

KHF-VLF Emissions – What are they?

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For the very first time, a strange spectral world of differently structured high-frequency waves has been opened up after filtering out the sferics above f = 4 kHz. To the best of our knowledge, such signals have not been reported before Manninen et al. (2016) [1]. On a 1-hour spectrogram, these signals often resemble 'sticks' or 'wands'. Actually, they are mostly hiss bursts with durations of a few seconds. These high frequency VLF emissions were previously known as recently revealed emissions, but from now on we will use new term: KHF-VLF (Kannuslehto High-Frequency VLF).

These KHF-VLFs are not rare since from 2006 to 2015, they were observed during 60-90 % of all campaign days. KHF-VLFs were also often detected during the winter campaigns in 2016-2019. It seems that during the years when solar activity was high (2013-2015) we observed KHF-VLFs very regularly: in winter 2014-2015 they were observed on 52 days out of 59, and in winter 2015-2016 on 75 days out of 91. However, to date there are no statistical studies on the occurrence and properties of these waves.

In this presentation, we will show our observations of KHF-VLF emissions during different years.



Figure 1. Two examples of KHF-VLF events. Non-typical emissions (KHF-VLF) are seen above 6 kHz.

References

 J. Manninen, T. Turunen, N. Kleimenova, M. Rycroft, L. Gromova, and I. Sirviö (2016). Unusually high frequency natural VLF radio emissions observed during daytime in Northern Finland, Environ. Res. Lett., 11, 124006, https://doi.org/10.1088/1748-9326/11/12/124006.