



## **Auroral Hiss Observations during Substorm Growth Phase on the Ground at L=5.5 in Northern Europe**

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Auroral hiss is a well-known type of nighttime natural VLF emission with a noise-like structure generated by the Cherenkov instability of precipitating soft electrons above the ionosphere. Auroral hiss occurrence up to 39 kHz was studied in the equatorward region of the auroral oval at the Finnish station Kannuslehto (KAN, MLAT = 64.2°N) during 11 winter months in 2015–2018. During this time interval, 98 isolated and rather powerful magnetic substorms were recorded over Scandinavia. In 93% of the substorms studied, an auroral VLF hiss was recorded at the same time as enhancement of field-aligned currents (FACs). FACs are caused by soft electron precipitation which could be a plausible source of the auroral VLF hiss generation. For the first time, it was found that auroral VLF hiss occurrence in the equatorward region of the auroral oval is a typical signature of the substorm growth phase [1].

Also a few examples of simultaneous auroral hiss observations at Lovozero, Russia (LOZ, MLAT = 64.2°N) will be shown. Simultaneous observations can be used for direction finding of auroral hiss events [2].

### **References**

- [1] Manninen, J., Kleimenova, N., Kozlovsky, A., Fedorenko, Y., Gromova, L., & Turunen, T. (2020). Ground-based auroral hiss recorded in Northern Finland with reference to magnetic substorms. *Geophysical Research Letters*, 47, e2019GL086285. <https://doi.org/10.1029/2019GL086285>
- [2] Lebed O.M., Yu.V. Fedorenko, N.G. Kleimenova, J. Manninen, and A.S. Nikitenko (2019). Modeling of auroral hiss propagation from the source region to the ground. *Geomagn. Aeron.*, 59, no 5, 577-586, <https://doi.org/10.1134/S0016793219050074>