

Interactive comment on “Three decades of research on the greater Agulhas Current” by J. R. E. Lutjeharms

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Page 945: The shelf structure off Durban is actually more complicated than the shallow region ‘ending abruptly at Durban’. There is a step structure at about 500 m depth, which affects the Agulhas Current structure to a marked extent, since the flow extends well below that depth. Indeed, this may also be a mechanism which could cause changes in the Agulhas Current, and possibly affect the germination of the Natal pulses. It is only farther south - more than 100 km at about Port Edward (Fig 3) - that the whole shelf narrows again to a single structure. Schumann (1982) provided evidence for a large semi-permanent clockwise eddy with the southern limb at a position more than 50 km south of Durban and extending offshore for more than 20 km.

Page 947: The evidence that there is an ‘upwelling cell’ at Port Alfred is tenuous indeed,

and the Figure 5 given in support of this statement shows how variable it actually is. Upwelling occurs along much of the southeast coast (Schumann, E H The coastal ocean off the east coast of South Africa, *trans. Roy Soc. S. Afr.*, 1987, 215-229), and is driven by more than the mechanism given by the author. Ekman veering in the bottom boundary layer plays its part in bringing colder, deeper water onto the narrow shelf (Schumann, E H The bottom boundary layer inshore of the Agulhas Current off Natal in August 1975, *S.Afr. J. mar. Sci.*, 4, 93-102). It can then be brought to the surface by northeasterly winds. Such upwelling has been observed from Port Edward all the way to Port Elizabeth, increasing in frequency with distance south. There is no special reason to identify Port Alfred as an 'upwelling cell', and indeed the terminology has had unfortunate consequences. Biologists have taken it to mean that Port Alfred identifies some sort of dividing line between conditions to the north and those to the south. As indicated above this is far from the truth, since there is a gradual transition all along the coast. This is then also a plea to the author to stop using the term 'upwelling cell', since it implies a circumscribed area with identifiable distinct properties, which the area around Port Alfred does not have.

Note that Figure 18 is similar to Figure 19.4 in Schumann, E H The coastal ocean off southeast Africa, including Madagascar, *The Sea*, 11, 557-581.

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