

An alternative explanation for the Ultra-Slow Tail of sprite-associated lightning flashes

Sergei L. Shalimov, (shalimov@ifz.ru)
Institute of Physics of the Earth, Moscow, Russia

Tilmann Bösinger,
University of Oulu, Finland

Stimulated by experimental direct and indirect evidence of highly ionized plasma columns overhead of sprite associated lightning discharges in the upper mesosphere, respectively lower ionosphere, a model is constructed by which secondary ULF transients in the magnetic field are explained in terms of magnetic signatures caused by induced currents flowing in the short lived, highly ionized plasma columns. These signatures exhibit a quasi-periodic evaluation in time and exhibit time scales comparable with those reported for distant ULF transients connected with sprite associated lightning discharges. In particular the model allows an alternative explanation for the so called ultra-slow tail which was taken as an indication for the excitation of the ionospheric Alfvén resonator overhead of the sprite, an option for which some theoretical support exists in the literature. Virtues and draw backs of both models are discussed.