

Preliminary results of the geophysical mapping in the Australian-Antarctic Discordance - R/V Hakuho-maru KH01-3-3 cruise-

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The AAD (Australian-Antarctic Discordance), a part of the Southeast Indian Ridge between the Australia and the Antarctic continents, is known as its chaotic morphology and anomalous depth. The AAD is one of the important target areas for mid-ocean ridge studies, for the magmatic supply is very low due to the low mantle temperature beneath the AAD under intermediate spreading rate (74mm/year). During KH01-3-3 cruise (R/V Hakuho-maru, 2002.1.26-2.12) we conducted the geophysical mapping using SeaBeam2120, proton magnetometer and shipboard gravimeter and reflection and refraction surveys. In our poster, we show the preliminary results of the bathymetry and magnetic anomaly surveys. The ridge axis in the AAD is divided into five segments, B-1 to B-5 from east to west, based on previous studies. The off-axis seafloor of B-5 segment shows the well-ordered, ridge-parallel abyssal hills, on the other hand the chaotic morphology including the mullion structure is dominant in B-4 segment. Our survey covers on- and off-axis seafloor of B-3 segment, where the chaotic structure has been expected. The swath survey covers the almost whole length (90 km) of the axial valley of B-3 segment, trending 105 deg. and off-axis areas up to 70 km. The axial valley has a discontinuity at the middle of the B-3 segment, where the axis shows about 10 km right-step offset. The B-3 segment consists of two second order segments, B-3W and B-3E. The off-axis seafloor of B-3W, a typical, well-ordered abyssal hill pattern is observed. The average depth is rather shallower at the south of the axial rift, indicating the existence of a slight asymmetry of crustal production. The feature of B-3E segment is a complete contrast to the well-ordered B-3W segment. The morphology is chaotic, consisting of both ridge-parallel and ridge-perpendicular lineaments and semi-circular hills and depressions. The inside corner of the easternmost B-3E, mullion-like structure is observed. Ten magnetic anomaly profiles parallel to the relative plate motion are also obtained. The magnetic anomalies younger than Chron 2 (2Ma) can be identified and an asymmetry about the ridge axis is observed in the eastern part of B-3E. Our data shows that the recent anomalous area is limited to B-4 and B-3E in the AAD. Future analysis will lead us the better understanding of the detailed spreading history after 2 Ma and the origin of the anomalous structure of the AAD.