As the Agulhas Current terminates downstream and retroflects (see Retroflection), it sheds vortices. These vortices are anticyclonic and are known as Agulhas rings (refer to Fig. 1). They cause a substantial unidirectional leakage of tropical and subtropical waters from the Indian Ocean to the Atlantic Ocean which could be an important component of the global thermohaline circulation (Pichevin, Nof and Lutjeharms, 1999).

Ring shedding occurs at irregular intervals, but on average about six times per year. The diameter of an Agulhas ring is between 200 and 280 km, reaching a depth of about 1100 m. From the retroflection region they drift northwestward into the south Atlantic, travelling at a speed of approximately 5-8 km per day (Pichevin, Nof and Lutjeharms, 1999).

Based on Bleck and Boudra (1986) reduced-gravity isopycnic model, the Natal pulse was simulated, and it was concluded that Natal pulses do not create Agulhas rings (as has been previously suggested). They can, however, result in the shedding of a ring or accelerate the process. The model also showed that the production of rings is intrinsically necessary, as without

Figure 1 - Sketch of the eddy shedding process at the retroflection. From Lutjeharms and van Ballegooeyen (1988).
this production the flow force associated with the Agulhas Return Current would not be balanced (Pichevin, Nof and Lutjeharms, 1999).

Lutjeharms and van Ballegooyen (1988) showed that at the subtropical convergence, a cold wedge of Sub-Antarctic Surface Water is formed prior to almost all ring shedding events (refer to Fig. 3). This wedge penetrates through the retroflection loop and separates the newly-formed Agulhas ring from the retroflection loop.

Figure 2 - South to north temperature (a) and salinity (b) cross-sections of an Agulhas ring. (Diagram reproduced and altered from Duncombe Rae, 1991).
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