

Surface Exposure Dating with Cosmogenic Nuclide Depth Profiles: A Study of fold-and-thrust belt in the Western Taiwan

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The western foothills of Taiwan represent a major part of the passive Eurasian margin and comprise a typical thin-skinned fold-and-thrust belt. The Hsiaomei anticline is located between a series of mountain-front-bounding laterized terraces and the Chiuchungkeng fault. It is an active fault-propagation fold associated with a small amount of reverse slip along upper portions on the original normal fault, the blind thrust Hsiaomei fault. The first task of this study is to assess whether the growth of the western mountain belt can be linked to the shape of geometry and the kinematics development of the fold-thrust belt. Hence, methods suitable for correlate the river terraces in subtropical climatic condition of Taiwan are investigate in this study, and is dedicated further to identify the relationship between river terraces formation and tectonics activities. But many numerical dating techniques are not applicable to age range between 50K and 300K years old. To achieve these scientific goals, the analysis should combine both the quantitative geomorphology base on high resolution DEM and the statistical curve fitting from the cosmogenic nuclides concentration (^{10}Be)

measured in alluvial terraces profile.

In this study, we using two cosmogenic dating methods have been successfully and applied to two difference fluvial deposition. Our results indicate that two potentially active structures, the Hsiaomei anticline is characterized growth fold and associated with the blind thrusting (Hsiaomei fault) in western Taiwan. In Chiayi area, the Santieh River associated with growth of the Hsiaomei anticline with the incision rate of 0.2 cm/yr, integrated over the last ~40 kyr. The folding inception associated to the blind-thrust Hsiaomei Fault, and the shortening rate of the growth anticline, is on the order of ~0.5 cm/yr. The chronological framework of entrenchment and abandonment of the Pachang alluvial terraces spans the last 14 kyr. The results allowed of the new reassessment about occurrence of the river terraces deposits, cosmogenic profiles dating could provide a useful tool to distinguish depositional hiatus in Chaiyi area.

Key words: Cosmogenic profiles dating; Surface exposure age; ^{10}Be concentration; fluvial deposition