粘性残留磁化を用いた野島断層破砕帯の年代測定法:予察

福沢 友彦 [1]; 中村 教博 [2]; 小田 啓邦 [3]; 佐藤 哲郎 [4]
[1] 東北大・理・地学; [2] 東北大・高教機構; [3] 産総研・地質情報; [4] 東北大・理・地学

Preliminary result of Paleomagnetic Viscous Dating of Fault Gouge in the Nojima Fault, Japan

Tomohiko Fukuzawa[1]; Norihiro Nakamura[2]; Hirokuni Oda[3]; Tetsuro Sato[4]
[1] Earth Science,Tohoku Univ; [2] IEHE, Tohoku Univ; [3] IGG, GSJ, AIST; [4] Earth Science, Tohoku Univ

Dating of an active fault is important task for tracing the history of large earthquakes and creating risk-management policies for future disasters from geological evidence. Generally, we employ a fault-offset method that a sedimentary layer is cut by an active fault, but this method can not apply if there is no overlying sedimentary layer over an active fault and the fault has only the outcrop of fault gouge. Direct age determination methods from fault gouge materials have been proposed such as potassium-argon method to an illite in fault gouge, fission track dating of epidotes in fault gouge, and electron spin resonance (ESR) dating to quartz grains in fault gouge. These methods are very powerful but hard to determine spatial distribution of ancient fault plane. Although scanning ESR microscopy reveal this, ferrimagnetic mineral productions by thermal decomposition ($>350^{o}$C) of paramagnetic minerals during frictional slips prohibit the application of ESR dating due to an overprint of un-pair electron ESR spectrum by ferrimagnetic resonance spectrum. Here, we propose an alternative paleomagnetic age determination to take advantage of the production of ferrimagnetic minerals during frictional slip. A newly-developed scanning SQUID magnetic microscopy by AIST and paleomagnetic viscous dating are employed to the Nojima fault gouge to determine slip planes and to reveal the age of their slip planes. Our preliminary results suggest that SQUID magnetic microscopy revealed the presence of highly magnetized slip zones less than 1millimeter. Alternating-field demagnetization (AFD) result shows that each slip zone has two different components both of characteristic remanence and viscous component. The direction of its secondary magnetization tends to record Earth’s current magnetic field. These results imply that we can use temperature-dependent viscous remanent magnetization to estimate the age of fault gouge. In this presentation, we will show the results of thermal demagnetization and derive the age of the fault gouge, using magnetic relaxation theory.