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Seismic reflection imaging of a canyon system at the Argentine continental margin to identify changes in sediment transport und ocean circulation

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The deposition of contourites in the oceans is controlled by bottom water currents and thus the characterization of contouritic features (e.g. sediment drifts, moats) with seismic reflection data provides a means to reconstruct past changes in the abyssal circulation. This is particularly challenging in areas with significant interaction of the contour currents with turbiditic processes. We here present a detailed investigation of such a depositional system located between 41 and 45°S at the slope of the Argentine continental margin. A complex history of sediment deposition in the study area is indicated by the presence of a canyon system, submarine channels and sediment drifts. We use a dense grid of seismic reflection profiles to identify sedimentary units from regional reflector PLe (∼65 Ma) upward, map depocentre geometries and separate along-slope from down-slope processes.

The most prominent indicator for along-slope current controlled transport processes is a detached, elongated and buried sediment drift that most likely is the extension of a giant drift previously identified further to the south where it crops out at the seafloor. Overall, the feature extends over more than 400 km along the margin and is bounded by regional reflectors AR4 and AR5. Based on a tentative seismostratigraphy for the area the drift grew from ∼34 to 17 Ma and was likely shaped by Antarctic bottom water (AABW) circulating in the Argentine Basin. Along with Miocene climate cooling (< 12 Ma) down-slope processes became more prominent. The upper sedimentary column is characterized by a major erosional unconformity and the development of the canyon system.