Geophysical Research Abstracts
Vol. 20, EGU2018-1178-7, 2018
EGU General Assembly 2018

New chronological insights from Late Pleistocene tilted terraces along the deformation front of the Central Range (Taiwan): A comparison of luminescence and in situ cosmogenic dating.

Antoine Poujol (1), Maryline LeBéon (2), Lionel Siame (3), Alexander Kunz (4), Rou-Fei Chen (5), Wen-Jeng Huang (1), and Yue-Gau Chen (4)

(1) Department of Applied Geology, National Central University, Taiwan, (2) Department of Earth Sciences, National Central University, Taiwan, (3) CEREGE, Aix-Marseille University, France, (4) Department of Geosciences, National Taiwan University, Taiwan, (5) IES, Academia Sinica, Taiwan

In the central part of the Western Foothills (Taiwan), the Pakuashan tableland consists of a flight of ∼0.5-1km wide imbricated alluvial terraces standing up to 300m above the current riverbed and tilted eastward as a result from the folding along the foremost deformation front of the Central Range (Changhua blind thrust). The Western Foothills region is densely populated and exposed to seismic hazards as indicated by four destructive earthquakes which occurred in this region during the last century (the last one was the Chi-Chi EQ 1999, Mw 7.6). Over the past decades several studies using different geochronological methods, like OSL dating, cosmogenic nuclides or soil index, were performed along the Pakuashan anticline. However, the chronological framework still suffers from large age discrepancies of more than 70 ka between the different dating methods.

In order to improve the chronological framework of Pakuashan tableland, we performed a geomorphic and geochronological study on five over six alluvial terraces by combining a high-resolution topography survey (DEM from RTK GPS and drone photogrammetry) together with different dating methods at the same site: OSL on quartz, pIRSL on K-feldspar minerals from the sand fraction and 10Be/26Al on quartz-rich pebbles. In contrast to previous studies, we took advantage of technical improvements using the high-temperature IRSL signal from K-feldspar (pIRIR) that allows dating older deposits, as well as reduced fading. Furthermore, we collected the samples from 3-to-4m deep trenches to avoid the impact of surface weathering.

First ages obtained by quartz OSL dating showed chronological inconsistencies between the different terraces that we explain by the remains of felsdpar and/or clay within the quartz minerals lattice (after SEM and BSE analysis). However, preliminary ages obtained by pIRIR dating from feldspar range from 60±12 ka to 130±15 ka and are consistent with in-situ cosmogenic 10Be/26Al dating. Moreover, while these new results yield younger ages than the ones estimated by the soil index, they seem to be partially consistent with the previous 10Be dating. These new insights show that the uplift/incision is still ongoing and the shortening rate may be faster than previously estimated. That suggests reconsidering the seismic hazard along the Central Range front.