The 2007 Chuetsu-oki, Japan, Earthquake: Rupture over a Complicated Fault System

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A fault model of the 2007 Chuetsu-oki earthquake (M_w6.5) that occurred along a northern coastal region of the Honshu Island, Japan, was explored from strong motion records. Several fault configurations that consist of a single to three faults were taken into consideration. It is found that a model of three faults that have different dip angles and directions yields the least residual.

Two of the the faults gently (30 deg. - 35 deg.) dip, and the fault with the hypocenter more steeply (55 deg.) dips to the southeast. Several asperities (patches of large slip) with the spatial extent of about 5 km were inferred on the fault system, and the two gently dipping faults have more moment release than the steeply dipping fault with the hypocenter.

In this sense, the seismic moment has been largely released on faults that are favorably oriented to the present compressional stress.

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