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Recent summertime observations of interannual variability near the Filchner Sill and adjacent continental shelf

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Over the Antarctic continental shelves the focus has until recently been on the export of cold dense shelf waters to the world's deep ocean. Far less attention has been given to the import, onto the continental shelves, of surface and warm deep waters, which are key components of the heat, salt and mass budgets for the shelf seas. In the southern Weddell Sea, limited observations indicate that Modified Weddell Deep Water (MWDW) upwells onto the continental shelf, thus providing source water for the shelf regime. These intrusions of MWDW occur at various locations along the shelf break, although only two are known to persist beyond the shelf break region, accessing the shelf via 200-m deep troughs that cut through the surrounding shelf. The westernmost inflow reaches as far south as Ronne Ice Front before entering the sub-ice shelf cavity, while the other inflow heads southward along the eastern flank of Filchner Depression. Our knowledge of heat and fresh water transports across the shelf break and shelf is limited by sparse and sporadic observations. To address this, hydrographic surveys were undertaken in early 2003, 2005, and 2007; however, perennial sea ice restricted ship access to all but the eastern shelf, Filchner Depression and shelf break. Nevertheless, these observations should also provide a useful analogue for the westernmost inflow of MWDW. From these three cruises, the CTD observations show the progress of the MWDW along the shelf break, its rise onto the shelf, and its southwards flow towards Filchner Ice Shelf, together with a near surface southward flow along the coast. Strong interannual variability is observed in the distribution and properties of these water masses, which make a significant contribution to the flux of

heat, salt, and mass budgets of the shelf region east of Filchner Depression.