. At the initial stage of the development of the virtual auroral system, a large-scale structure of auroras is displayed where the plasma pressure is high enough (as a proxy of diffuse auroras) and/or the intensity of upward field-aligned current exceeds predetermined threshold (as a proxy of discrete auroras). Manipulating the system, a user is allowed to discover the physical relationship between the magnetospheric topology and the auroras without modifying existing software. In addition, the system is expected to help scientists understand the auroras observed in the Antarctic and Arctic regions, and provide the public with accurate knowledge related to the formation of the auroras.