



## **An estimate of sea ice and deep water production in Antarctic coastal polynyas**

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Antarctic coastal polynyas play an important role in the sea ice and deep water production. The study of the polynya dynamics is carried out by applying a two dimensional steady state model to various coastal polynyas. Model results are validated through the use of remote sensing, and an estimate of the relative importance of the coastal polynyas is given in terms of sea ice and deep water produced. An estimate of the amount of sea ice produced in winter in the studied polynyas has been given, and it has been found that despite the fact that they only cover up to 0.15% of the total sea ice covered area in the Antarctic, the ice production in polynyas reaches 7% of the total winter ice production in Antarctica. Furthermore, in the polynya areas studied the amount of salt released resulting from ice production, could potentially contribute to dense water production to a level of well over 1 Sv. This amounts to over 10% of recent deep water estimates. This work assessed that polynya areas have a fundamental role in the deep water production and ventilation processes around the Antarctic.