



Automated Q-burst finding and identification of the source lightning strokes using ELF-band records from Nagycenk, Hungary and WWLLN data

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Q-bursts are transient pulses in records of extremely low frequency (ELF, 3 Hz-3 kHz) band radio noise. Q-bursts are produced by exceptionally powerful lightning strokes and can be detected globally due to the low dissipation rate of energy of ELF-band signals propagating in the Earth-ionosphere waveguide [1]. Q-bursts from globally distributed lightning strokes were investigated in the ELF-band time series recorded by the Schumann resonance monitoring system in the Széchenyi István Geophysical Observatory (NCK, 47°38' N, 16°43' E) near Nagycenk, Hungary [2].

Automatic finding of Q-bursts was implemented utilizing excursions in the time series of the Poynting vector upon passages of the transient signals over the monitoring site. Horizontal components of the Poynting vector are calculated from the vertical electric and two horizontal magnetic components of the atmospheric electromagnetic field recorded at NCK. Direction of the source is derived from the direction of the excursion of the Poynting vector. The source lightning stroke of a Q-burst is identified in the lightning database of the World Wide Lightning Location Network (WWLLN) by the matching detection time and direction calculated for NCK station.

Statistics of Q-burst and source lightning stroke pairs found in selected periods from recent years are presented in this contribution to demonstrate the performance of the applied procedure.

[1] Nickolaenko et al., 2010, *Surv. Geophys.*, doi:10.1007/s10712-010-9096-9

[2] Bór et al., 2016, *J. Geophys. Res. Atmos.*, doi:10.1002/2015JD024712