



Non double couple seismic sources and inhomogeneity of stress state

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Non double couple (NDC) sources are considered based on different deformation modes of these sources and parameters of stress in their vicinity. Stress state is determined based on the first approximation summation of seismic moment tensors. A measure of the NDC part of the moment tensor is calculated. On the local scale the stress state and deformation process can be investigated using CMT-solutions, especially for the NDC earthquakes. Non double couple sources are usually considered in a framework of the hypothesis that the process of seismic rupture can be viewed as a result of complicated fault geometry and its segmentation. The present study focuses on the comparison of the deformation modes of the NDC sources with the states of stresses in its vicinity. Analytical approach is found to reveal reliability of the NDC measure taking into account the values of seismic moment tensor errors.

A tectonophysical interpretation is proposed to highlight the role played by stress factor in the local kinematics of structural discontinuities during the seismic rupture process. The majority of the NDC events have mixed NDC modes in their vicinities. This may be considered as an evidence for the inhomogeneity of a deformation mode as whole. This further implies that second order factors, such as hydrothermal or magmatic pore fluids in rocks, likely influence source characteristics and bring new complications in scaling relations.