

2018年北海道胆振東部地震の動的破壊シミュレーション：非平面断層形状の役割

Dynamic rupture simulation of 2018, Hokkaido Eastern Iburi earthquake: Role of non-planar fault geometry

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The 2018, Hokkaido Eastern Iburi, Japan, earthquake is an event characterized by complexity of rupture process, which may involve both reverse and strike slip depending on the locations on the fault surface. We perform dynamic rupture simulations based on simple physical laws and conditions for stressing and fault friction, taking complexity of the fault into account. The complex fault geometry is numerically treated by the boundary integral equation method accelerated by the fast domain partitioning method. We search in a small number of parameter spaces for the stress ratio of the regional stress field and the frictional coefficients assumed to be the same over the fault area, rather than assigning heterogeneous distributions of the stress drop on the fault, to evaluate to what extent relatively simple forward models accounting for realistic fault geometry can explain the characteristics of coseismic observations. The fault geometry is constrained based on the aftershock distribution (NIED, 2018) and characterized primarily by the combination of three fault planes. As the result, we are able to reproduce several observed features of the event including the spatial variation of the fault slip direction, which is inferred from the seismological inversion (Okuwaki and Yagi, 2018), and the ground surface displacement observed by GEONET. The results suggest that the complex rupture event can be reproduced by a relatively simple physical model to some extent if the geometrical complexity of the faults is properly taken into account.