Spreading rate and its stability of Chile Ridge near the Chile Triple Junction

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Chile triple junction (CTJ) is located at 46°13'S, 75°13'W off the coast of Chile and is composed of Nazca plate, Antarctic plate and South America plate, forming a ridge-trench-trench type triple junction. Chile ridge that is an active spreading ridge is subducting under the South America plate at CTJ and is the only ridge system that is currently subducting under trench in the world. Therefore this area is an important target to study the behavior of the active ridge just before subduction. And also, the mechanism and a possible driving force of the active ridge subduction are also to be studied by subsurface structure, age, development history, and so on through marine geophysical survey. The authors analysed total geomagnetic data from the tracks along the segments and attempted to obtain seafloor spreading rate at each segment and seafloor age from magnetic anomaly, and spreading stability in this area by the magnetic N/R boundary strikes derived from the three component magnetic data. Both the total force and the three-component magnetic data for this study were obtained from MR16-09 cruise by R/V MIRAI, Leg1 and Leg2. Marine Trackline data that were achived in National Geophysical Data Center were also used supplementarily. Seafloor spreading rate decrease is shown along almost all the tracks close to the trench, and comparison of several track data along the Segment SCR1 shows the same characteristics that spreading rate along the southern track is slower than that along the northern track. Moreover, the result from the other segments show that SCR1’s spreading rate (about3.0cm/yr) is higher than SCR3’s one (about 2.0cm/yr). These results show spreading rate is decreasing as the ridge is close to the trench. This mightbe due to declining of igneous activity and reduction of magma supply rate near the trench as Matsumoto et al (2013) showed. The reason why the young seafloor subducts early is that increasing of slab pull force caused by thickening of the oceanic lithosphere by cooling with closing the trench. Magnetic N/R boundary strike shows almost uniform trends, except near Guamblin fracture zone, so spreading stability is attained on the whole.

