



Structural image of the north Chile subduction zone offshore between 28°S and 33°S

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The grid of multichannel reflection seismic profiles with a total length of 1522 km acquired by BGR and the comprehensive amount of high resolution multibeam bathymetric data available between 28°S and 34°S improve the structural image of the north Chilean subduction zone considerably.

On this data basis a detailed structural interpretation has been carried out. Structural boundaries like major faults, the subduction front, and the westernmost signature of the continental crust of the South America Plate were identified on the seismic lines and correlated with corresponding lineaments and topographic features on the bathymetry map.

The results show a prominent system of normal faults bounding the horst and graben structures of the downbended oceanic Nazca Plate in great detail. The faults form different angles with the trench axis. Further, on the Nazca Plate lineaments are discovered trending NW-SE, subparallel to the magnetic anomalies. They could have formed during the seafloor spreading process. The Chile Trench is extremely narrow north of 33°S. The westernmost limit of the South American continental crust (WLC) is morphologically characterized by the seaward limit of the mid-slope terrace. Detailed analysis of the bathymetry shows that the WLC is displaced by sinistral NW-SE trending strike slip faults. A great number of those faults displace the lower and middle slope of the Chile margin including the subduction front. In the vertical, on some seismic lines those strike slip faults are imaged by minor faults at the seafloor and by major seaward dipping faults of the continental basement. The upper slope is dissected, too, but only a few strike slip faults could be traced to the subduction front.

Possibly, the strike slip faults can be associated onshore with NW-SE trending strike slip fault systems occurring north of 30°S at the Coastal Cordillera or even at the Western Cordillera.