SUPPLEMENTARY MATERIAL

to the manuscript

Preliminary catalogue of natural and anthropogenic VLF radio spectral patterns

Michal HOFFMAN

Preliminary catalogue of patterns

Legend to the below figures:

Kp – planetary index of the intensity of geomagnetic changes (Kp1 – Kp9, Kp5 = G1),
G – class of magnetic storms (G1 – G5),
B – intensity (class) of solar flares (A, B, C, M, X, X10).

That the mentioned X-ray flare may have appeared only after the studied period (though on the same day), having thus no effect on the spectrum. Hydrometeorological data were provided by the Slovak Hydrometeorological Institute (SHMÚ). The given precipitations characterize the overall day. Geomagnetic and solar data are from `https://www.spaceweatherlive.com/`. The nomenclature of radio emissions was used in the description from *Helliwell (1965)*.

Time in the spectrogram is CEST, for easier signal identification and signal detection. Time given in the table in the lower left corner is UTC obtained through the NTRIP connection.

Spectral patterns of anthropogenic emissions from the vicinity of the "Kamenica" landslide

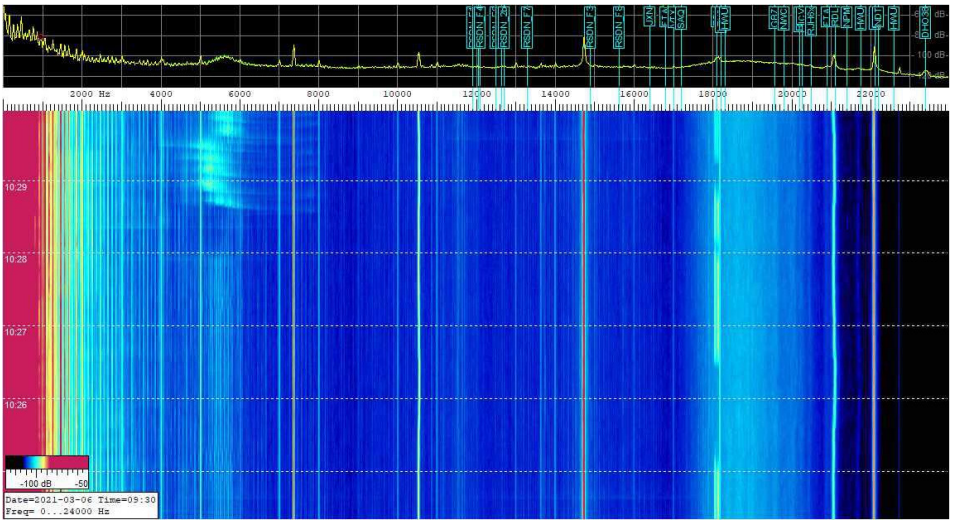

Fig. A1. Assigned source: engine. Recorded 6.3.2021, 9:30 UTC, range: 4–8 kHz, Kp4, B1.5, t = 14 °C, precipitation: 0 mm.

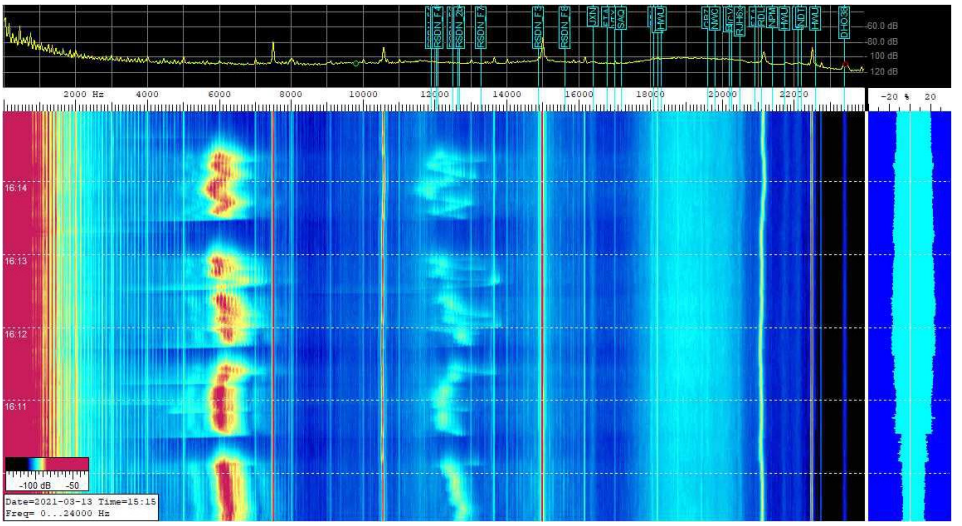

Fig. A2. Assigned source: motor, grinder, circular saw. Recorded 13.3.2021, 15:15 UTC, range: 4–8 kHz and 11–14 kHz, Kp4, t = 12 °C, precipitation: 0 mm.

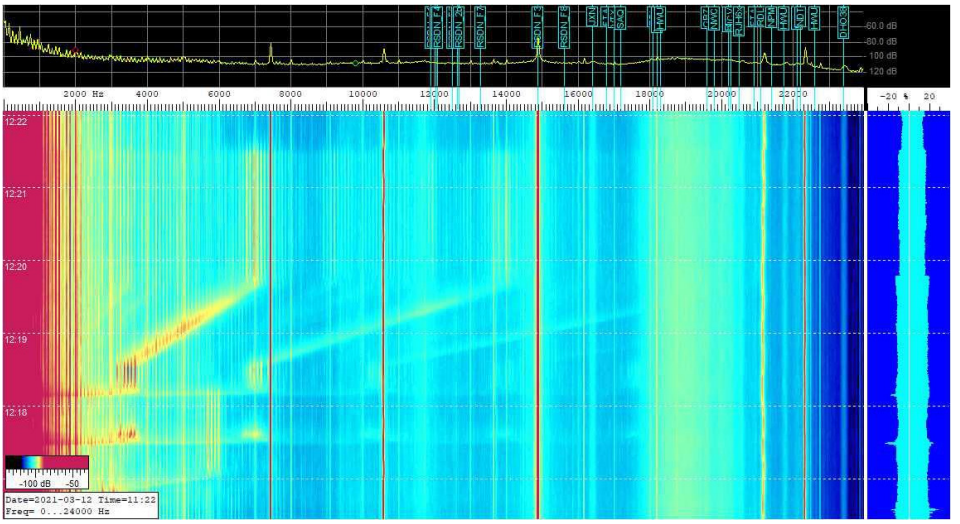

Fig. A3. Assigned source: pump motor. Recorded 12.3.2021, 11:22 UTC, range: entire spectrum, Kp3, B2.6, t = 10 °C, precipitation: 0.5 mm.

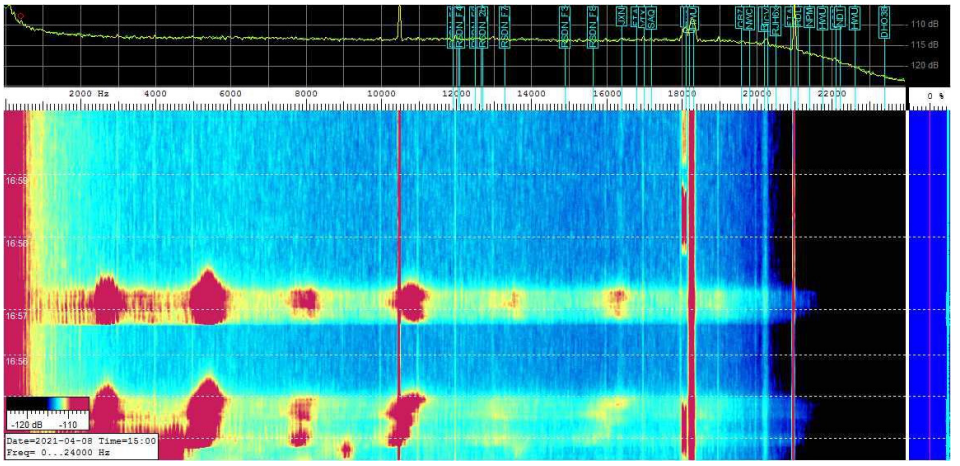

Fig. A4. Assigned source: electric saw. Recorded 8.4.2021, 15:00 UTC, range: entire spectrum, Kp2, t = 8 °C, precipitation: 2 mm.

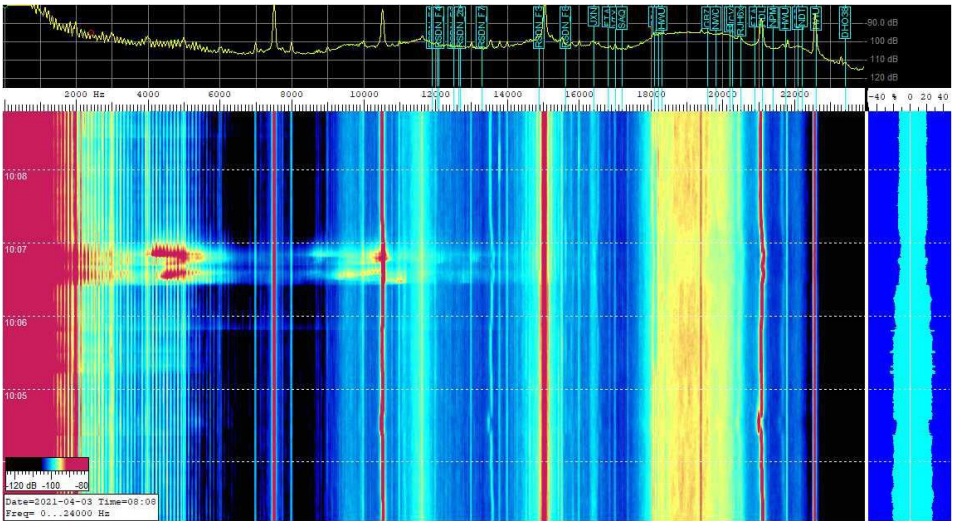

Fig. A5. Assigned source: electric mower, circular saw. Recorded 3.4.2021, 8:06 UTC, range: entire spectrum, Kp2, t = 15 °C, precipitation: 1 mm.

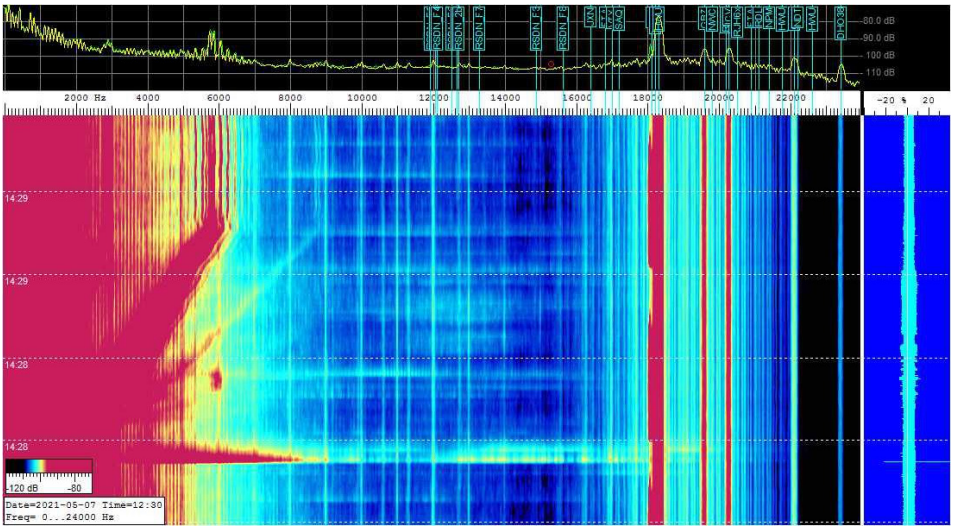

Fig. A6. Assigned source: pump motor. Recorded 7.5.2021, 12:30 UTC, range: DC – 10 kHz, Kp1, M3.9, t = 10.2 °C, precipitation: 0.47 mm.

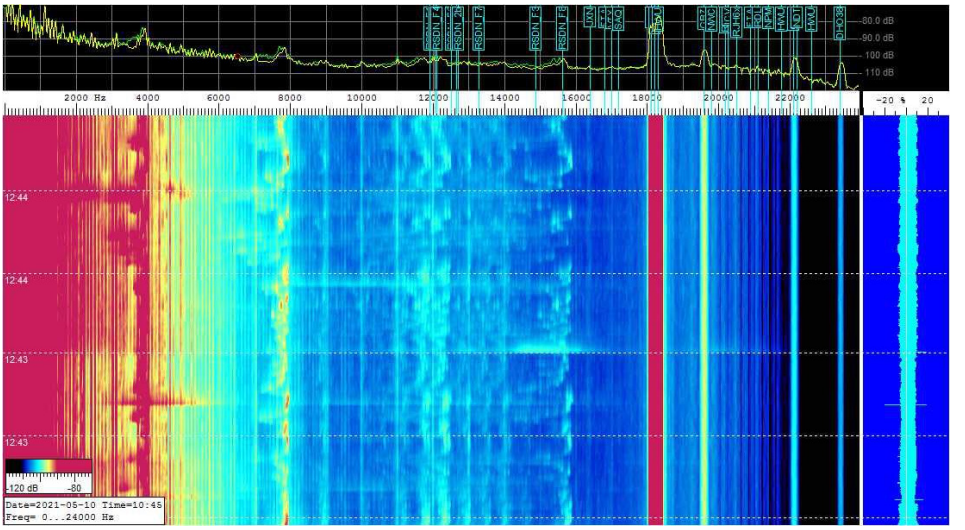

Fig. A7. Assigned source: engine, electric mower. Recorded 10.5.2021, 10:45 UTC, range: entire spectrum, Kp2, B1.9, t = 25 °C, precipitation: 0 mm.

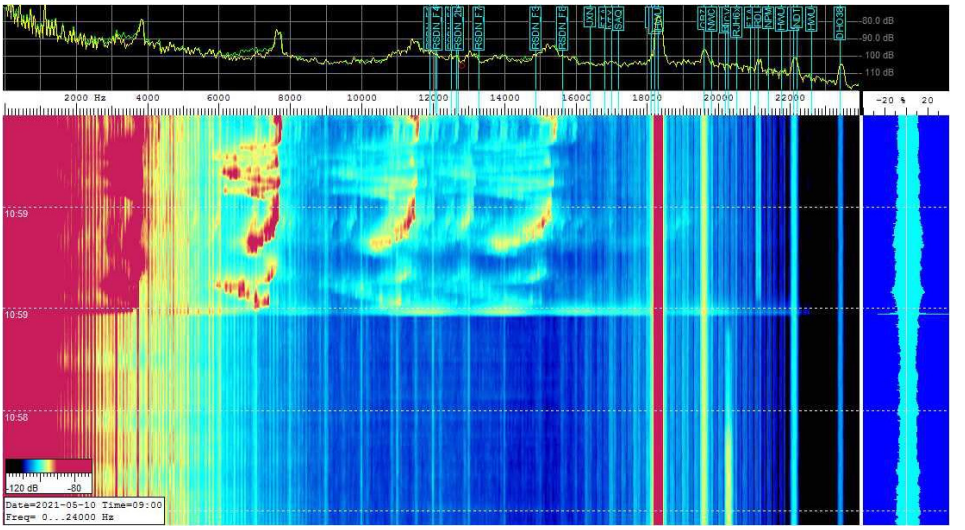

Fig. A8. Assigned source: engine, starting electric mower. Recorded 10.5.2021, 9:00 UTC, range: entire spectrum, Kp2, B1.9, t = 25 °C, precipitation: 0 mm.

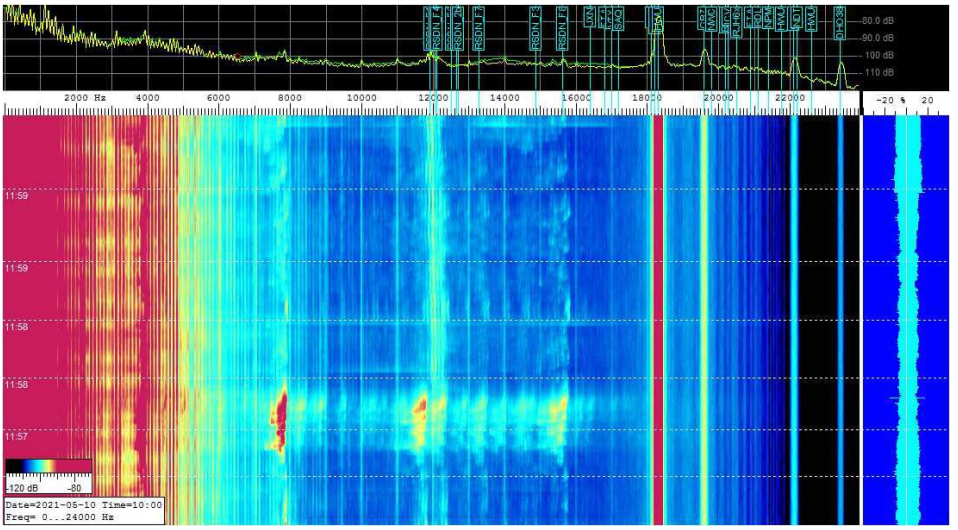

Fig. A9. Assigned source: engine, far away moving electric mower. Recorded 10.5.2021, 10:00 UTC, range: entire spectrum, Kp2, B1.9, t = 25 °C, precipitation: 0 mm.

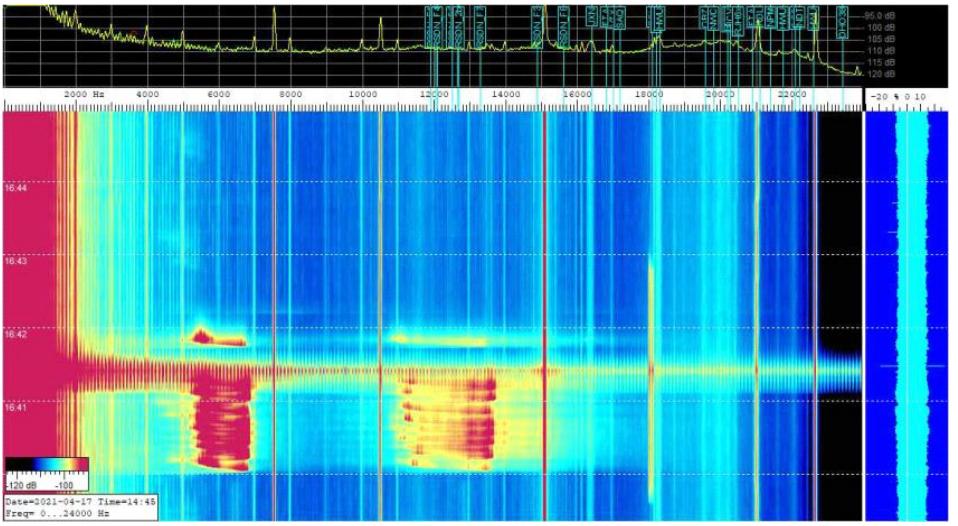

Fig. A10. Assigned source: motor, electric sander, carbon sander. Recorded 17.4.2021, 14:45 UTC, range: entire spectrum, G1, B9.6, t = 16 °C, precipitation: 0 mm.

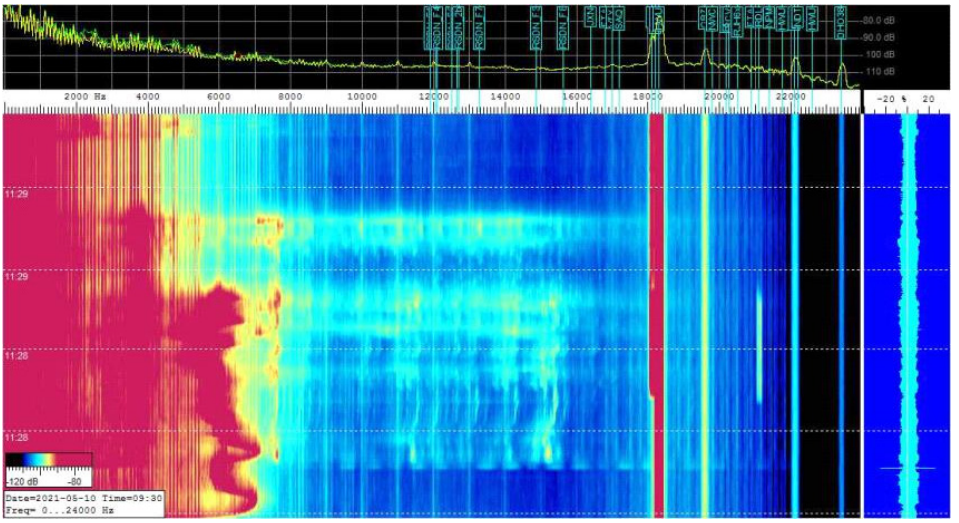

Fig. A11. Assumed source: engine, electric mower. Recorded 10.5.2021, 9:30 UTC, range: entire spectrum, Kp2, B1.9, t = 25 °C, precipitation: 0 mm.

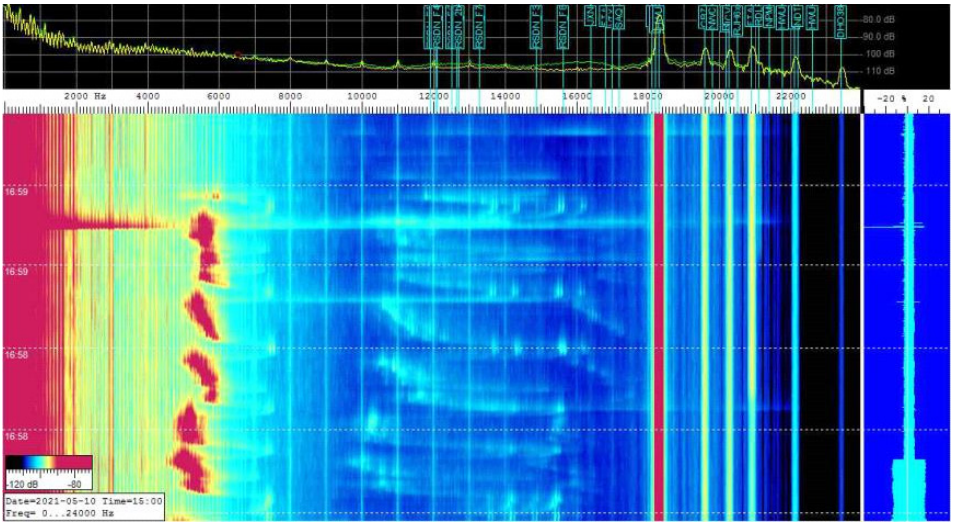

Fig. A12. Assigned source: engine, carburizing machine. Recorded 10.5.2021, 15:00 UTC, range: entire spectrum Kp2, B1.9, t = 25 °C, precipitation: 0 mm.

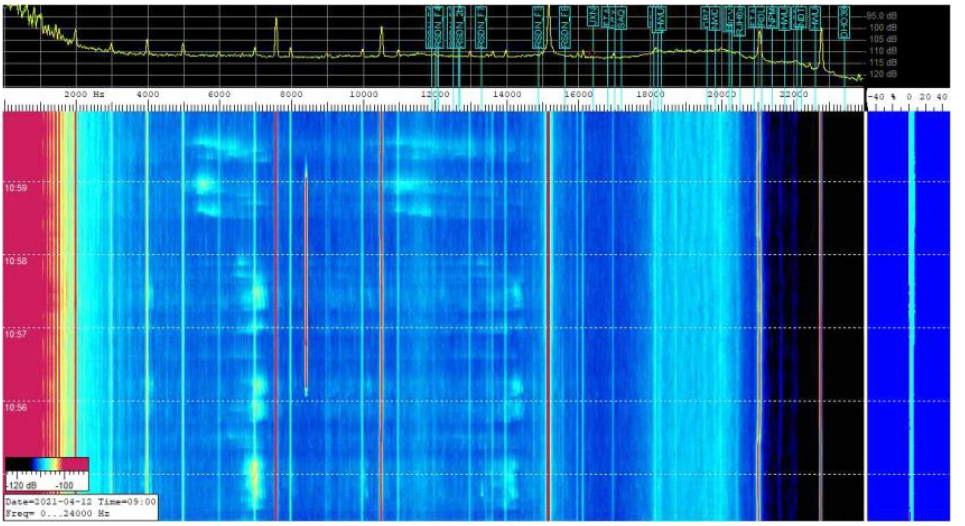

Fig. A13. Assigned source: engine, carbon sander. Recorded 12.4.2021, 9:00 UTC, range: 5–14 kHz, Kp2, B8.5, t = 18 °C, precipitation: 3 mm.

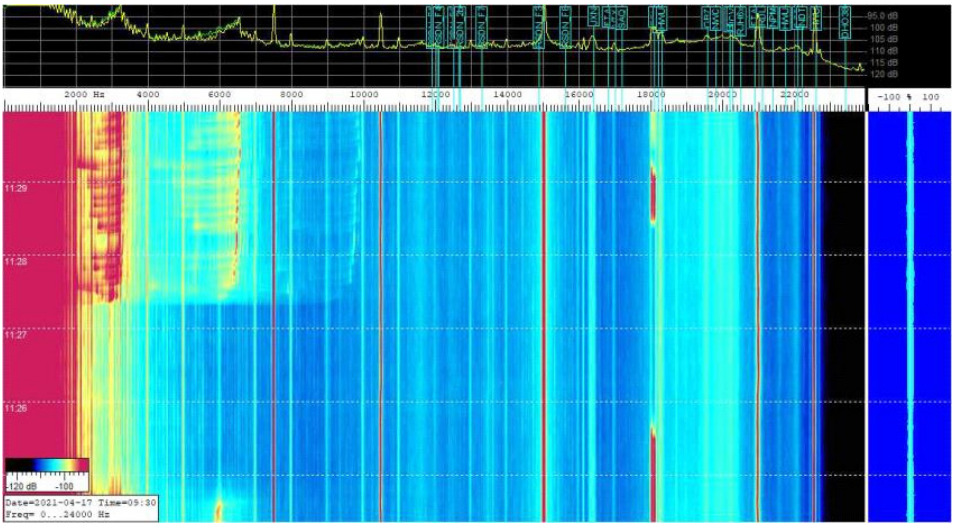

Fig. A14. Assigned source: engine, carbon sander. Recorded 17.4.2021, 9:30 UTC, range: DC – 10 kHz, G1, B9.6, t = 16 °C, precipitation: 0 mm.

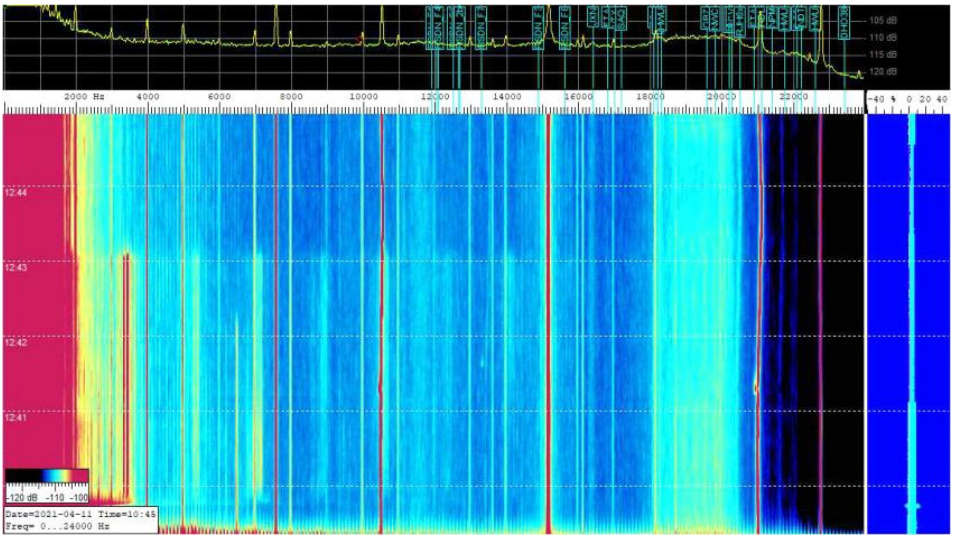

Fig. A15. Assigned source: compressor. Recorded 11.4.2021, 10:45 UTC, range: entire spectrum, Kp2, t = 16 °C, precipitation: 0 mm.

Spectral patterns from around the "Kamenica" landslide, which we attribute to natural sources

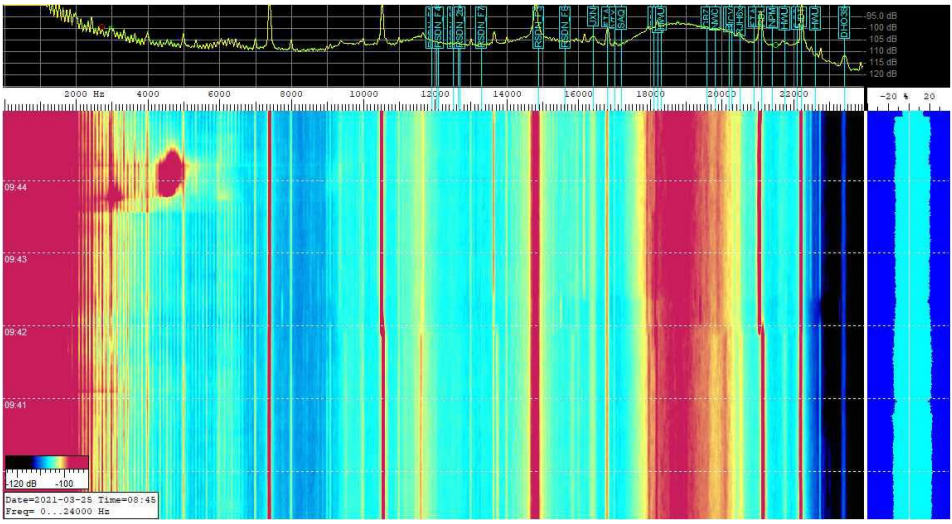

Fig. B1. Non-periodic emission, discrete emission. Recorded 25.3.2021, 8:345 UTC, range: 4–5 kHz, G1, t = 7.13 °C, precipitation: 0.13 mm.

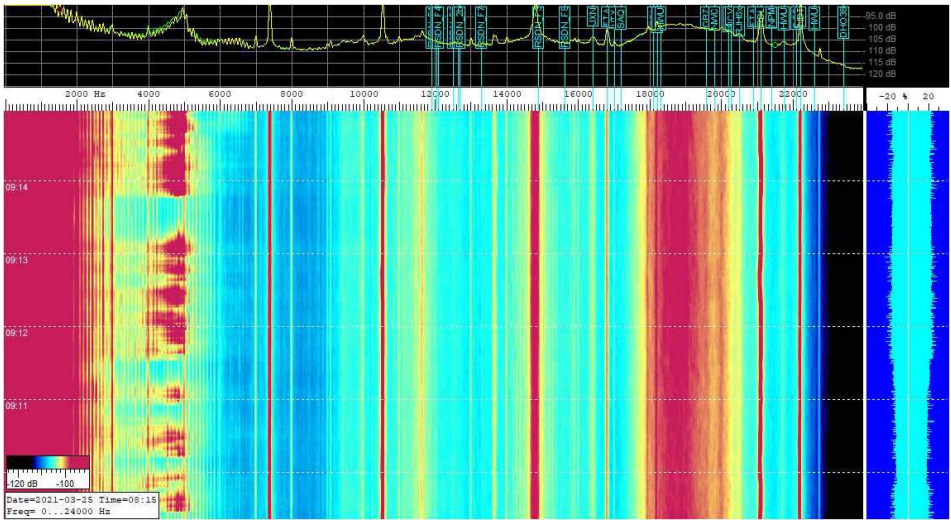

Fig. B2. Quasi-periodic emission, chorus, combined (hook, falling and rising tone) emissions, assigned to landslide activity. Recorded 25.3.2021, 8:34 UTC, range: 4–5 kHz, G1, t = 7.13 °C, precipitation: 0.13 mm.

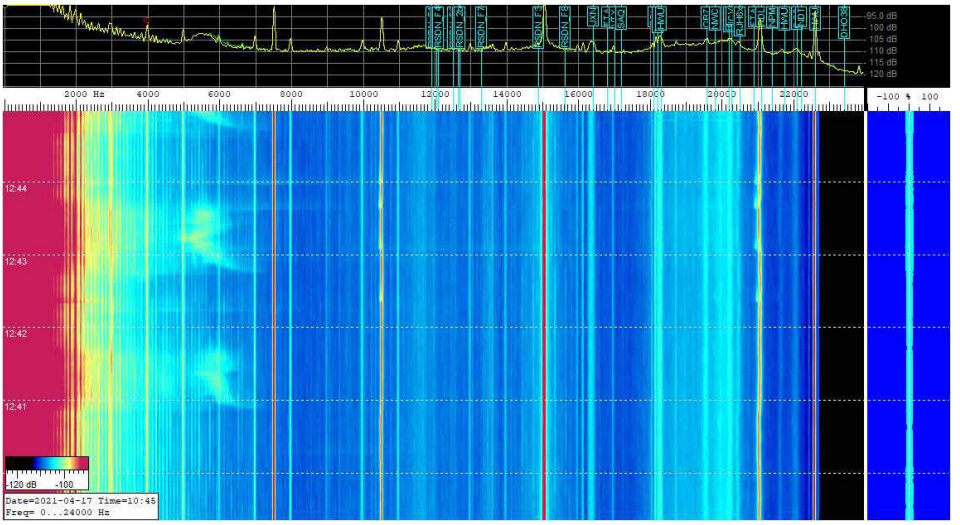

Fig. B3. Periodic emissions ("falling tone"), non-dispersive emissions. Recorded 17.4. 2021, 10:45 UTC, range: DC – 7 kHz, G1, t = 12.5 °C, precipitation: 0 mm.

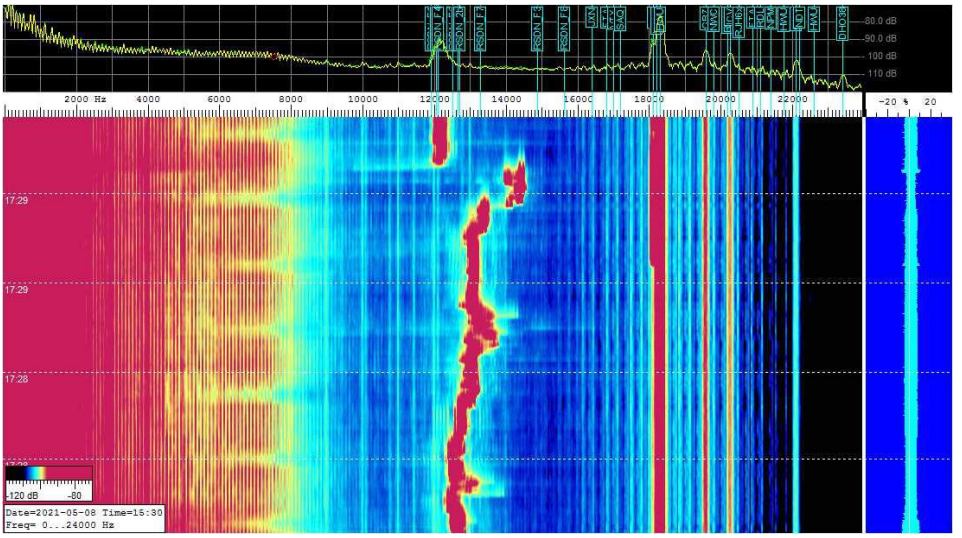

Fig. B4. Combined (hook, falling and rising tone) "triggered" emissions. Recorded 8.5. 2021, 15:30 UTC, range: 12–15 kHz, Kp1, C8.7, t = 22.7 °C, precipitation: 0 mm.

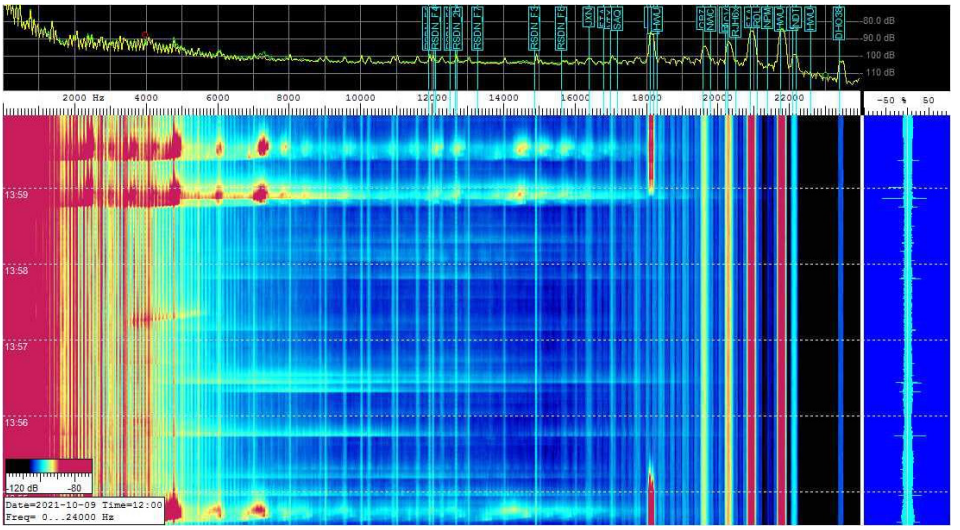

Fig. B5. Spherical, non-periodic emissions. Recorded 9.10.2021, 12:00 UTC, range: entire spectrum, Kp2, M1.6, t = 8.7 °C, precipitation: 0 mm.

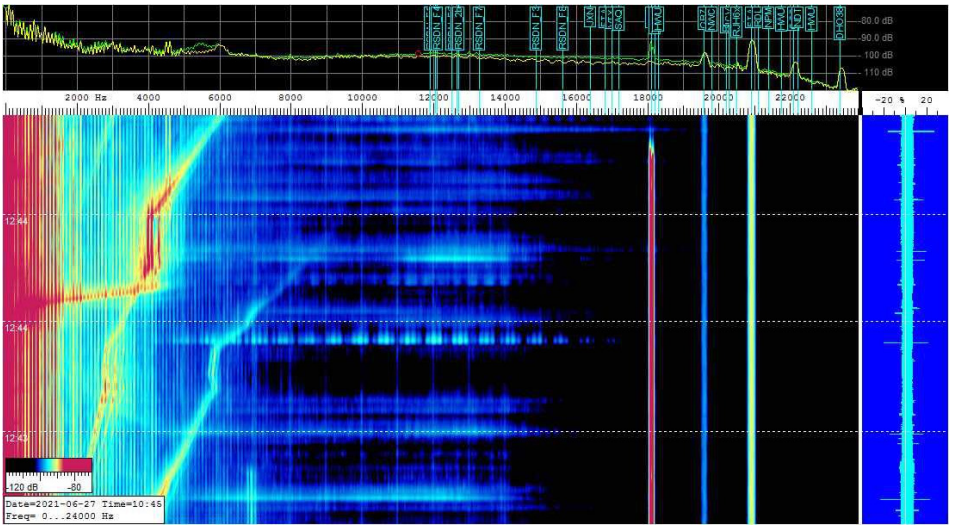

Fig. B6. Assigned to landslide activity. Recorded 27.6.2021, 10:45 UTC, range: DC – 10 kHz, Kp1, B1.5, t = 26 °C, precipitation: 0 mm.

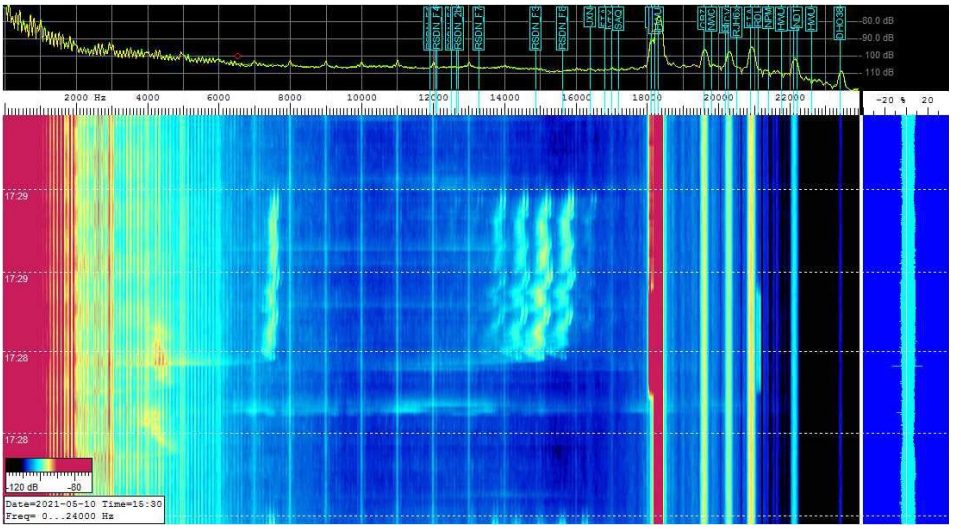

Fig. B7. Combined (hook, falling and rising tone) emissions, non-periodic. Recorded 10.5.2021, 15:30 UTC, range: 7–8 kHz and 13–17 kHz, Kp2, B1.9, t = 20.9 °C, precipitation: 0 mm.

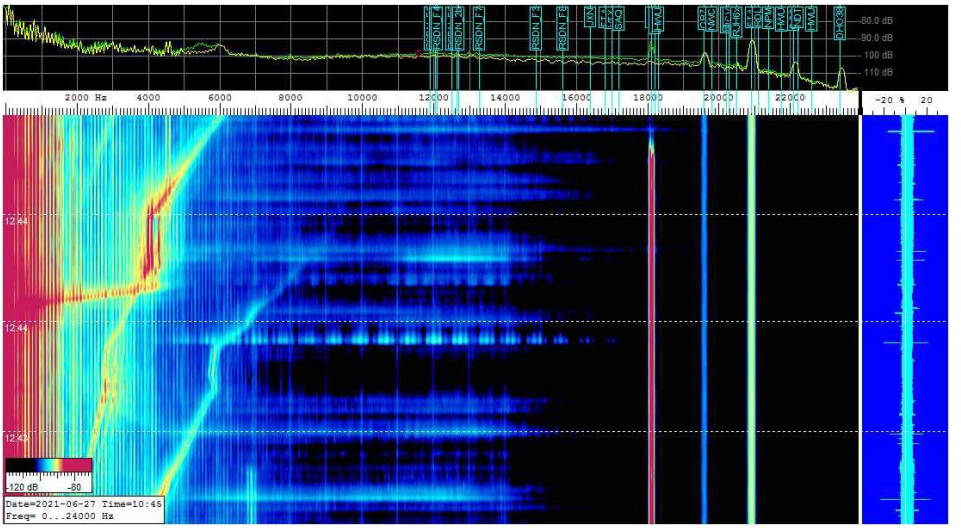

Fig. B8. Discrete non-periodic emission. Recorded 30.3.2021, 16:30 UTC, range: 3–6 kHz, Kp2, B7.4, t = 14.6 °C, precipitation: 0 mm.

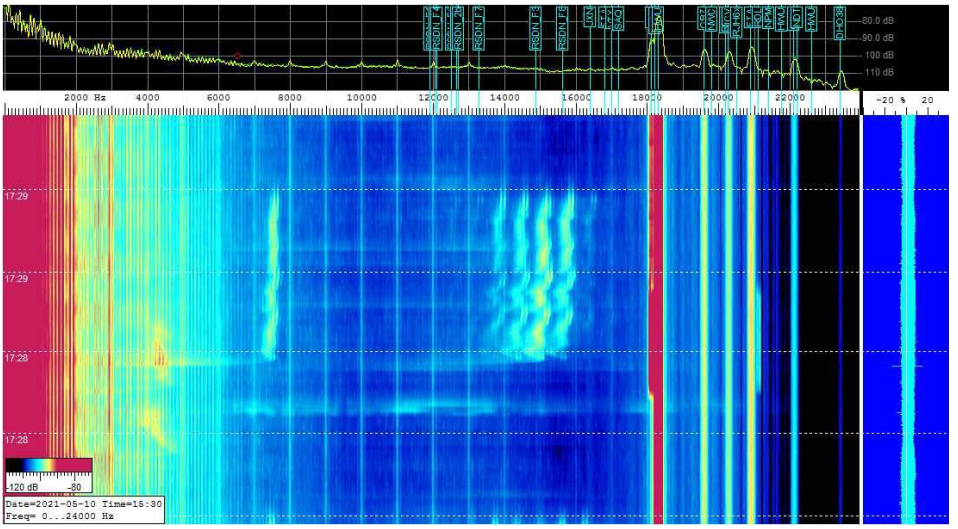

Fig. B9. Non-periodic "triggered" emissions, combined (hook, falling and rising tone) emissions. Recorded 2.4.2021, 13:30 UTC, range: DC – 9 kHz, Kp3, t = 10.2 °C, precipitation: 0 mm.

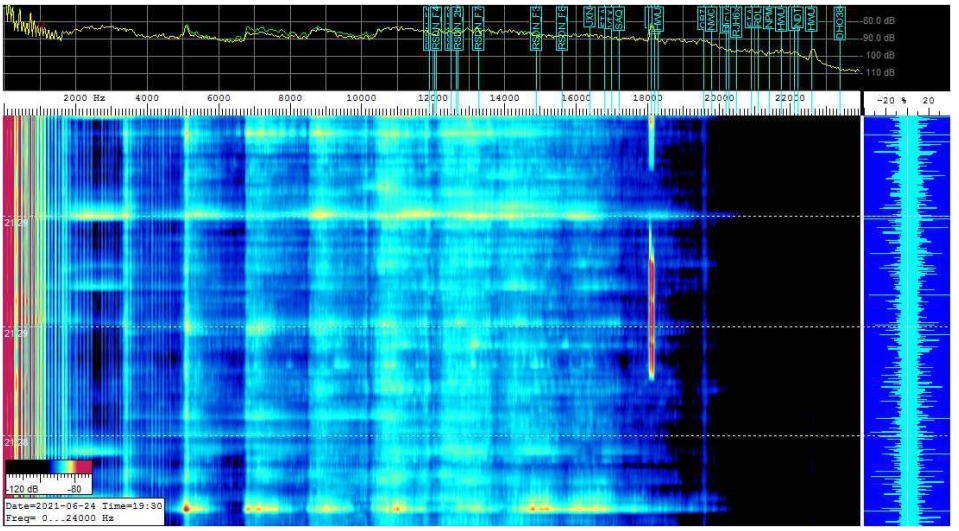

Fig. B10. Spherical, non-periodic (due to lightning). Recorded 24.6.2021, 19:30 UTC, range: entire spectrum, Kp2, B2.9, t = 27.3 °C, precipitation: 0 mm.

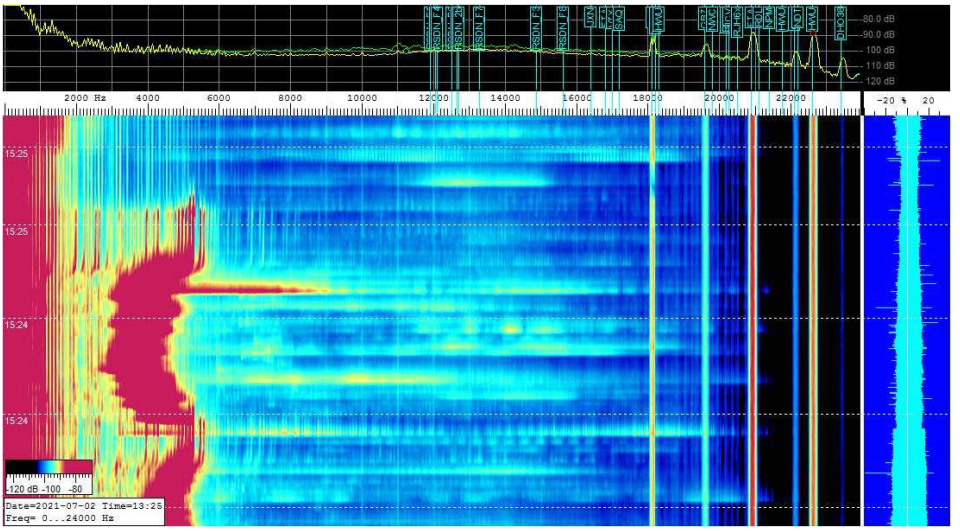

Fig. B11. Non-periodic "triggered" emissions, combined (hook, falling and rising tone) emissions. Recorded 2.7.2021, 13:25 UTC, range: DC – 10 kHz, Kp2, B8.6, t = 19.8 °C, precipitation: 0.1 mm.

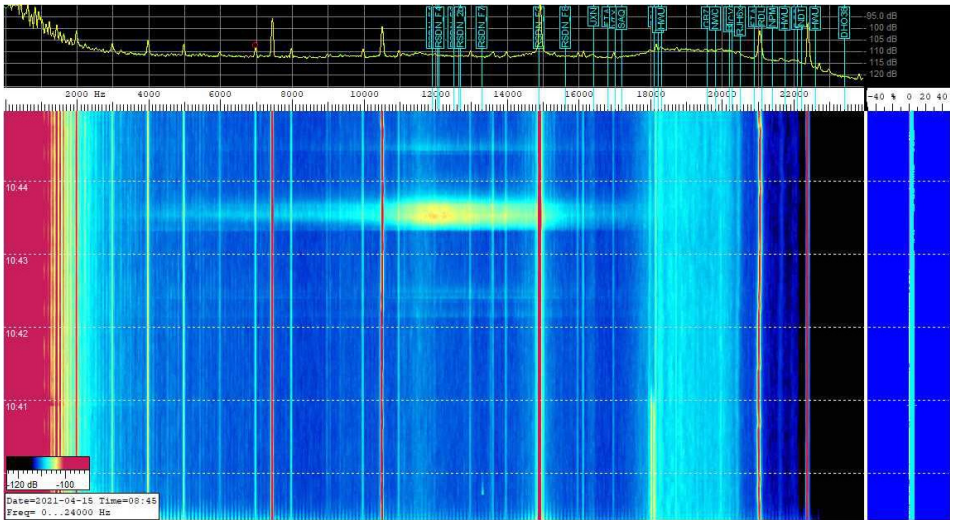

Fig. B12. Non-periodic emission, discrete emission. Recorded 15.4.2021, 8:45 UTC, range: 4–18 kHz, G1, B1.7, t = 4.4 °C, precipitation: 0.4 mm.