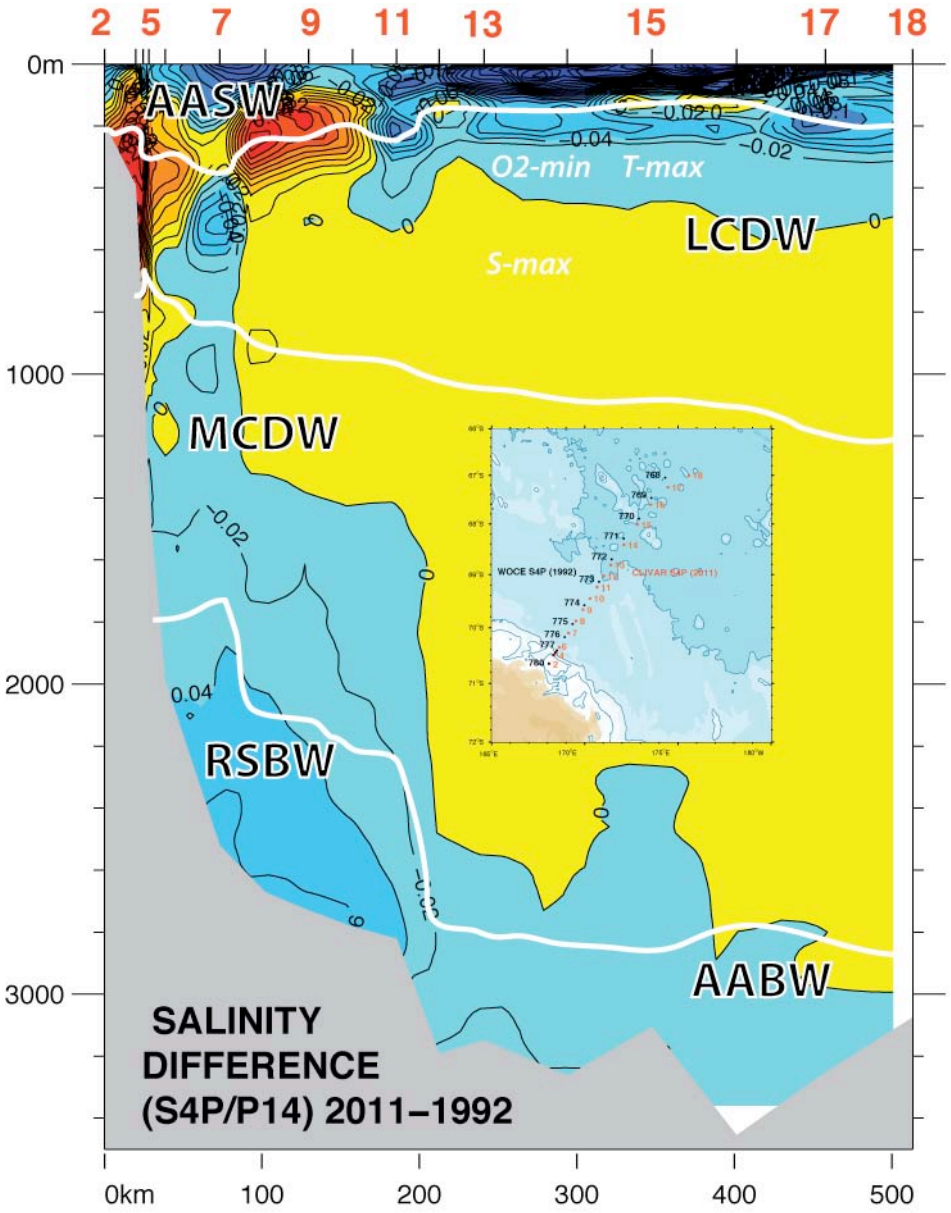

Caption (Alex Orsi): A remarkable contrast in the spatial and temporal distribution of currents and water properties is apparent on the 2010 repeat of S04P near Cape Adare. Sharp subsurface gradients and strong westward flow over the upper continental slope mark the Antarctic Slope Current, but tens of km farther offshore than in 1992. In addition to the expected small to mesoscale variability at this frontal location, we notice significant long-term changes in the characteristics of all major water masses. The regional types of Antarctic Surface and Bottom waters are considerably lighter (by about 0.1 kg/m3) , and primarily due to the anomalous low salinities measured this year, e.g. AASW < 34 and AABW < 34.68. The thick bottom outflow of saline (>34.72) Ross Sea Bottom Water (RSBW) captured during WOCE with potential temperatures below -0.4°C is no longer revealed on the CLIVAR repeat. Instead the roughly 1000-m thick outflow includes new deep and bottom waters with temperatures colder than 0.2°C and fresher than 34.70. The bulk of the northern Lower Circumpoolar Deep Water (LCDW) shows opporite trends: it has warmed by about 0.1°C , and also gained salt content(~0.01) between the repeat hydrographies.

Near the shelf break, the local mixtures of LCDW and AASW with the evolving characteristics also render a fresher variety of Modified CDW (MCDW) that is able to contribute directly to the adjacent deep ocean basins along density layers. To some extent the current export of Shelf Water mixtures in the Ross Sea, although not as cold, resembles the more ubiquitous low-salinity AABW and MCDW outflows elsewhere around Antarctica.