

A study on sea-level changes and tectonic movements during the late Quaternary deduced from the uranium-series method of dating for emerged coral reefs

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A study on sea-level changes and tectonic movements during the late Quaternary deduced from the uranium-series method of dating for emerged coral reefs

Research Project

Project/Area Number

13440145

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

Geology

Research Institution

Kanazawa University

Principal Investigator

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2001 - 2004

Keywords

Uranium-series Dating / Quaternary / Coral Reef Terrace / Sea Level Change / tectonic Movement / Kikai Island / Philippine Islands / Marine Isotope Stage

Research Abstract

This study was performed on coral reef terraces to compare regionally the relative sea level changes and tectonic movements from the Ryukyu through the Philippine Islands. The results revealed that the "Western Pacific Region" has experienced significantly different tectonic movement during ca. 210 ky, as follows :

1. Based on the α -spectrometric $^{230}\text{Th}/^{234}\text{U}$ method of dating, the lowest Pleistocene reef terrace in Kikai Island was proved to have been

formed in different depositional environment during Marine Isotope Stage 5b (MIS-5b) through MIS-3, with lowering the relative sea level, namely from the insular shelf where fore-reef sediments were deposited to shallow water environment where reefs were formed. Holocene reef terrace along Araki Coast of Kikai overlies thin coral limestone and can be sub-divided into six steps, have been emerged at ~7.4, 6.6, 4.0, 3.0 ky or later, respectively.

2. $^{230}\text{Th}/^{234}\text{U}$ method of dating was successively applied to reef-building corals collected from the lowest reef terrace of Aguni, Tarama and Ishigaki Islands, which were assigned to MIS-7, MIS-5c and MIS-5e, respectively.

3. U-series dates from 0.93 ± 0.04 to 8.57 ± 0.13 ky were obtained from hermatypic corals collected from several marine terraces (at a maximum altitude of 45m) along the west coast of Taiwan. This fact indicates that the upheaval rate of Taiwan during Holocene is highest in the world.

4. The reef terrace assigned to MIS-5e is distributed at the altitude of 13-14 m in the Panglao Island adjacent to the southwestern end of Bohol Island, whereas the reef terrace of the same age is attained to 29 m at the Pamilacan Island. It means that the tectonic movement may occur among small-scaled blocks. Such a tectonic movement can be observed in Holocene reef terraces and the other paleo-sea level indicators such as tidal notches and a cluster of micro-atoll along northwest coasts of the Luzon Island.

Research Products (28 results)

All	2005	2004	2003	2002	2001
All	Journal Article (25 results)		Book (3 results)		

[Journal Article] 喜界島に分布する後期更新世最下位段丘構成物の堆積年代	2005 ▼
[Journal Article] U-series ages of carbonate sediments underlying the lowest Pleistocene marine terrace in Kikai Island, Central Ryukyus, Japan.	2005 ▼
[Journal Article] U-series dates of Pleistocene corals and their tectonic implications to the paleo sea levels and the vertical displacement in the central Philippines	2004 ▼
[Journal Article] Higher-than-present Holocene mean sea levels in Ilocos, Palawan and Samar, Philippines	2004 ▼
[Journal Article] Interstadial coral reef terraces and relative sea-level changes during marine Isotope stages 3-4, Kikai Island, central Ryukyus, Japan	2004 ▼
[Journal Article] 台湾におけるサンゴ化石の $^{230}\text{Th}/^{234}\text{U}$ 年代からみた ^{14}C 年代のローカルリザーバー効果と気候変動	2004 ▼
[Journal Article] Sea level change during the last interglacial deduced from coral reef terraces of Bohol Island, Philippines	2004 ▼
[Journal Article] U-series dates of Pleistocene corals and their implications to the paleo-sea levels and the vertical displacement in the central Philippines	2004 ▼
[Journal Article] Higher-than-present mean sea levels in Holocene mean sea levels in Ilocos, Palawan and Samar, Philippines	2004 ▼
[Journal Article] Interstadial coral reef terraces and relative sea-level changes during marine oxygen isotope stages 3-4, Kikai Island, central Ryukyus, Japan.	2004 ▼
[Journal Article] Local marine reservoir effects and climate changes deduced from α -spectrometric $^{230}\text{Th}/^{234}\text{U}$ and AMS ^{14}C dates of Holocene fossil corals collected from Taiwan	2004 ▼
[Journal Article] Last interglacial sea level changes deduced from coral reef terraces in southwest Bohol, Central Philippines	2004 ▼
[Journal Article] Trace elements and radioactive isotopes in carbonate fossil hard tissues	2004 ▼
[Journal Article] Quaternary shorelines of Kaibu Island, southwest Pacific Ocean : implications for last interglacial sea-level history and uplift of the Lau-Colville Ridge	2003 ▼
[Journal Article] 南西諸島喜界島西端の荒木海岸における完新世サンゴ礁段丘	2003 ▼
[Journal Article] Quaternary shorelines of Kaibu Island, southwest Pacific Ocean	2003 ▼
[Journal Article] Holocene coral reef terraces at Araki coast of Kikai Island, southwestern Japan	2003 ▼

- [Journal Article] Late Quaternary sea-level and tectonic changes in northeast Fiji 2002 ▾
- [Journal Article] サンゴ化石の $^{230}\text{Th}/^{234}\text{U}$ 年代からみた琉球列島における ^{14}C リザーバー年代 2002 ▾
- [Journal Article] Late Quaternary sea-level and tectonic changes in northeast Fiji 2002 ▾
- [Journal Article] Marine reservoir age deduced from α -spectrometric $^{230}\text{Th}/^{234}\text{U}$ ages of fossil corals collected from the Ryukyu Islands, southwestern Japan 2002 ▾
- [Journal Article] Last interglacial coral record of enhanced insolation seasonality and seawater ^{18}O enrichment in the Ryukyu Islands, the northwestern Pacific 2001 ▾
- [Journal Article] Last interglacial coral record of enhanced insolation seasonality and seawater ^{18}O enrichment in the Ryukyu Islands, northwest Pacific 2001 ▾
- [Journal Article] Tectonic history and eustatic sea level changes in Tsukumo Bay area, Ishikawa Prefecture 2001 ▾
- [Journal Article] Topographic development of the Ryukyus 2001 ▾
- [Book] 古生物の科学5:地球環境と生命史(鎮西清高, 植村和彦編) 2004 ▾
- [Book] 北陸の自然をたずねて(北陸の自然をたずねて編集委員会編) 2001 ▾
- [Book] 日本の地形7:九州南西諸島(太田陽子ほか編) 2001 ▾

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