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英 文 ： U-Pb analyses of detrital zircons in a sedimentary rock from Yüshan Mountain in Taiwan

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８．研究実績報告（成果）（別紙にて約 1,000 字 A4 版（縦長）横書）（別紙に作成）

１０．成果公表の方法（投稿予定の論文タイトル、雑誌名、学会講演、談話会、広報等）
①学会講演（３月に結果が出たばかりなので講演学会名は未定）
②投稿予定論文タイトル：U-Pb dating of detrital zircons in Taiwan （雑誌名は未定）

備考　・研究成果を論文等で発表される場合、以下の形式の文章を謝辞等に記載して下さい。

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・特定共同研究 B については、プロジェクト終了年度に冊子による報告書の提出が必要です。

・研究成果について、本所の談話会、セミナー、「広報」での発表を歓迎いたします。

研究実績報告

課題番号：

U-Pb analyses of detrital zircons in a sedimentary rock from Yüshan Mountain in Taiwan

(台湾玉山の堆積岩中のジルコン U-Pb 年代測定)

Geological Background:

The analyzed rock was taken from the outcrop nearby the main peak of Yüshan Mountain (elevation is 3950 m above sea level) in Taiwan. Therefore, it is mapped as the Yüshanchushan Formation (Lee, 1979) which is composed of alternation of metasandstone and slate. The depositional age of this formation is assigned as Pre-late Eocene based mainly on the occurrence of the large foraminifera fossil of *Assilina*.

In stratigraphic column, the Yüshanchushan Formation is underlain by the Tachien Sandstone and overlain by the Chiayang Formation (Chen, 1977). The lithology of the Tachien Sandstone is metasandstone occasionally intercalated with greenstone whereas that of the Chiayang Formation is mainly slate. In a small scale (1:500,000) geologic map of Taiwan compiled by Ho (1988), the Yüshanchushan Formation was lumped into the Chiayang Formation as the lowest part. Thus, the name of Yüshanchushan Formation has vanished from the geologic map of Taiwan. The age of the Chiayang Formation is assigned by Ho (1988) as Eocene to Oligocene.

Result:

93 analyses were obtained from 100 grains of zircon separated from the rock sample of Yüshan Mountain. The youngest age is early Paleocene (65.1 ± 2.7 Ma). Two analyses show late Archean ^{238}U-^{206}Pb ages, of which, the oldest age is 2567 ± 75 Ma. Age spectrum shows several prominent age peaks at 120 Ma, 160 Ma, 240 Ma and 440 Ma, with weaker peaks at 530-1100 Ma and 1720-1840 Ma.

Preliminary Remark:

1. Nd model ages (T_{DM}), upper intercept age of U-Pb zircon discordia using TIMS and CHIME monazite ages consistently gave Paleoproterozoic crustal residence age, starting from about 2 Ga ago, for Taiwan's crustal rocks (See Lan et al., 2008, for review). The oldest age of this study, 2567 ± 75 Ma, suggested that the oldest crustal growth of Taiwan could extend back to late Neoarchean time and that the crustal residence age of Taiwan is derived from much older protolith.
2. Four tectonic events - an Early Jurassic event (200-190 Ma), a Late Mesozoic event (90-88 Ma), a Cenozoic of pre-Pliocene event (episodic from 56 to 9 Ma) and an ongoing Late Cenozoic event (since 5 Ma) delineated from previous isotopic dating for igneous and metamorphic rocks of Taiwan (Lan et al., 2008; Yui et al., 2008) are not comparable with the prominent age peaks of this study.
3. The age spectrum for the pre-crustal history (>250 ± 20 Ma) of Taiwan is comparable to that of west Cathaysia (Xu et al., 2007) in mainland China and may suggest a possible potential

source region for the Yüshanchushan Formation.

4. The youngest age of this study, 65.1 ± 2.7 Ma, defines the best estimate for the maximum depositional age of the sedimentary sequences of the Yüshanchushan Formation.
5. Further studies are needed for the nearby formations in the Yüshan Mountain area.

References

Chen, C.H., 1977. Some stratigraphic problems of the Hsuehshan Range of Taiwan. Proc. Geol. Soc. China 20, 61-70.

Ho, C.S., 1988. An introduction to the geology of Taiwan: Explanatory text of the geologic map of Taiwan. Central Geological Survey, MOEA, 192pp.

Lan, C.Y., Lee, C.S., Yui, T.F., Chu, H.T. and Jahn, B.M., 2008. The tectono-thermal events of Taiwan and their relationship with SE China. TAO (in press).

Lee. C.S., 1979. Paleogene rocks of the Yushan-Shuili area, Nantou, Central Taiwan. Memoir Geol. Soc. China 3, 237-247.

Xu, X.S., O'Reilly, S.Y., Griffin, W.L., Wang, X.L., Pearson, N.J. and He, Z.Y., 2007. The crust of Cathaysia: age, assembly and reworking of two terranes. Prec. Res. 158, 51-78.

Yui, T.F., Okamoto, K., Usuki, T., Lan, C.Y., Chu, H.T. and Liou, J.G., 2008. Late Triassic-Late Cretaceous accretion/subduction in the Taiwan region along the eastern margin of South China – evidence from zircon SHRIMP dating. Island Arc (in review)