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## Enhanced calving rates related to meltwater plume occurrence at Eqip Sermia, Greenland

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Glacier calving plays a key role in the recently observed dynamic mass loss of the Greenland ice sheet. Calving waves, generated by the sudden detachment of ice from the glacier terminus, can reach tens of meters of height and have devastating effects upon impact on surrounding shores. In this study, we describe a new method for the detection of source location and timing of calving waves, and the analysis of their magnitude and spreading properties using a terrestrial radar interferometer (TRI). This method was applied to 11,500 minute-interval TRI acquisitions from Eqip Sermia, Greenland. More than 2,000 calving waves were detected within seven days. Quantitative assessment with a Wave Power Index (WPI) showed spatially distinctive patterns: the sector of the calving front ending in deep water shows a higher wave activity (+49%) with higher cumulative WPI (+34%) than the shallow sector. In combination with a detection of meltwater plume locations, we highlighted a 2.3 times higher occurrence of visible meltwater plumes in the deep sector than the shallow one. We found both the cumulated WPI and the number of waves to increase by more than 80% in the presence of a meltwater plume in the deep sector while only by 30% in the shallow sector. We therefore explain the higher calving activity in the deep sector to be strongly related to a combination of higher occurrence of meltwater plumes and more efficient calving enhancement linked to better connections to deep warm waters.