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Drivers of intermittent reduction in ocean heat transport into the Getz Ice Shelf cavity

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Ice shelves in West Antarctica have been thinning during the last decades due to an increased supply of ocean heat that melts the ice from below. The Getz Ice Shelf in the western Amundsen Sea has experienced an inflow of warm water during 2016-2017, but intermittent events of reduced heat content occur during this period. The processes behind the variability of heat transport towards the Antarctic ice shelves on daily to decadal time scales are not well known.

Here, we present possible drivers and implications of these events of reduced heat content. We find that they are preceded by strong easterly winds that open up a coastal polynya and depress the cold Winter Water towards the ocean floor. Simultaneously, the ocean current flowing towards the ice shelf veers to the right and aligns with the ice shelf front rather than entering the ice shelf cavity. The heat transport into the ice shelf cavity is consequently reduced by 22% in winter 2016. These events do not occur during winter 2017, possibly due to stronger stratification and weaker winds.