Throat aurora and the important implications on solar-wind/magnetosphere coupling

*Han Desheng[1]

1. Polar Research Institute of China

Observational properties of throat aurora are investigated in detail by using 7-year continuous auroral observations obtained at Yellow River Station (magnetic latitude 76.24˚N). From our inspection, throat aurora is often observed under the condition of stripy diffuse aurora contacting with the persistent discrete auroral oval, and the long-period throat aurora observations generally consist of intermittent subsequences of throat aurora brightening followed by poleward moving auroral form (PMAF) and throat aurora dimming. We also noticed that the orientation of throat aurora is aligned along the ionospheric convection flow and its local time distribution shows clear dependence on the interplanetary magnetic field (IMF) *By* component. These observational results indicate that factors inside the magnetosphere may play important role on occurrence of throat aurora. We thus suggest that throat aurora may present the ionospheric signature of redistribution of reconnection rate on the magnetopause by cold magnetospheric plasma flowing into the reconnection site. In addition, we also found that the occurrence rate of throat aurora clearly decreases with increase of the IMF cone angle (arccos(|*Bx*|/*B*)), which is very similar with the occurrence rate of high-speed jet (HSJ) observed in magnetosheath depending on the IMF cone angle. This is suggested as that the HSJs occurred outside the magnetosphere may also play important role for generation of throat aurora by triggering magnetopause reconnection or by direct impacting. Although further studies are needed to clarify how the throat auroras are generated in detail, the relevant observations about throat aurora have presented important implications on a variety open questions, such as, distribution and generation of cold plasma structures in the outer magnetosphere, magnetopause deformation, and possible relation between HSJ and reconnection.

Keywords: throat aurora, convection, ionospheric outflow, cold plasma, magnetic reconnection