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In-situ glacier monitoring in Zackenberg (NE Greenland): Freya Glacier and A.P. Olsen Ice Cap

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Due to the scarceness of glacier mass balance measurements from glaciers and local ice caps in East Greenland and the strong impact that local glaciers and ice caps outside the Ice Sheet are expected to exert on sea level rise in the present century, in 2007 and 2008 two glaciological monitoring programmes of peripheral Greenlandic glaciers started to operate near the Zackenberg Research Station in NE Greenland (74˚N, 21˚W).

Freya (Fröya) Glacier is a 6 km long valley glacier situated on Clavering Island 10 km southeast of the Zackenberg research station with a surface area of 5.3 km^2 (2013), reaching from 1305 m to 273 m a.s.l. The glacier is mainly oriented to NW and surrounded by high mountain ridges on both sides.

A.P. Olsen Ice Cap is a 295 km^2 peripheral ice cap located 35 km northeast of Zackenberg. The mass balance monitoring network is situated on the SE outlet glacier reaching from 1425 m to 525 m which drains into the hydrological basin of Zackenberg. This outlet glacier dams a lake which caused several glacial outburst floods within the period of investigation.

The two studied glaciers are very close to each other (35 km), but they are complementary in many ways. Apart from the difference in size, which requires different monitoring strategies, Freya Glacier is nearer to the coast and therefore exposed to a more maritime climate with higher winter accumulation. The different area-altitude distribution of both glaciers is one of the main reason for the significantly more positive mean specific mass balance of A.P. Olsen Ice Cap compared to Freya Glacier.

In this talk we present the glaciological monitoring on both glaciers and the main results of the first seven years of data.