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The electromagnetic device optimization modeling of seismo-electromagnetic processes for Marmara Sea earthquakes

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1 Abstract

The crustal structures are considered as a complex network of distributed circuits involving slot antenna arrays, open waveguides, cavities, transmission strip lines, attenuators, frequency converters, dividers, couplings in the electromagnetically equivalent device model (EEDM) [1]. The variations at the geo-data alter the electromagnetic characteristics of the distributed complex network explained above. The mapping said in previous paragraph is based on the transformations among both the temporal and the spatial variations of both geo-data and the electromagnetic characteristics of the distributed complex network; i.e., phase velocity, attenuation factor, phase constant, input impedance, output impedance, relaxation factor, etc. The Finite Difference Time Domain method is used at the evaluations. The temporal variations at the mapping of EEDM at specific locations extract the mechanisms explaining the relationship among the characteristics of the distributed complex network and seismic phenomena at future.

The modeling of the seismicity-related geo-data as the self-optimization process of an electromagnetically equivalent device and developing a less accurate but fast model. A mapping is established between the parameter space of the geo-data and the characteristics of the electromagnetically equivalent device model. The temporal variations

of the geo-data are correlated to the self-optimizing the specific characteristics of the electromagnetically equivalent device. The relationship said here gives a possibility of predicting the geo-data. Using the inverses of the mapping generates the evaluations giving the predictability conditions involving restrictions.

The inversion of the mapping exploits a fine model at predicting the natural iterations of the geo-data at future on both the region under the observation and some locations non-related to the observation region either geologically or seismically or phenomenologically relating to the earth [1] – [4].

The fine model of 13D-hypersurface is generated by using the geophysical EQ data set. The coarse model of 10D-hypersurface is generated by using the data set of electromagnetical waveforms. The method is applied to earthquakes at the Marmara Sea region and useful extractions for the prediction are given.

2 References

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