

# ***Interactive comment on “Seasonal and regional variations of sinking in the subpolar North Atlantic from a high-resolution ocean model” by Juan-Manuel Sayol et al.***

## **Anonymous Referee #1**

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The present manuscript provides a useful synthesis of a number of recent studies using idealized models and observations of the vertical mass transport in buoyancy driven systems. While it does not present any fundamentally new ideas, it is a useful bridge between the idealized studies and the complexity of the actual North Atlantic system. It is well written and illustrated and I believe it could be published with few if any revisions. I make a few suggestions below that may help clarify a few points but will leave it to the editor to determine if they are ultimately necessary.

My first suggestion relates to the choice of origin for the offshore directed coordinate used in the analysis shown in Figs 4, 9, and 11, and the definitions of the Regimes

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I- III. I suggest that a better choice for the origin would be the shelf break rather than the coast as the broad shelves (e.g. in the Rockall area) play no role in the dynamics under discussion.

A second, and somewhat related point, concerns discriminating between regions by the slope of the topography. At a number of points in the text (e.g the paragraph following Fig 7), the importance of "steep topography" in localizing vertical velocity is discussed. However, no direct quantitative relationship between topographic slope and vertical motion is provided.

#### Minor Points

Pg. 6, line 24 : Thea AMOC

Pg 6, line 31: A clarification that the maximum is taken over monthly means, rather than instantaneous values would be helpful here.

Pg 9, line 4: I am looking for a box or some other indication of the region in Fig 2. I assume you mean defined by the domain shown in Fig 2?

Pg 15, Fig 8: I found little additional information in this Figure beyond that shown in Fig 7. and Table 2. Could be dropped without loss of support for the text.

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