



Complex networks in geosciences: a global and a local scale cases study

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In this paper a complex network based approach is used both at global and local scale in order to analyze spatio-temporal relationships among active volcanoes of the world and among faults system and eruptive activity on Mt. Etna.

At world-wide scale, it is well known that volcanoes separated by hundreds of kilometers frequently erupt in unison. These eruptions suggest there is a connection between different active volcanoes. Worldwide volcanic activity is in fact related to the general plate tectonics that locally drives the faults activity, that in turn controls the magma upraise beneath the volcanoes. In the attempt to understand and analyze the nature of these relationships we have calculated the correlation among all active volcanoes of the world over the last two thousand years in order to create a functional network.

At local scale, we tried to find correlation between seismicity and eruptions on Mt. Etna. The understanding of the possible relationships between seismic and volcanic activity at Mt. Etna is an open problem and represents a real challenge, due to the hazard related to fault activation on its flanks. To this end, we used the graph theory and statistical analysis was applied based on macroseismic data and eruptions recorded in the period 1832-2005.