

## Structural geology of the Shogawa anticlinorium in the Shitada Hill, Niigata, northern Japan

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We investigate the Shogawa anticlinorium of the Shitada Hill, Niigata, northern Japan. Geological structures of Plio-Pleistocene formations of the Shitada Hill are characterized by NNE-trending overturned anticlines and synclines with ESE-dipping axial surfaces. These folds are associated with ESE-dipping listric reverse faults. Geometry of these folds and faults shows they are fault-propagation folds. By the multiple inverse method (Yamaji, 2000; Otsubo and Yamaji, 2006; Sato and Yamaji, 2006; Otsubo et al, 2006), three stress states are separated from fault-slip data as follows: 1) WNW-ESE horizontal maximum principal stress and vertical minimum principal stress axes, 2) WNW-ESE horizontal maximum principal stress and NNE-SSW horizontal minimum principal stress axes, and 3) vertical maximum principal stress and WNW-ESE horizontal minimum principal stress axes. The WNW-ESE horizontal maximum principal stress and vertical minimum principal stress axes suggest the Shogawa anticlinorium was formed as buckle folds. The WNW-ESE horizontal maximum principal stress and NNE-SSW horizontal minimum principal stress axes were formed transverse strike-slip faults. On the basis of detailed geological mapping, fault-slip and paleocurrent analyses, we also conclude that the anticlinorium began uplifting no earlier than the deposition of the lower part of the Uonuma Formation, i.e., < 2 Ma.

**Keywords:** Shogawa anticlinorium, fault-propagation fold, minor fault analysis, paleostress, paleocurrent analysis, Niigata sedimentary basin