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The ESASSI-08 cruise in the South Scotia Ridge region: Water masses, currents, and the ASF

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The ESASSI-08 oceanographic cruise carried out in January 2008 was the major milestone of ESASSI, the Spanish component of SASSI (a core project of the International Polar Year devoted to study the shelf-slope exchanges in different locations of Antarctica). The specific objectives of ESASSI, the sampling strategy and the overall distribution of the main variables across the 11 sections covered by the cruise are presented in a poster. Here we focus on three specific issues: i) the observation of strong tidal currents over some of the sampled slopes; ii) the path of the Antarctic Slope Front (ASF) over the SSR; and iii) the outflow of dense, ventilated water from the Weddell Sea into the South Scotia Sea.

The main results are: i) Strong tidal currents with a significant diurnal component were observed over the southern slope of the SSR. Three tidal models are compared with the observations and used to de-tide ADCP currents. ii) The signature of the ASF is clearly detected on the southern slopes of the SSR (on the Weddell Sea flank). Over the northern slopes (the Scotia Sea flank), however, only weak signatures of frontal structures are observed; an in-depth biochemical analysis will be required to link the structures observed over the two flanks of the SSR. What seems clear is that the ASF does not extend further than Elephant Island, since southwestward of that island the shelf and the slope are fully occupied by Circumpolar Deep Water (CDW) from the Antarctic Circumpolar Current. iii) The shallower component of Weddell Sea Deep Water (Upper WSDW) flows over the SSR and pours into the Scotia Sea except to the east of Elephant Island, where the channels are less than 1500 m deep. The densest component of WSDW (Lower WSDW) is observed at both flanks of the SSR, but again a more detailed analysis of biochemical data will be required to prove a direct flux of this water mass across the SSR. Weddell Sea Bottom Water (WSBW) is not observed in any of the sampled sections.