Float of the month

March 2009

Caught in the Agulhas Current

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Between May and September of 2008 this float was situated in the Agulhus Current. This current transports warm and saline Indian Ocean water along the south-east coast of South Africa. Near Cape Agulhus, the southern tip of Africa, it 'retroflects': instead of continuing its way into the Atlantic Ocean, it turns back by nearly 180°; to flow eastward. The position of the retroflection is not constant, but moves back and forth between roughly 15°E and 25°E. Often large rings containing the warm and saline Indian Ocean water are spun off from the retroflection and transported into the South Atlantic Ocean.

Our float has been launched over the Agulhus Plateau. After drifting westward for about two months it leaves the plateau (Fig. 1) and is caught by the Agulhus Current. This is clearly visible from the water becoming warmer and saltier (Fig. 2). Within the current, it makes two fast and large west-east sweeps, the second of which brings it until 15°E, well within the Atlantic Ocean (Fig. 1). But staying within the retroflecting current, it is transported back into the Indian Ocean and finally leaves the warm and saline Indian Ocean water in September (Fig. 2). Heading southward, it is finally caught by the Antarctic Circumpolar Current (ACC) and will probably continue its way into the Indian Ocean and may even reach the Pacific.

Usually, the density is nearly constant at a given depth, reflecting the fact that currents are weak. In this case, however, the imprint of the Indian Ocean water is clearly seen in the density section. Between April and September of 2008 the water is markedly denser down to at least 1500 m. This large density difference suggests that the strong Agulhus Current reaches down to this depth.

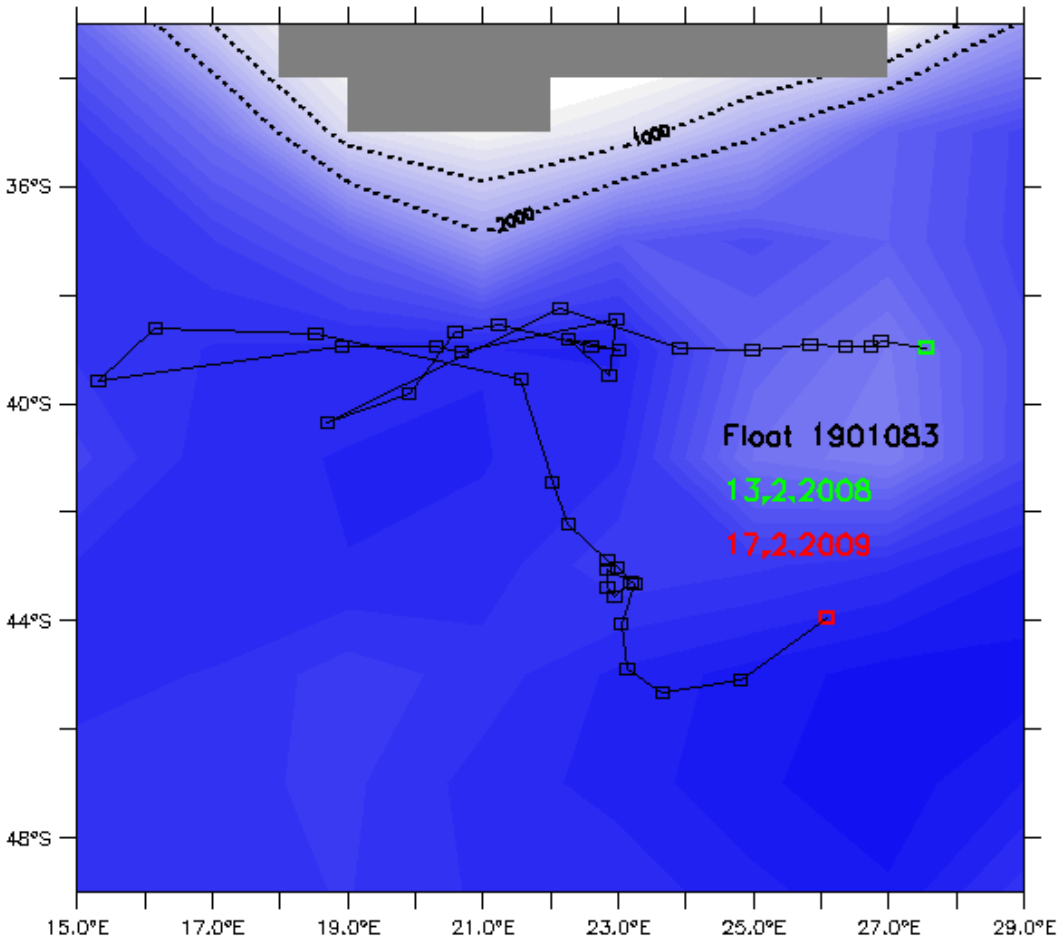

Figure 1: Trajectory of float 1901083. It was launched on February 13, 2008 (green box), and its most recent profile was obtained on February 17, 2009 (red box). The black boxes indicate the positions from where it transmitted a profile. They are 10 days apart.

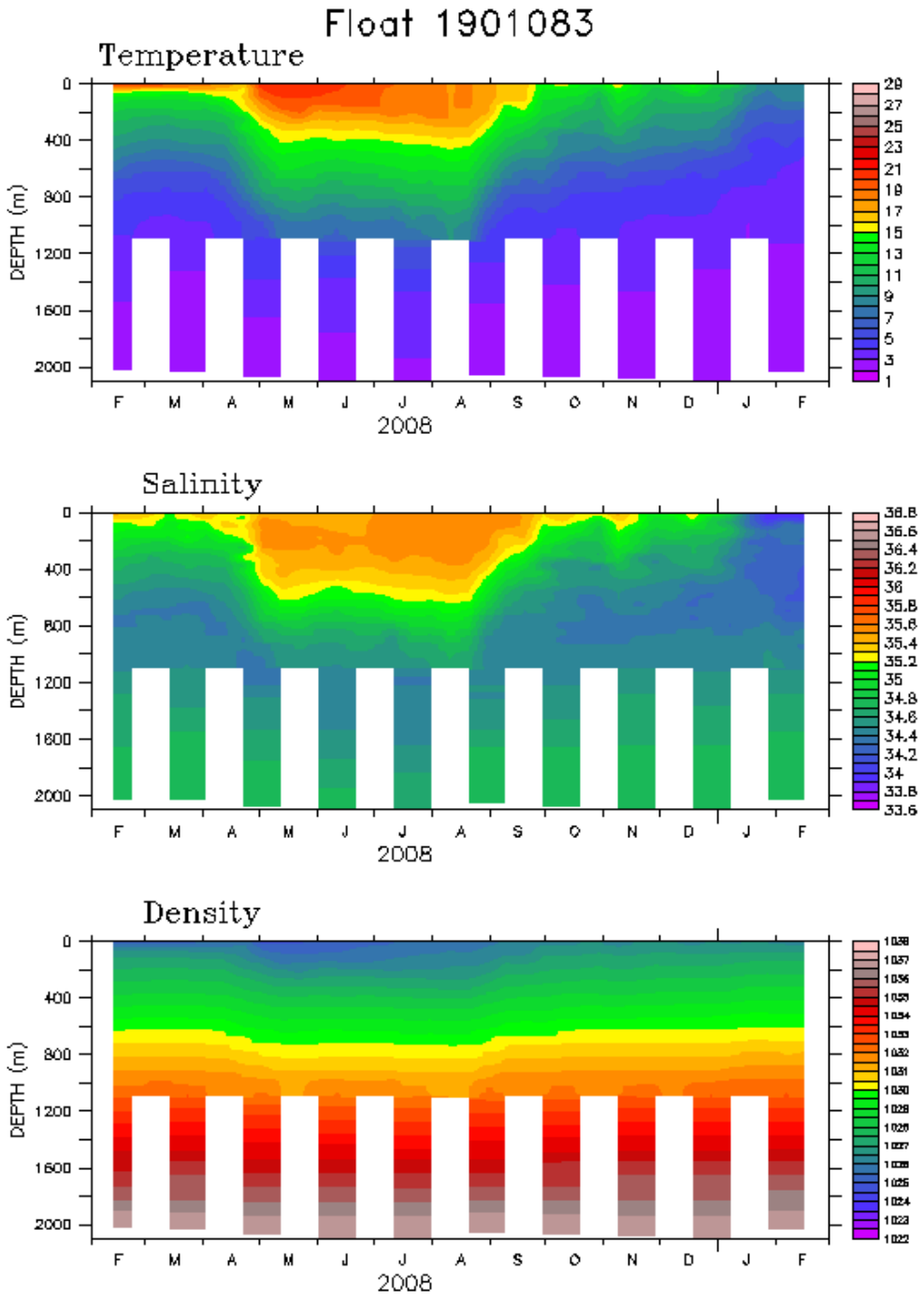

Figure 2: Section of temperature, salinity and density along the path of the float. The x-axis thus represents both time and position. The float takes one profile every 10 days. Every fourth profile goes down to 2000 m, while others reach only 1000 m.