An increment of optically-stimulated luminescence (OSL) signal of quartz due to low- to intermediate-velocity frictional sliding

*Kiyokazu Oohashi¹, Koji Akasegawa², Noriko Hasebe³, Kazumasa Miura⁴

1. Graduate School of Sciences and Technology for Innovation, Yamaguchi University, 2. Daiwa Exploration & Consulting Co., Ltd., 3. Institute of Nature and Environmental Technology, Kanazawa University, 4. Graduate School of Natural Science & Technology, Kanazawa University

There is an attempt that trying to determine an age of faulting from a dating of fault zone material (e.g., K-Ar dating of authigenic illite, fission track dating of zircon, electron spin resonance dating). Recently, Ganzawa et al. (2013) demonstrated that the potential of luminescence dating for the direct dating method of earthquake event. The basic idea behind to luminescence fault dating is the accumulated natural radiation damage (trapped charge) will be released by an external stimulus such as frictional heating, friction, wear, and crushing. Oohashi et al. (2017) conducted high-velocity friction experiments for quartz powders, and found the OSL signal zeroing (release of trapped charge) due to frictional heating. On the other hand, if the OSL signal becomes small or disappear due to friction, wear, and crushing that is also accompanied by stable sliding, OSL signal zeroing in natural fault zone can not be attributed to earthquake event. Here we report an increment of OSL signal of quartz during a low- to intermediate-velocity frictional sliding, which can be useful to discriminate between coseismic rapid slip and stable sliding.

[References]

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