

## ***Interactive comment on “Internal hydraulic control in the Little Belt, Denmark. Observations of flow configurations and water mass formation.” by Morten Holtegaard Nielsen et al.***

### **Anonymous Referee #3**

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This paper on internal hydraulic control in the Little Belt by Nielsen et al. is of considerable interest. The introduction comprises an overview of the present state of multi-layer hydraulics and sections 2 and 3 (physical setting, methods) provide adequate descriptions of the location and fieldwork. My main comments pertain to section 4 dealing with the observations and discussion. First some minor points:

line 179: generally the expression used is "back and forth", but the authors may possibly have some ingenious reason for reversing the standard order.

line 181: pycnocline (singular) is located

line 199: for heightened clarity write ... the upper and lower water masses of the  
C1

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Kattegat with a density difference...

These were minor matters but my next comment is more important: line 228: It is stated that the cross-strait density transects showed density variations across the strait, cf. fig. 5. An examination of in particular the right panel of fig 5 reveals a slope of such a magnitude that a geostrophic balance is a distinct possibility, and hence that it is doubtful whether the system can be regarded as nonrotational and farther down the page line 255 et seq. the authors apply Armi's nonrotating formalism. It is necessary to include a discussion of why rotational effects can be neglected!!

Sections 5 and 6 (discussion and conclusion) are satisfactory and I particularly appreciated that the authors invoked the hydraulic effects on the biogeochemical processes, something I do not think has been done before.

A minor point here is that on line 390 ... internal dynamics (plural) are not. . .

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