# Article information:

Simulation of convection at a vertical ice face dissolving into saline water | Journal of Fluid Mechanics | Cambridge Core
<https://www.cambridge.org/core/journals/journal-of-fluid-mechanics/article/simulation-of-convection-at-a-vertical-ice-face-dissolving-into-saline-water/EC244843D451B754C7E9CB101CC65287>

# Article summary:

1. Antarctic ice shelves melt due to turbulent transport of heat and salt to the ice face, which contributes to Antarctic Bottom Water and affects global thermohaline circulation.

2. The flow field near the ice-water interface is difficult to measure in the field, but laboratory experiments have shown the formation of double-diffusive layers and efficient mixing of melt water with surrounding salty water.

3. Recent laboratory experiments have developed a theoretical model for dissolution by turbulent compositional convection, predicting that dissolution velocity depends on the 4/3 power of the difference between ocean temperature and its freezing point.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article discusses the melting of Antarctic ice shelves due to turbulent transport of heat and salt to the ice face. The authors highlight the importance of understanding the boundary layer, factors governing melting, and feedbacks between them to predict future rises in sea level. However, the article has some potential biases and missing points of consideration.

Firstly, the article focuses on laboratory experiments and theoretical models rather than field measurements. While laboratory experiments provide valuable insights into ice-ocean interactions, they may not fully capture the complexity of real-world conditions. Additionally, there is no discussion of potential limitations or uncertainties associated with these models.

Secondly, the article only presents one side of the argument - that melting is primarily driven by heat and salt transport. There is no mention of other factors that could contribute to melting such as mechanical erosion or changes in ocean currents.

Thirdly, while the authors acknowledge that seawater temperatures are close to 0°C in Antarctic conditions, they do not discuss how this affects their findings or whether it introduces any additional uncertainties.

Finally, there is a lack of discussion on potential risks associated with rising sea levels due to melting ice shelves. The authors briefly mention that Antarctic Bottom Water contributes to global thermohaline circulation but do not explore any potential consequences if this circulation were disrupted.

Overall, while the article provides valuable insights into ice-ocean interactions and their implications for rising sea levels, it has some potential biases and missing points of consideration that should be addressed in future research.

# Topics for further research:

* Factors contributing to Antarctic ice shelf melting beyond heat and salt transport
* Field measurements of ice-ocean interactions in Antarctic conditions
* Limitations and uncertainties associated with laboratory experiments and theoretical models
* Effects of seawater temperatures close to 0°C on ice shelf melting
* Risks associated with rising sea levels due to melting ice shelves beyond disruption of global thermohaline circulation
* Feedbacks between melting ice shelves and other components of the Earth system
* such as the atmosphere and cryosphere.

# Report location:

<https://www.fullpicture.app/item/7d503b15831c01db093cb79c241cf829>