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Anomalous character of the coda envelopes on Mt. Vesuvius: coda localization?

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Recent studies developed in tectonically active and volcanic areas demonstrated that the assumption of uniformity of the spatial distribution of the coda wave energy should not be adopted without verification (Aki and Ferrazzini, 2000, Wegler, 2003, Yoshimoto et al., 2006). In this work we experimentally check if the scattered wave field which produce the observational coda of local earthquakes at Mt. Vesuvius can be considered as homogeneous. We calculate the ratio between S and coda wave amplitude as a function of distance to find the values of the attenuation coefficients for each recording station (Aki, 1980). The plots found can be interpreted assuming that Qs increases with depth, or, alternatively with an anomalous space distribution of coda energy. Then, we analyze the shape of the seismograms recorded at the summit of the volcano and compare them with the seismograms recorded at the bottom, and finally study the site transfer functions for the different recording-sites on the volcano. The resulting space pattern of the site transfer function is interpreted together with the coda wave and direct S-wave attenuation results. We find that a Q which increases with depth can explain all the experimental results even in the assumption of a uniform scattered wave field. Even tough the interpretation in terms of a non uniform scattered wave field (the so called coda localization) cannot be excluded, we favor this hypothesis to explain the experimental data at Mt. Vesuvius.