

Generation mechanism of aftershocks -Focal mechanism patterns of on-fault and off-fault aftershocks-

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In order to know why aftershocks occur, it is important to obtain accurate hypocenters and focal mechanisms of many aftershocks. In this study, we investigated hypocenters and focal mechanisms of aftershocks of the 2003 Tokachi-oki earthquake and those of the 2000 western Tottori earthquake.

Aftershocks are classified into two groups by their feature of the focal mechanisms. One is on-fault aftershocks, which occurred on the same plane as the main shock fault plane. The other is off-fault aftershocks, which are scattered away from the fault plane of the main shock.

On-fault aftershocks do not overlap the co-seismic rupture area of the main shocks for the two earthquakes although they are distributed around the asperities of the main shocks. On-fault aftershocks of the 2003 Tokachi-oki earthquake overlap the post-seismic slip area. The observation that on-fault aftershocks are distributed on the aseismic slip area suggests that on-fault aftershocks are slips of small, isolated asperities surrounded by the aseismic slip area.

Focal mechanisms of off-fault aftershocks show a typical spatial variations at the both end and both sides of the fault plane of the main shock. These variations of the focal mechanisms are consistent with the spatial variation of the strain field due to the static displacement on the fault plane, which suggests that off-plane-aftershocks are generated by the static stress change due to the dislocation on the fault plane.