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Evaluating the influence of lightning generated whistlers on the overall VLF wave intensity detected by a low-altitude spacecraft

Jan Zhlava (1), Frantisek Nemec (1), Ondrej Santolik (2,1), Ivana Kolmasova (2,1), and Michel Parrot (3)

(1) Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic (jan.zhlava@centrum.cz), (2) Institute of Atmospheric Physics, Czech Academy of Sciences, Prague, Czech Republic, (3) LPC2E/CNRS, Orléans, France

The influence of lightning generated whistlers on the overall very low frequency (VLF) wave intensity in the Earth's inner magnetosphere is still a subject of discussion. We combine lightning location data and VLF wave intensity measured by a low altitude spacecraft to identify frequency-location intervals where this influence is significant. The World Wide Lightning Location Network (WWLLN) provides a unique data set of times and locations of lightning strokes all around the world. When combined with the wave measurements performed by the DEMETER spacecraft (Sun-synchronous polar orbit, altitude of about 700 km), it allows us to calculate average/median power spectral densities of electric field fluctuations in the frequency range up to 20 kHz distinguished according to the lightning activity level. A comparison of the dependencies obtained for low and high lightning activity levels is then used to determine the influence of lightning generated whistlers. The obtained results are discussed in the frame of a possible relation to the plasmaspheric hiss generation.