

Figure captions

- Figure 1. Study area. A. Location map Japan with Median Tectonic Line (MTL) shown in red, N.A. North American Plate, B. Fault zones in Central Japan (modified from Takagi et al. 2005), C. Atera Fault local geology.
- Figure 2. Outcrop details. A. Atera Fault overview Kawaue area, B. studied outcrop sketch, C. outcrop image and structural context of Fig. 2B (modified from Niwa et al. 2015). (1) to (4) in Fig. 2B and 2C show major lithological boundaries and correspond to each other.
- Figure 3. Representative XRD spectra showing the <2 μm fractions and the host rock sample. Sm: smectite, Ill: illite, Qtz: quartz, F: feldspar, Kf: K-feldspar, Pl: plagioclase, Chl: chlorite, Hbl: hornblende.
- Figure 4. Thin section petrography (crossed polarized light). Foliation is developed in the fault rock samples of A. Atera 1 and B. Atera 2 (white arrows), C. host rock. Qtz: quartz, Kf: K-feldspar, Pl: plagioclase, Mm: chloritized mafic mineral.
- Figure 5. SEM images with EDS results showing illite/smectite. Qtz: quartz, Pl: plagioclase. A. Atera 1 Fault gouge, B. Atera 2 Fault gouge, C. host rock.
- Figure 6. TEM images with EDS results showing illite/smectite particles (arrows). A. Atera 1 < 0.1 μm , B. Atera 2 < 2 μm .
- Figure 7. K – Ar age versus grainsize plot. AFTA apatite fission track ages, ZFTA zircon fission track ages, WR whole rock.
- Figure 8. K – Ar age data in the geochronological context of the study area in Central Japan. Toki Granite host rock data based on Shibara and Ishihara (1979), Suzuki and Adachi (1998), Yamasaki and Umeda (2012), Yuguchi et al. (2019) and Yamasaki et al. (2013). B biotite, H hornblende, R Rb-Sr, C Chime (chemical U–Th total Pb isochron method), U U – Pb, K K-feldspar, S Shrimp U – Pb. Opening of Japan sea based on Hoshi et al. (2015).
- Figure 9. Thermochronological summary of study area. A. Toki area (background grey shade) based on Yamasaki et al. (2013), opaque square, rectangle, triangle and circle symbols indicate Toki area thermochronology data. B. Nohi Rhyolite and Naegi–Agematsu Granite area (front), cooling curve modified from Yamasaki et al. (2013). HR host rock, Hb hornblende, Bt biotite, KF K-feldspar, Mo monazite CHIME chemical U–Th total Pb isochron method, WR whole rock.

Figure 1

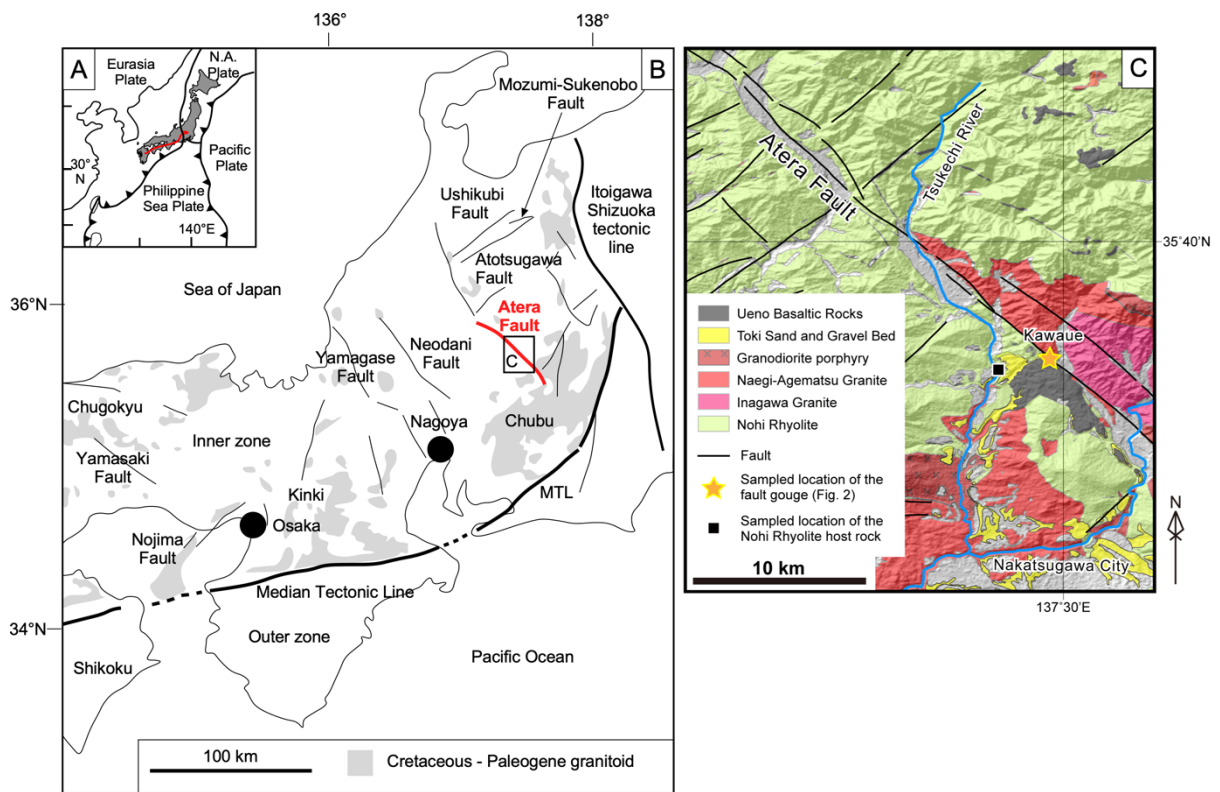


Figure 2

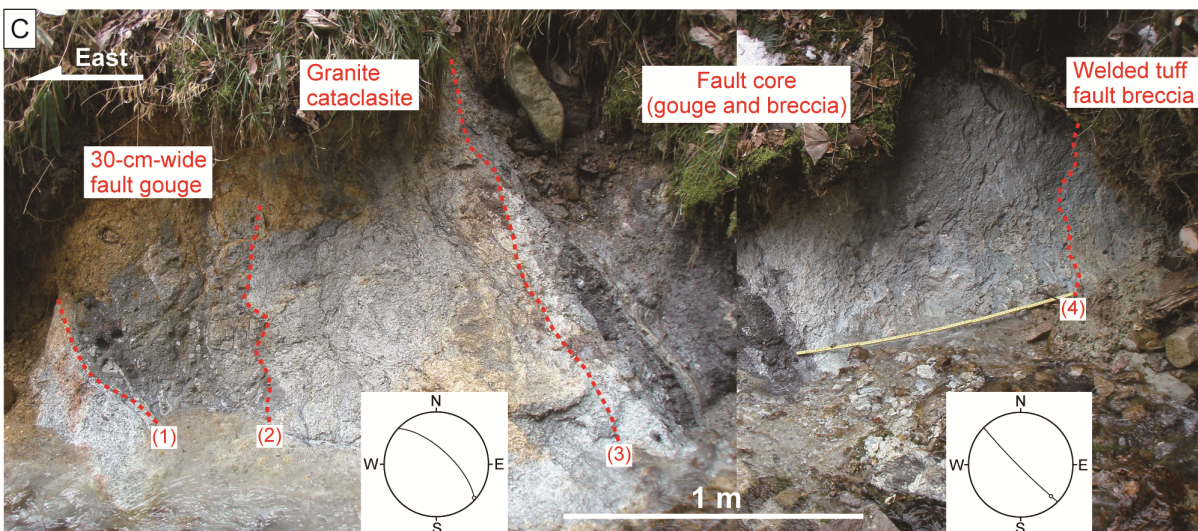
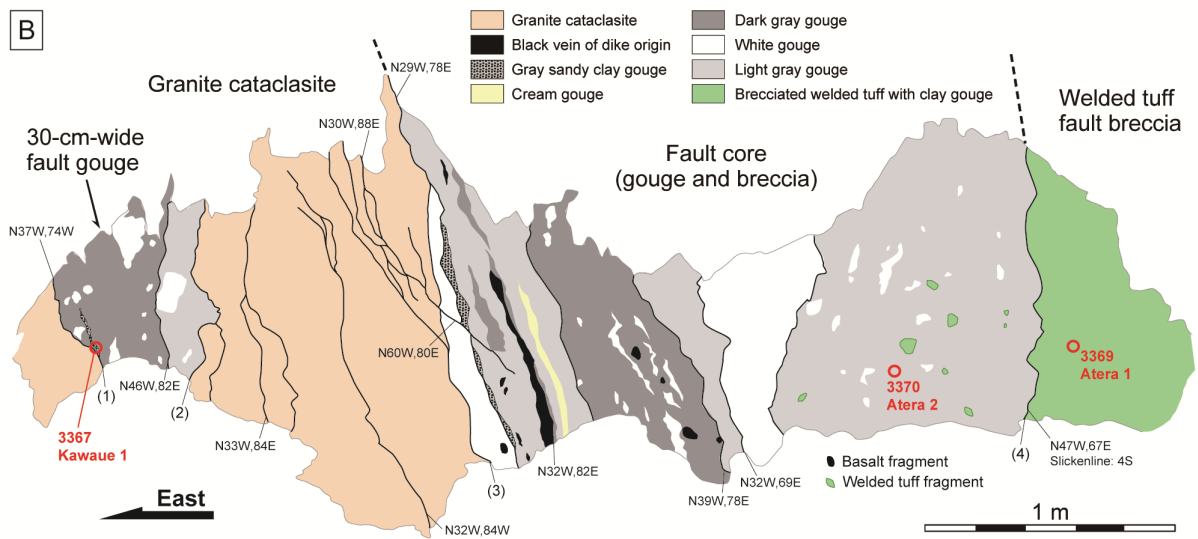
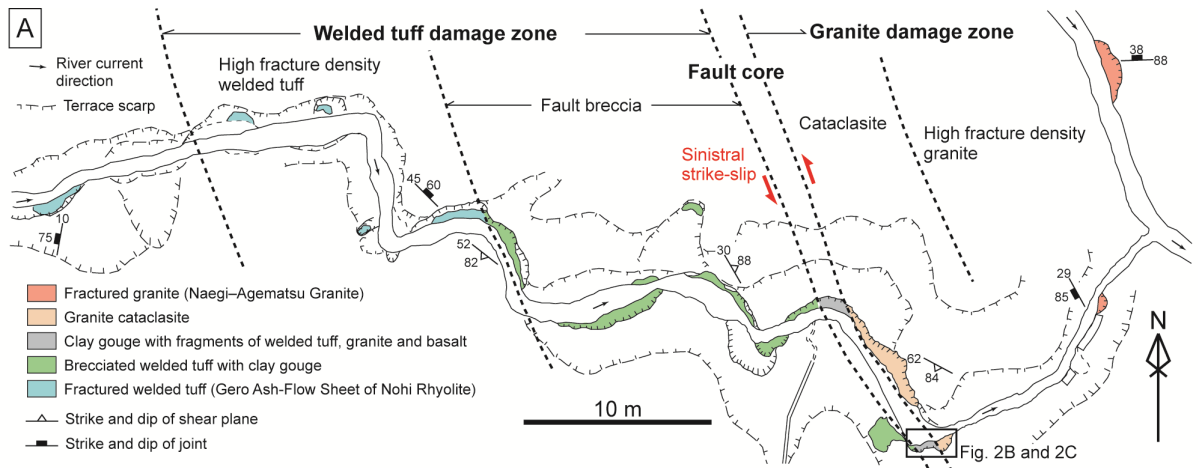


Figure 3

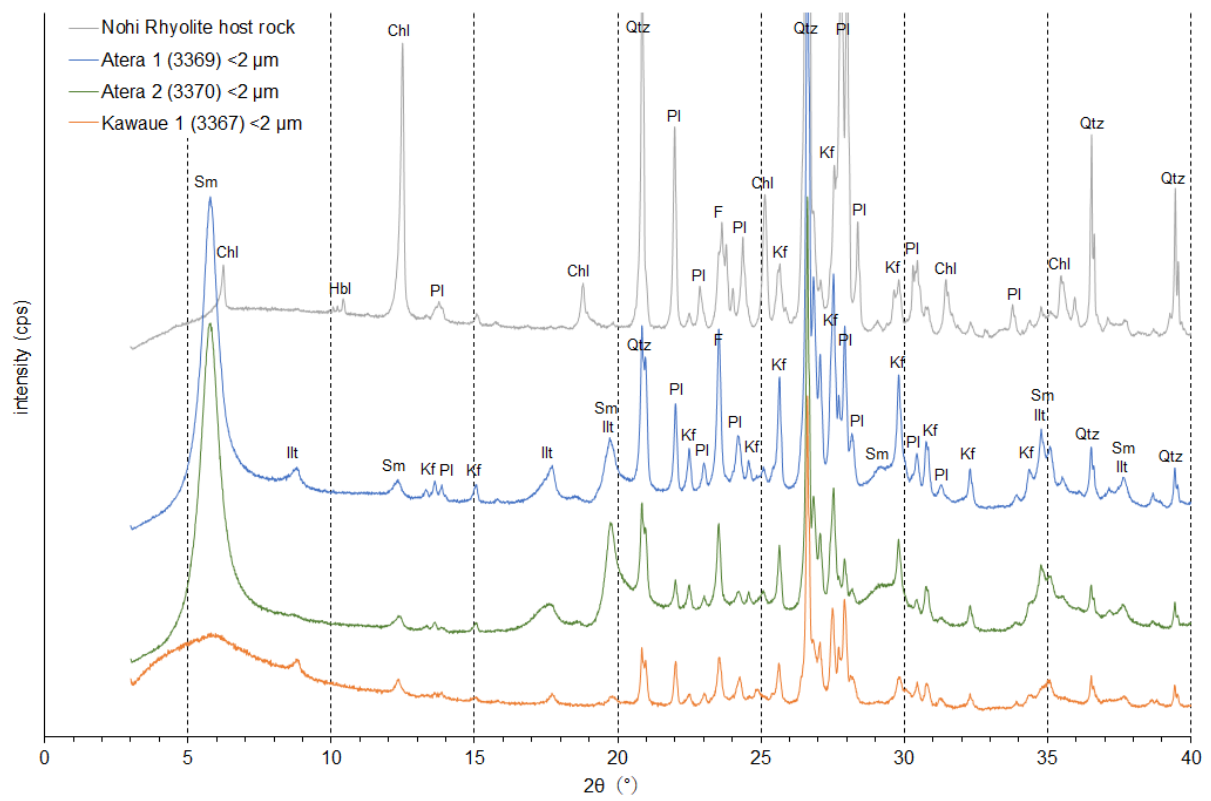


Figure 4

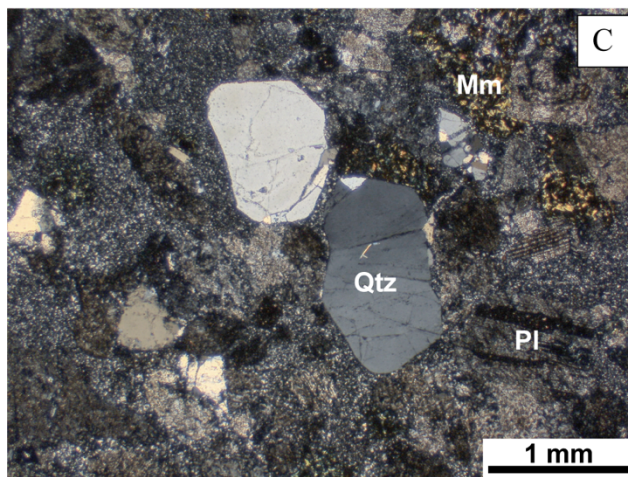
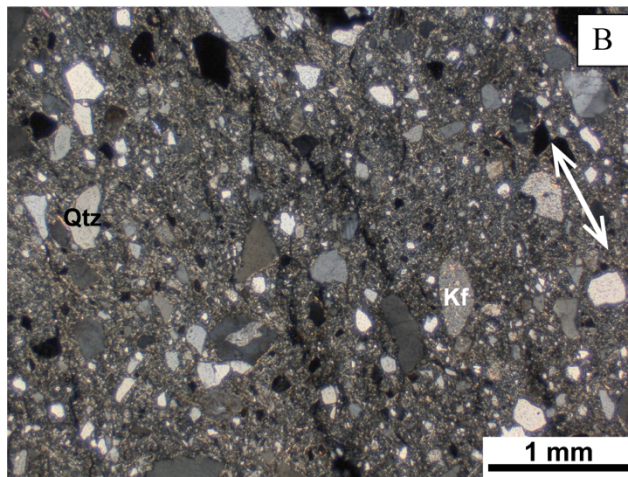
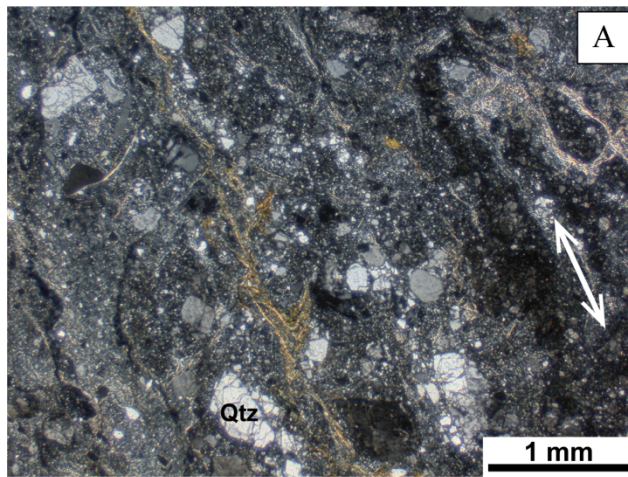


Figure 5

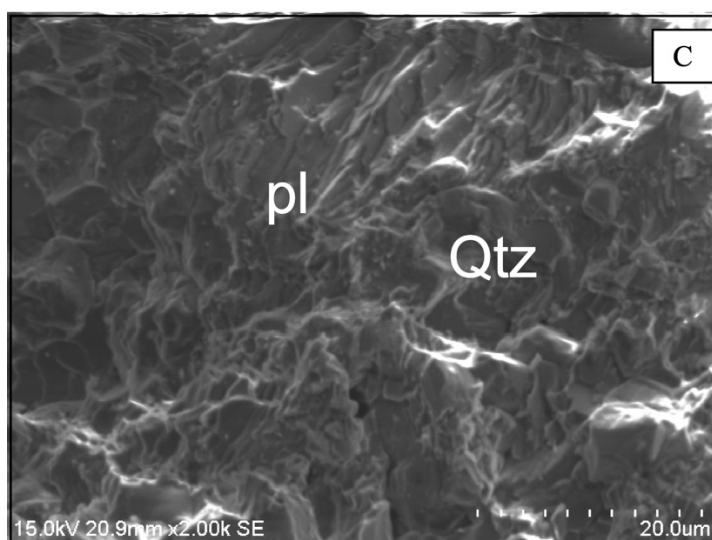
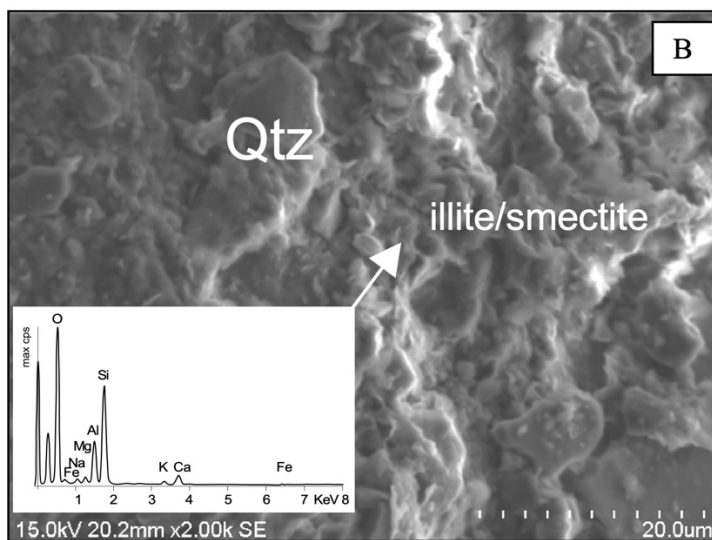
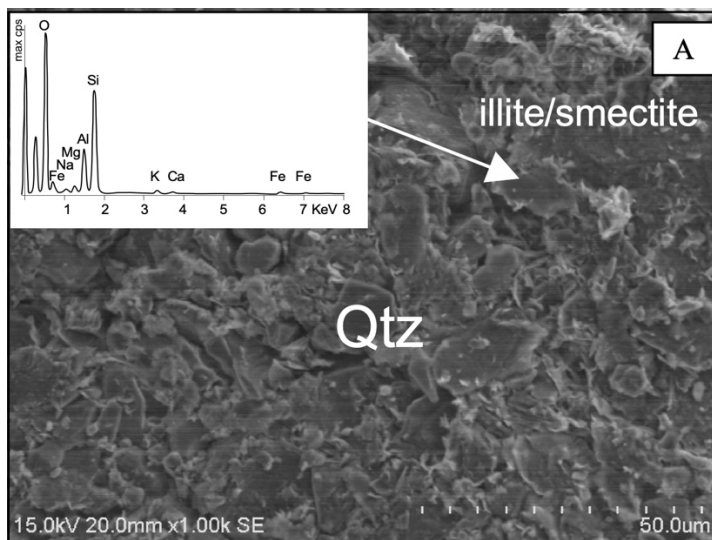


Figure 6

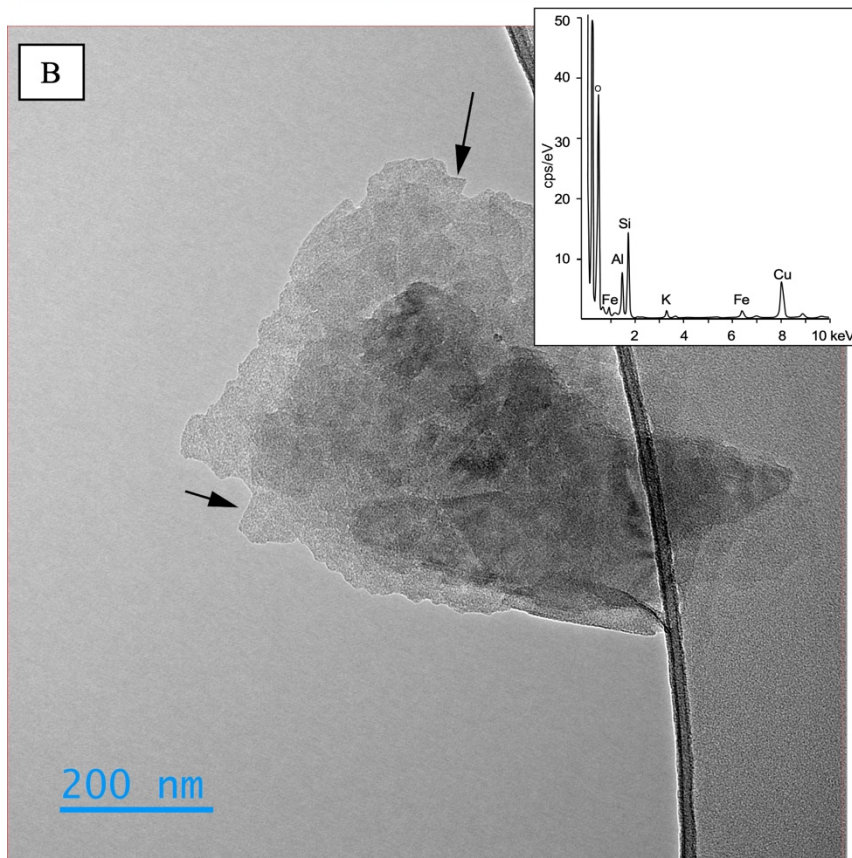
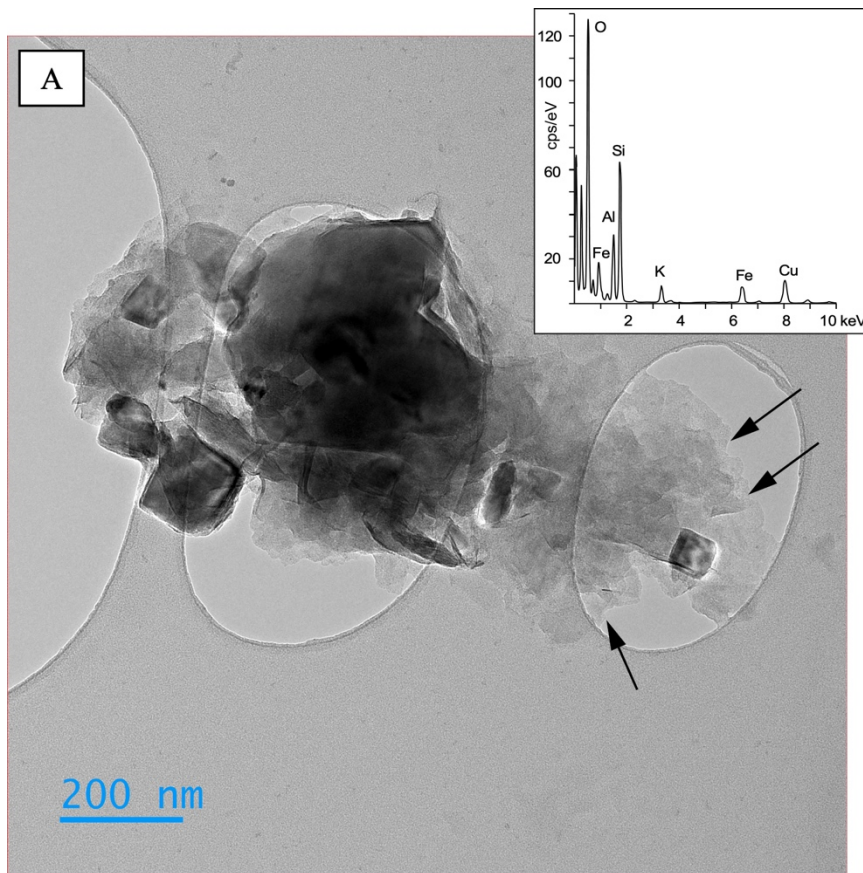


Figure 7

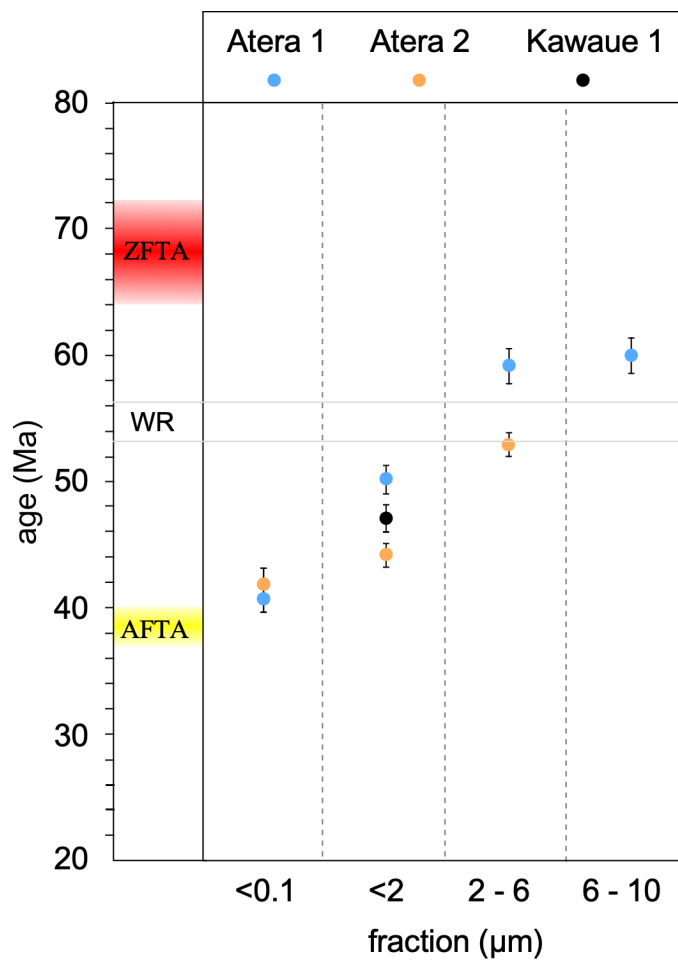


Figure 8

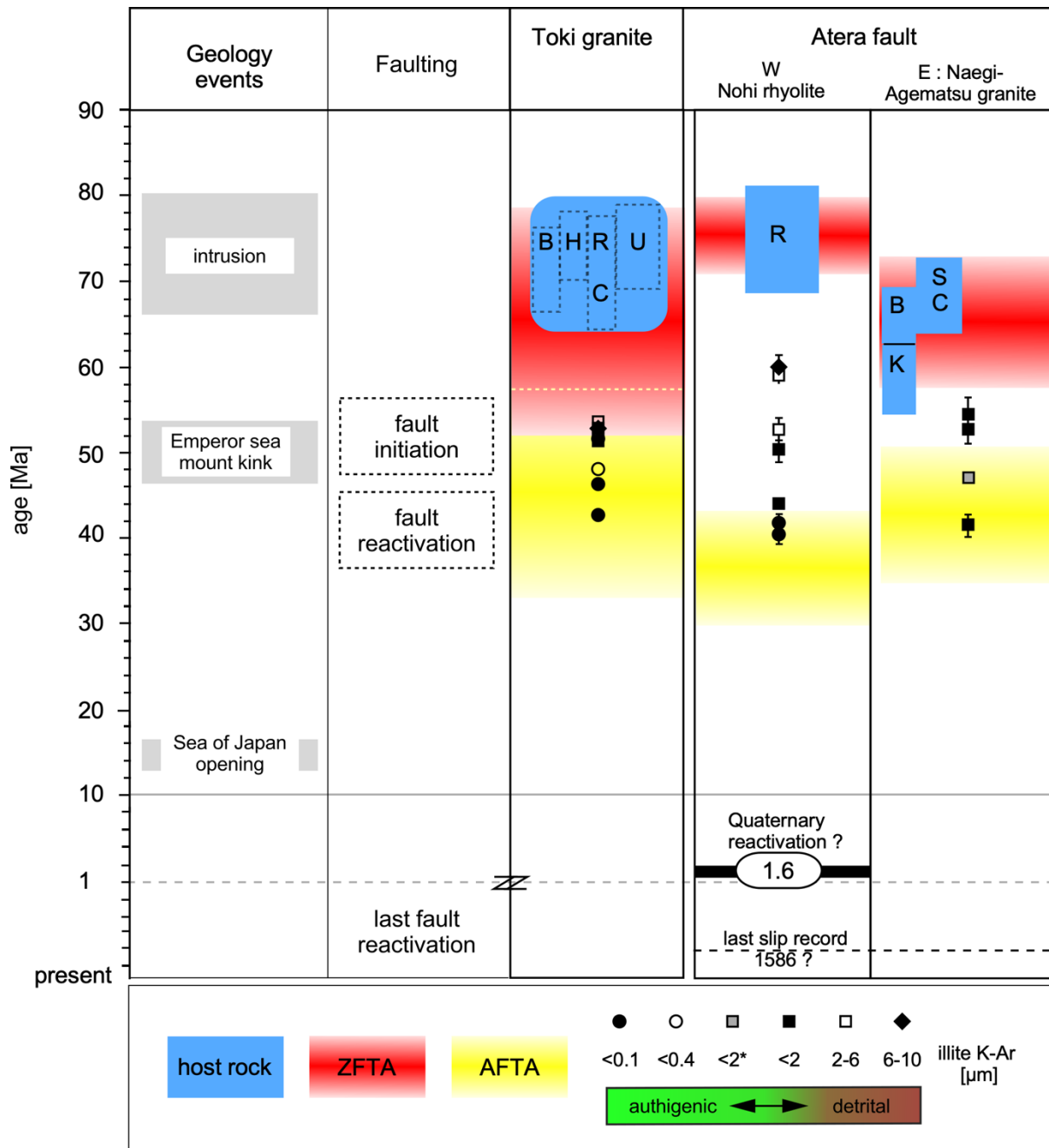


Figure 9

