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Annual glacier dammed lake drainage in Zackenberg, Northeast Greenland

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A.P. Olsen is a 295 km2 ice cap in the Zackenberg region of Northeast Greenland (74.6° N, 21.5° W), 35 km from the ZERO Zackenberg Research Station. The ice cap lies on a gneissic plateau, covering an elevation of 200 to 1450 m a.s.l. A.P. Olsen mass balance has been monitored since 2008 and reconstructed for the period 1995-2007. Meltwater from this ice cap drains into the Zackenberg River, and into Young Sund via the Zackenberg Delta. One outlet dams a c. 0.8 km2 lake fed by the northern part of the ice cap. Observational data suggests this lake drains annually, flooding subglacially into the Zackenberg River. But the impacts of these flood events on the hydrology, sediment transfer, and geomorphology of the proglacial zone downstream have not been examined in detail. Understanding the impacts of glacial lake outburst flood events is important in the sensitive Arctic environment, where glacial change is rapid. We use Landsat scenes to reconstruct lake extent from 1999-2015. This is compared to Zackenberg River discharge measurements, available from the ZERO Zackenberg monitoring programme. These datasets are used to examine the nature and timing of flood events, and assess the impacts on the Zackenberg river downstream.