Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)
©2015. Japan Geoscience Union. All Rights Reserved.

SIT07-P01 Room:Convention Hall Time:May 25 18:15-19:30

Tectonic evolution of the Philippine Sea: Magnetic data collected during the Japanese continental shelf survey

OKINO, Kyoko[1*]

[1]AORI, The University of Tokyo

Marine magnetic anomalies have been used to date the seafloor, characterize the oceanic crust and reconstruct the evolution process of ocean basins. Japanese continental shelf survey project has collected high-quality, dense magnetic data in the Philippine Sea and the adjacent areas for two decades. The compiled and processed magnetic anomaly data improve our understanding of the tectonic history of the area. Clear magnetic lineation patterns in the Shikoku, Parece Vela basins allow us to elaborate the spreading history of these basins, including the initiation and cessation process of the backarc opening. The anomalies associated with the Kyushu-Palau Ridge also record the transitional phase from arc volcanism to backarc rifting-opening. The West Philippine Basin, Daito Ridges and its intervening small basins, that was formed before the formation of the paleo-IBM arc, show their specific magnetic characteristics. These areas are considered to have moved northward and rotated after their formation. The skewness analysis of magnetic data can provide us some insights about paleo-latitude and/or rotation.

Keywords: tectonics, Philippine Sea, magnetic anomaly, backarc basin, arc

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)
©2015. Japan Geoscience Union. All Rights Reserved.

SIT07-P02 Room:Convention Hall Time:May 25 18:15-19:30

Petrography of mantle xenoliths from Lyudao, in the Luzon arc, Taiwan

KOMARU, Chihiro[1*] ; MORISHITA, Tomoaki[1] ; TAMURA, Akihiro[1] ; ARAI, Shoji[1]

[1]1Graduate School of Natural Science, Kanazawa University

Lyudao, island of southeastern Taiwan, is located at the north end of the Luzon arc. Lyudao is volcanic island, which is made up of andesitic rocks and pyroclastic rocks. Peridotite xenoliths have been found in andesite of Lyudao and Lanyu (Chen, 1988 Acta Geol. Taiwanica). Lanyu is the island, which is located on the south of Lyudao. Peridotite xenoliths have been found in the Luzon arc, such as Batan Island (Arai and Kida, 2000 Island Arc; Arai et al., 2004 J. Petrol.), Pinatubo volcano (Kawamoto et al., 2013 PNAS) and Siayan Island (Y. Iizuka, unpublished date). Peridotite xenoliths from Luzon arc can provide spatial information of mantle wedge peridotites at the subduction zone. Because Lyudao is located at the north end of the Luzon arc, it is important for addressing the spatial variations. Peridotite xenoliths in Lyudao Island have never been, however, studied in details since Chen (1988). Here we report petrological characteristics of peridotite xenoliths from Lyudao.

Peridotite xenoliths are mainly harzburgite with one olivine websterite. Harzburgite shows two types in terms of grain size; fine-grained (less than 0.1mm across) and coarse-grained (several millimeters across). These textures coexist in hand-specimen. There is no difference in mineral mode between them. These petrological textures are the same as those of Batan Island (Arai et al., 1996). Amphibole occurs at the border part of the host andesite and peridotite xenoliths. The Fo content [=100Mg/(Mg+Fe^{2+}) atomic ratio] of olivine is from 91 to 92. The Al_2O_3 content and Mg# [=Mg/(Mg+Fe^{2+}) atomic ratio] of orthopyroxene are from 2.4 to 3.5 wt%, and from 0.90 to 0.92, respectively. The Al_2O_3 and Cr_2O_3 content, and Mg# of clinopyroxene are from 1.7 to 4.3 wt%, about 1 wt%, and from 0.90 to 0.94, respectively. The TiO_2 and Na_2O contents of clinopyroxene are very low, being from 0 to 0.2 wt%. Fe^{3+}/(Cr+Al+Fe^{3+}) atomic ratio of spinel is very low, mostly being less than 0.2, There Cr# [=Cr/(Cr+Al) atomic ratio] and TiO_2 content is from 0.4 to 0.6, and from 0 to 0.1wt%, respectively.

Keywords: xenolith, mantle, peridotite, Luzon arc, Taiwan, Lyudao

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)
©2015. Japan Geoscience Union. All Rights Reserved.

SIT07-P03 Room:Convention Hall Time:May 25 18:15-19:30

Deformation history of the Chimei Fault, eastern Taiwan: Insights from paleostress and fold analysis

KUO, Szu-ting[1*]

[1]Institute of Geosciences, National Taiwan University

The Chimei Fault, the only fault cutting across the Coastal Range in eastern Taiwan, is the boundary fault that thrusts the forearc basement (Tuluanshan Formation) over the forearc sedimentary rocks (Paliwan Formation). Although previously deemed to be a reverse fault with strike-slip component, paleostress pattern along the Chimei Fault zone has not yet been established. In order to reconstruct the deformation history of the fault, this study carries out paleostress and fold analysis along a well-exposed outcrop in the central part of the Coastal Range.

The Chimei Fault zone is composed of 100 and 500-m wide damage zones in the hanging wall and the footwall, with several sets of subsidiary faults developed intensely. Based on crosscutting relationship, the fault-slip data could be divided into three stages. The earliest stage is characterized by the left-lateral fault slickensides that crosscut mineral veins related to heat flow activity in the Tuluanshan Fm. In the footwall, a 100 m-wide fold zone, including boudins and mud-filled veins, indicates deformation of buried unconsolidated sedimentary rocks during the second stage. The third stage is characterized by brittle subsidiary faults. The predated folds and postdated brittle faults indicate that the deformation depth of fault rocks decreased during faulting. In addition, both folds and faults show N-S compression, suggesting that two structural processes record the same paleostress status.

The three-stage evolution could be comparable to previous reconstruction from paleomagnetic analysis: (1) The initial left-lateral component is consistent with island-arc movement since late Miocene; (2) Folding and faulting of the footwall then illustrate the N-S forearc closure since late Pliocene.

Keywords: fault damage zone, paleostress analysis, fold analysis, reverse fault