

Paleostress analysis using Hough-transform based inversion method from slip data of mesoscale faults in the Dewa Hills, Akita

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Paleostress analysis was conducted using Hough-transform based inversion method (HIM; Sato, 2006) from slip data of mesoscale faults in the Dewa Hills, Akita, where both pre- and post-lift deposits are widely exposed. The Dewa Hills has been uplifting under E-W compression stress field since late Neogene, and shows a regional variety in deformation intensity and structure. Low angle faults with reverse sense are dominant in the Iwaki coastal area, where an intense shortening occurred showing N-S trending folds and thrusts associated with the activity of the Kitayuri thrust fault. Orientations of σ_1 and σ_3 are detected in E-W and nearly vertical, respectively. In the Toyokawa area at the hinge of the anticlinorium and the northeast part of the Dewa hills without intense deformation, high angle normal faults mainly occur. Stress states of relatively strong σ_1 s in vertical and σ_3 s diffused widely in NW-SE are obtained from the stress analyses. These are different from the regional stress field, and infer that mesoscale faults in these areas provide signals of later stage of uplifting. Under a limited influence of the regional stress state, the effect of equalization of crustal topography would be apparent. Normal faulting probably occurred resulted from the gravitational spreading (e.g., Ikeda and Yamaji, 2008) towards the structural low away from the high.

Keywords: Hough-transform, paleostress analysis, mesoscale fault, Dewa hills