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

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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]
Ganzawa,Y., et al., (2013). Dating of active fault gouge using optical stimulated luminescence and thermoluminescence. *Jour, Geol, Soc, Japan*, Vol, 119, No. 11, p. 714-726, November 2013.
Oohashi K., et al., (2017). Experimental investigations of OSL signal changes of quartz gouge during low- to high-velocity friction. American Geophysical Union 2017 Fall Meeting, T14D-08.

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