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Seasonal enhanced melting under Ekström Ice Shelf, Antarctica

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Ice-ocean interaction is crucial for the integrity of ice shelves and thus ice sheet stability. Warm ocean currents lead to enhanced basal melting of ice shelves, which is the dominant component of mass loss for the Antarctic Ice Sheet. Knowing the current melt rates and predicting those under future climate scenarios is thus of great importance. In the course of the MIMO-EIS (Monitoring melt where Ice Meets Ocean) Project, we deployed a continuously measuring ApRES (Autonomous phase-sensitive Radio-Echo Sounding) device in the center of Ekström Ice Shelf, recording an hourly time series since April 2020. The continuous time series reveals a seasonal onset of enhanced melt rates, abruptly increasing from <0.5 to 2 m/a in July/August. High melt rates with around weekly to bi-weekly fluctuations last until November/December. In addition, we performed annual point measurements to determine the spatial pattern of basal melt rates. The majority of these sites show yearly averaged melt rates of <0.5 m/a. These measurements allow the evaluation of future ocean-simulations and are in good agreement with satellite remote sensing estimates.