Modulations in VHF Wireless Signals Linked to Pre-earthquake Processes

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Extended Abstract

We study the atmospheric variations in the intensity of broadband wireless signals propagation correlated with earthquake preparation processes. Our observations revealed a phenomena associated with the artificially enhancement of the intensity in range 1.8-3.5GHz signals as a result of electric and electrochemical processes in atmosphere over the regions of ongoing earthquake preparation. Moriya et al, 2010, studied a similar phenomenon based only on VHF-band radio waves propagation. Since 2015 we continuously operating in VHF range of 1.8 -3.5GHz for two validation sites located in two different seismic regions — Orange, Southern California (US) and SW Bulgarian- Greece region (EU). We working with EMC antennas with receiving range 10MHz - 6GHz and real-time processing RF Spectrum Analyzer with Displayed Average Noise Level DANL: -135dBm(1Hz). Our observations revealed a phenomena associated with an artificially enhancement of the intensity of the signals (no change in the transmitting level) hours before the seismic events as a result of electric and electrochemical processes in atmosphere in the regions surrounding the transmitter- EMC antennas. We have reported for more then 15 cases of –pre-earthquake influence on VHF wireless signals for seismic events on different distance (30-260 km) and within magnitude range M3.5-M6.5. (Ouzounov et al, 2016). Most likely the observed increase in the intensity is a direct result of the change in the atmospheric properties in the Atmospheric boundary layer (ABL) triggered by intensification of radon and other gases release, which leads to change in lower atmosphere conductivity, already suggested by Lithosphere-Airosphere-Ionosphere Coupling (LAIC) concept, Pulinets and Ouzounov, 2011. Another possible reason is the forward scattering of VHF signal (similar to meteor wakes scattering) on aerosol layers formed over the earthquake preparation zone. We are registering an effect of systematic increase (with different rate) at range 1.8 -3.5GHz associated with the regional seismicity and no significant intensification modulation with an absence of major seismicity in the region.

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Figure 1. Acceleration in the occurrence of VHF (1.8GHz) discharge 30 hours before the M4.3 of 04.18.2016 in SE Bulgaria.

References