South Falkland Basin Fold and Thrust Belt

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Abstract

High quality seismic data from submarine fold and thrust belts provides a spectacular opportunity to study the evolution of these complex settings. The South Falkland Basin is no exception. Subduction beneath the South American plate along the Magallanes-Fagnano Fault becomes transpressional along the North Scotia Ridge, whereby the Burdwood Bank, has been accreted on to the southern margin of the Falkland Plateau. This resulted in the downwarping of the underlying Mesozoic shelf, with reactivation and development of normal faults that displace both the basement and Cenozoic sediments. This tectonic regime, thought to have initiated in the Miocene, and was accompanied by the development of a fold and thrust belt and foreland basin. This fold and thrust belt can be considered to be an offshore extension of the Magallanes fold and thrust belt of Terra Del Fuego and has a similar complex of north-vergent thrust geometries. This contribution provides a detailed description of the fault architecture using a 2D and 3D seismic dataset. Key reflectors and faults were mapped to produce contour maps in depth of the main horizons. The foreland basin displays a range of fault structures of varying generations, suggesting reactivation of pre-existing fault structures, as well as development of new structures. The FTB itself displays the characteristic range of structures from the deformation front to the hinterland. The frontal thrusts cut through post-Early Paleogene sediments and appear to have a decollement at approximately the Top Cretaceous unconformity, although thrusts in the hinterland appear to detach at a deeper level. Furthermore, the style of thrusting varies from thin-skinned in the east to thick skinned in the west. The thin-skinned deformation is illustrated whereby undeformed Mesozoic reflectors are visible beneath thrust sheets, while thrusts in the western area are more complex and include basement and sedimentary

packages. This variation is largely controlled by the increasing depth to basement from west to east.