

## DEEP-TOWED SONAR SURVEY AT THE EAST SCOTIA RIDGE

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The deep-towed sonar, TOBI, incorporating 30 kHz sidescan and phase bathymetry subsystems, was deployed on two segments of the East Scotia Ridge, an intermediate-rate (65 - 70 km Ma<sup>-1</sup>) spreading centre behind the South Sandwich Arc, during a 28-day leg by RRS James Clark Ross in February and March 1999. The two segments lie at the northern and southern extremities of the ridge, and are both anomalously shallow in comparison with the intervening segments. Segment E2 is propagating southward at the expense of E3, and varies in its morphology, from a shallow median valley at a depth of 4000 m near the propagator tip, to a narrow, steep-sided topographic high at approximately 2650 m near its centre. Beneath this feature, known as the 'mermaid's purse', an axial magma chamber (AMC) reflector was observed by seismic profiling in 1995. This segment, and its southern counterpart E9, were the targets for deep-towed sonar mapping together with hydrothermal plume detection using a newly-developed optical backscatter sensor string which was suspended beneath the TOBI vehicle. The biggest surprise was the form of the axial high at E2, which was bounded on its western and eastern flanks by steep, narrow and rugged ridges, rising in places to a depth of 2300 m. Evidence was obtained for hydrothermal activity in the form of particle-laden mid-water plumes overlying the centres of segments E2 and E9.