

Review of “The surface thermal signature and air–sea coupling over the Agulhas rings propagating in the South Atlantic Ocean interior”

### General Comments

The mesoscale air-sea coupling is a very interesting topic, especially in terms of a coherent structure, mesoscale eddies.

1) The manuscript is well written. I enjoyed reading it. The Ekman pumping part is a new contribution to existing literature on mesoscale air-sea coupling study though sea surface wind modification has been reported before.

2) TMI measures SST free of clouds over the global tropics between 38°N/S. It also measures column-integrated cloud liquid water content, water vapor content and rainfall. So it can be used to study how the heat exchange taking place in the Agulhas rings and how it affects the precipitation. This will make the manuscript more interesting and more readers.

3) The authors obviously missed a new publication by Frenger et al (2013, Nature Geoscience). It is important to have a full review of literature before submitting a manuscript.

4) The eddy synthetic pattern (Fig. 5, 6) generally presents a pattern which could represent a dominant one, however the pattern significance should be estimated. The variation correlation can not be served as such estimated.

5) Based on statistical analysis, please justify 16 rings are statistical enough to make the conclusion.

Based on my reading, the manuscript is recommended to be published with a minor revision.

### Specific comments

- 1) P10, second paragraph, it is not clearly how the Argo profile data are processed to obtain only east-west section
- 2) P.15, Line 10-15 should wind stress is replaced by the relative wind speed with respect to the surface current?
- 3) P.15 Line 20-25, the interpretation of Term 1 does not make sense.
- 4) P.16, Line 1, it seems there are disconnection in context, which two fields?
- 5) P.16, can the heat flux by Ekman pumping be estimated using Argo data?

