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2011 M 7.0 いわき地震断層:井戸沢・湯の岳断層に発達する剪断帯と断層岩，地震テクトニクス的意義
Shear zones and fault rocks developed along the coseismic normal fault zones of the 2011 M 7.0 Fukushima earthquake

林 愛明[1*], 遠田晋次[2], ラオ　ガン[3], 土橋　悟[3], ヤン　ビン[3]
LIN, Aiming[1*], Toda Shinji[2], Rao Gang[3], Tsuchihashi Satoru[3], Yan Bing[3]

[1] 静岡大学大学院/理学部, [2] 京都大学防災研究所, [3] 静岡大学大学院
[1]Graduate School of Science and Technology/Faculty of Science, Shizuoka Univ., Japan, [2]Disaster Prevention Research Institute, Kyoto Univ., Japan, [3]Graduate School of Science and Technology, Shizuoka Univ., Japan

The 2011 Mw 9.0 Tohoku (Japan) earthquake generated a violent tsunami and unexpected high tsunami wave that caused great substantial damage and more than 23,500 fatalities along the east-northeast coast of Honshu Island of Japan. Seismic inversion results reveal a maximum thrust slip of up to ~50 m on a 500-km-long fault plane (e.g., Yagi and Nishimura, 2011; Ide et al., 2011). Following this huge earthquake, several large earthquakes of M>/= 7 occurred in the east-northeastern Honshu Island, which are considered to have been triggered by the drastic change of crustal stress caused by the Mw 9.0 earthquake in the east-northeastern Japan. The 2011 M 7.0 (Mw 6.6) Fukushima earthquake occurred on April 11 in Iwaki City, ~250 km southwest of the epicenter of 2011 Tohoku earthquake, is considered to be one of such post-seismic events. Field investigations and InSAR data reveal that the Fukushima earthquake produced two sub-parallel ~15-km-long surface rupture zones with a normal slip sense along the pre-mapped faults: the Itozawa and Yunodake faults striking NNW-SSE and NW-SE, respectively (Tsutsumi et al., 2011).

In this study, to better understand the nature of seismogenic faults, we focused on the internal deformation structures of coseismic shear zones and on fault rocks within the Itozawa and Yunodake faults that triggered the 2011 M 7.0 Fukushima earthquake, and discuss the seismotectonic implications. Field investigations and structural analyses of the coseismic Itozawa and Yunodake fault zones and fault rocks show that i) the main coseismic shear zones consist of a fault core that includes a narrow fault gouge zone of <10 cm in width (generally 1-2 cm) and a fault breccia zone of < 50 cm in width, and a damage zone of ~5-50 m in width that is composed of cataclastic rocks including fractures and subsidiary faults; ii) the foliations developed in the fault core zone indicate a dominantly normal fault slip sense, consistent with that indicated by the coseismic surface rupture; and iii) veinlet cataclastic rocks composed of unconsolidated fault gouges and fine-grained materials are developed within the fault shear zones as simple veins and complex networks. These structural characteristics of the coseismic fault shear zones and cataclastic rocks indicate that the locations of coseismic slip zones associated with the 2011 Fukushima earthquake were controlled by pre-existing shear zones of the Itozawa and Yunodake faults that have repeatedly moved as normal faults of seismogenic source since the formation of cataclastic rocks.

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