Revisiting the Nojima fault drilling – new illite and FT age dating results from the Hirabayashi-NIED borehole core

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Zwingmann et al. [1] reported timing of authigenic illite formation within outcrop and drill core samples of the Nojima Fault zone on Awaji Island, Japan, within the Median Tectonic Line and investigated in a scientific drilling program (Ando [2]) after the 1995 Kobe earthquake. Several additional samples from remaining drill core were investigated to further constrain the timing of illite authigenic within the fault zone. The age data were obtained using a simplified and standarized method described by Zwingmann et al. [3]. New illite K-Ar ages of 2 μm fractions range from the Palaeogene-Late Paleocene (59.0 ± 1.3 Ma) to the Palaeogene-Late Eocene (35.0 ± 0.8 Ma) and are in agreement with data reported by Zwingmann et al. [1], using the 1838 m borehole core drilled by the National Research Institute for Earth Science and Disaster Prevention (NIED) at the Hirabayashi site. Yamada et al. [4] found heterogeneous distribution of discordant FT ages between apatite and zircon for fracture zone samples in the NIED core caused by secondary heating and heat transfer or dispersion via geothermal fluids.

The K–Ar illite ages from gouge in the NIED core are consistent with published zircon fission track ages of about 56 Ma from the vicinity of the outcrop samples, and are consistent with illite stability in fault gouges requiring temperatures lower than those of the partial annealing zone for zircon FT.

[1] Zwingmann et al. (2010a) Chemical Geology, **275**, 176–185. [2] Ando (2001) Island Arc **10**, 206–214. [3] Zwingmann et al. (2010b) Geology, **38**, 487-490. [4] Yamada et al. (2007) Tectonophysics, **443**, 153–160.