

**EGUSPHERE-2023-1051**  
**CHARACTERIZATION OF PHYSICAL PROPERTIES OF A  
COASTAL UPWELLING FILAMENT WITH EVIDENCE OF  
ENHANCED SUBMESOSCALE ACTIVITY AND TRANSITION  
FROM BALANCED TO UNBALANCED MOTIONS IN THE  
BENGUELA UPWELLING REGION**

REFEREE REPORT

1. GENERAL COMMENTS

This paper deals with results from a hydrographic survey of an upwelling filament in the Benguela Upwelling System. The objective of the paper is to investigate the evolution, lifetime and physical characteristics of the surveyed filament. Special emphasis is made on detecting the presence of unbalanced, ageostrophic motions. The paper presents ADCP, Scanfish, remote sensing and drifter measurements that were used to observe the hydrography and multi-scale dynamics of the filament and adjacent circulation. My opinion is that this is a timely contribution to the literature on upwelling filaments. However, I find the manuscript with shortcomings that must be addressed before publication. Therefore I am recommending that the manuscript be sent back to the authors for **minor revisions**.

My main concern is that the manuscript is written and organised in a way that doesn't flesh out its main conclusions. The analysis part of the manuscript (section 4), that deals with the Rossby-number analysis should be made the main part of the results presentation. The results that precede it (section 3), although important on their own, should be made secondary and only those pertinent to section 4 should be in the main body of the manuscript. The remainder may be moved to a supplementary information part or removed altogether.

Secondly, the structure of the filament is discussed in several sections in relation to its hydrographic and dynamic properties, however it is difficult to maintain a visually coherent picture of the processes being discussed and the filament structure. Therefore I recommend the authors to make a diagram of the filament cross-section that shows the different processes that the authors identify, especially those that occur differently on the filaments northern and southern boundary and over its depth.

2. SPECIFIC COMMENTS

2.1. Manuscript text.

- Introduction (lines 37–39). This sentence about climate models appears out of place. Either remove it or develop it further.

- Introduction (lines 83–84). This sentence is awkward, as it appears to move the focus of the paper from the filament itself to the wider Benguela upwelling region. It is better to remove it.
- Submesoscale instabilities (line 407). The assumption of a flow (which? the one associated to the filament?) mainly in geostrophic balance needs to be justified.
- Discussion and summary. The lack of references to figures makes it hard to follow the discussion.

2.2. **Figures.** In general, figures need to be improved for readability and quality.

- Subfigure labels size needs to be increased.
- Figure 1. This figure is loaded with information, but it is confusing as the elements of the figure lack any reference. I would do, if possible, some or all of the following:
  - Add the start and end points of the cruise and the dates.
  - Add the dates of the transects used to determine the KE spectra.
  - Add the dates of the Scanfish transects.and fix the figure boundary and the colorbar.
- Figure 5. Add a legend to panel a.
- Figure 6. I would remove the ship's track (grey broken line).
- Figure 7. In the label of the x-axis should there no be a "log"?