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# Determination of paleostress from Pliocene quartz veins in the Hashima mine area, Kyushu, Japan

Atsushi Yamaji[1], Katsushi Sato[1*], Satoshi Tonai[1]

[1]Kyoto University

The state of stress during the deposition of vein-type ore was investigated by means of our new numerical method, which was modified from the graphical method of Jolly and Sanderson (1997). The numerical method determines not only the attitude of stress axes, but also the stress ratio with 95% confidence regions. Moreover, the lower bound of the maximum fluid pressure responsible for the vein formation is calculated. The method was applied to the swarmed quartz veins cropping out on the coast of Hashima, Kushikino metallogenic province, Kyushu, Japan. They were deposited at 3.5--3.7 Ma (Izawa and Zeng, 2001). It was found that the veins were formed under the normal-faulting regime of stress with the stress ratio of 0.20+0.14/-0.09 and the sigma3 trend of 167+/-10 degrees. The low stress ratio and the lack of sheared fractures suggest a low stress level during the vein formation.

Keywords: vein-type ore, stress, orientation statistics, Kyushu, Bingham distribution, epithermal