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Fault interaction and triggering of seismicity by dynamic and static stress changes: application to the 2000 western Tottori (Japan) earthquake.

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The goal of this study is to investigate the effect of the static and dynamic stress changes on the triggering of faults under slip-dependent friction law. We specifically focus on the 2000 Western Tottori (Japan) earthquake and on the triggering of its largest aftershock. To this end we compute the dynamic and static stress changes caused by the 2000 Western Tottori (Japan) earthquake for which a good knowledge of the rupture history and aftershocks sequence exists. We compute the coseismic stress evolution caused by the mainshock fault, on the fault plane of the largest aftershock located 20 km SW of the mainshock. The static stress changes cannot explain the occurrence of the largest aftershock, located in a stress shadow whatever the friction coefficient that we use. Using the discrete wavenumber and the reflectivity methods we compute the complete time-dependent coulomb failure function CFF(t). We investigate the influence of the adopted coefficient of friction μ', the depth and the location of the hypocenter on the shape of the CFF(t). Finally, using a non-linear slip dependent friction law with a stability/instability transition, we constrain the frictional properties of the largest aftershock fault plane knowing the state of stress on the fault and the time delay of 48 hours. We propose that D_c must be greater than 0.3 m.