



Dynamic of warm water inflow onto the Antarctic continental shelf: lab experiment testcase and under-ice float observations

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The Southern Weddell Sea is a pivotal region for the global ocean circulation, by producing large amount of dense waters, which ultimately sink at the bottom of the oceans, the area is fuelling the overturning circulation. As they are produced on the continental shelf, some amount of dense waters interact with the largest ice-shelf of Antarctica, leading to basal melt and altering the characteristics of the outflowing dense waters. Warmer water located off the continental shelf, can also locally access the base of the ice-shelf, though their access is thought to be very limited in today's climate. A change of warm water access to the ice-shelf base could would dramatically increase basal melt, leading to global and widespread consequences on sea level rise, as well as, on water production. However, the dynamics at play in the blocking or access of warm water towards the ice-shelf base remains poorly described and understood. Here, the circulation of warm water toward ice shelves is studied with a set of experiments in order to understand the parameters governing this circulation. In addition, in situ measurements are also used to understand this circulation : a set of autonomous floats deployed in 2017 have been sampling on the continental shelf for almost a year, providing unprecedented year-round observation of top to bottom ocean characteristics directly next to ice-shelf. Theses floats allows us to describe the seasonal cycle of both the warm water flowing toward the ice shelf draft, and the dense water exiting the ice-shelf and being transformed as deep water on their way out of the Weddell Sea.