

Noise based seismic speed monitoring: co-seismic and post seismic speed drops

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Continuous recordings of ambient seismic noise can be used to perform a continuous monitoring of the elastic properties of a medium. We present the theoretical background and laboratory tests which demonstrate the feasibility of the approach. We then consider different cases including a moderate earthquake, a large earthquake and a silent earthquake. Our results indicate that earthquakes are associated with relative velocity drops of the order of 10^{-3} . The velocity drop extends to a regional scale for large (M8) earthquake. We observe that the velocity change is associated both with strong motion effect on the surficial materials and to the deformation at depth. This last point is illustrated in the case of a silent earthquake. The velocity change seems to be instantaneous for the upper "elastic" crust but delayed for the deep crust. These results will be confronted with conceptual models of deformation.