Japan Geoscience Union Meeting 2010
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SSS026-09 会場:ファンクションルームB 時間: 5月26日16:00-16:15

伊豆・小笠原海洋性島弧の地震波速度構造とその島弧地殻進化に関する解釈

Result of active-source seismic imaging in Izu-Bonin intra-oceanic arc and its implications for arc evolution

小平 秀一[1*]

Shuichi Kodaira[1*]

[1]海洋研究開発機構

[1]JAMSTEC IFREE

Toward understanding formation, deformation and alternation processes of arc crust in the Izu-Bonin intra-oceanic subduction zone, JAMSTEC has been conducting intensive active-source seismic surveys to cover the entire Izu-Bonin arc. I revealed, from those surveys, several new seismological constraints on formation processes of an arc crust. For examples, a large volume of felsic-to-intermediate component crust having Vp of 6 - 6.8 km/s has been predominantly observed beneath basaltic volcanic centers along the current volcanic front, which is believed to preserve an entire crustal formation process since a steady-state plate subduction has been occurred. I also discovered a similar along arc variation of the felsic-to-intermediate component crust in the rear-arc, which is proposed to be separated from the volcanic front. These findings suggest that the main part of the arc crust consisting of the felsic-to-intermediate component was created before the rear-arc has been separated from the volcanic front probably in Oligocene age. From recently obtained seismic data in the fore-arc, on the other hand, I found that the structure of the fore-arc region represents significantly different characters from that of the volcanic front. Petrological studies in the fore-arc region proposed a formation of oceanic crust associate with boninitic volcanism (i.e., supra-subduction zone ophiolite) during an initial stage of subduction. The newly obtained seismic structures in the fore-arc strongly support this idea; i.e., layers having crustal seismic velocity is remarkably thin (less than 10 km) under the Bonin ridge, and velocity-depth profiles in the fore-arc is almost identical to that of typical oceanic crust as well as an ophiolite section. Compiling the above seismic structures in the fore-arc, the rear-arc and the volcanic front well demonstrates the crustal evolution process from the fore-arc oceanic crust formed in the initial stage of the subduction to the mature arc crust in the current volcanic front.