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# Application of interleaving models to describe intrusive layers in the Deep Polar Water of the Arctic Basin

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Interleaving models of pure thermohaline and baroclinic frontal zones of finite width are applied to describe intrusions at the fronts found in the upper part of the Deep Polar Water, the Eurasian basin, under stable-stable thermohaline stratification. It is assumed that differential mixing is the main mechanism of the intrusion formation. Different parameterizations of differential mixing (Merryfield, 2002; Kuzmina et al., 2011) are used in the models. Important parameters of interleaving such as the growth rate, vertical scale, and slope of the most unstable modes are calculated. It is found that the interleaving model of a pure thermohaline front can satisfactory describe the important parameters of intrusions observed at a thermohaline, very low baroclinicity front in the Eurasian basin, just in accordance to Merryfield (2002) findings.

In the case of baroclinic front, satisfactory agreement over all the interleaving parameters is found between the model calculations and observations provided that the vertical momentum diffusivity significantly exceeds the corresponding mass diffusivity. Under specific (reasonable) constraints of the vertical momentum diffusivity, the most unstable mode has a vertical scale approximately two–three times smaller than the vertical scale of the observed intrusions. A thorough discussion of the results is presented.

References

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