

Interactive comment on “Strong influence of solar X-ray flares on low-frequency electromagnetic signals in middle latitudes” by Alexandr Rozhnoi et al.

Alexandr Rozhnoi et al.

v.fedun@sheffield.ac.uk

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During solar X-ray flares the phases/amplitude of VLF/LF signals reflected from the ionosphere sometimes shows an opposite behaviour, the so-called phase/amplitude antinomy (see e.g. Giovanni E. Perona, LF and VLF phase antinomies during solar X-ray flares, *Radio Science*, 10 (4), 435–444, 1975). Author has analysed two years of data and explains such behaviour in terms of changes in the phase of the ionospheric reflection coefficient. We observed antinomy (or even more complicated behaviour) of phase/amplitude anomalies during solar X-ray flares on very short paths where VLF signal propagation is structured with many propagating modes, each of which

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has its own phase and amplitude, and the signal at any given location is the sum of those modes, unlike signal which propagates on long distances (far-field zone) where the only one mode is the principal. The distance between the GBZ transmitter and receiver at the Birr is only 350 km. It is near-field zone and in such short distance we can expect any behaviour of the phase/amplitude of signal.

Please also note the supplement to this comment:

<https://www.ann-geophys-discuss.net/angeo-2019-53/angeo-2019-53-AC2-supplement.pdf>

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2019-53>, 2019.

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