Geophysical Research Abstracts,
Vol. 11, EGU2009-1264, 2009
EGU General Assembly 2009

The Electromagnetically Equivalent Complex Network Modeling of Compact Seismo-Climatic Processes for the Complete Earth

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1 Abstract

This paper concerns itself with modeling both the seismicity and climate related geo-data as the self-optimization process of an electromagnetically equivalent complex network and developing less accurate but fast models.

There are maps established between the parameter spaces of the geo-data and the characteristics of the electromagnetically equivalent system models. The temporal variations of the geo-data are correlated to the self-optimizing the specific characteristics of the electromagnetically equivalent complex systems in the models will be discussed in this paper. The relationships said here give the possibility of predicting the geo-data. Using the inverses of the mapping said above generates the evaluations giving the predictability conditions involving some certain restrictions.

The crustal structures are considered as a complex network of distributed circuits; i.e., systems involving slot antenna arrays, open waveguides, cavities, transmission strip lines, attenuators, frequency converters, dividers, couplings, etc. in the electromagnetically equivalent complex system model (EECSM) [1]-[2]. The variations at the geo-data related to the geo and/or climatic 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 and/or climatic 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 EECSM at specific locations extract the mechanisms explaining the relationships among the characteristics of the distributed complex network and seismic and/or climatic phenomena at future.

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 climatically or phenomenologically relating to the earth. The inversion processes from the electromagnetically equivalent complex system models, which are called EECSMs in short, will be discussed in this paper [1] – [5].

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 waveforms of electromagnetic quantities. The method is applied to both seismic and climatic phenomena at the Marmara Sea region and useful extractions for the prediction of both whether and seismicity are given.

2 References

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