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Changes of Fedchenko Glacier, Pamir, during the last 81 years

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Fedchenko Glacier in the Pamir is one of the largest mountain glaciers in the world. Already in 1928 a Russian/German expedition carried out detailed photogrammetric surveys of the entire glacier. Thirty years later a large part of the glacier was surveyed again which allowed the direct comparison of glacier changes for about two thirds of the glacier area. During a new expedition in 2009 not only the surface elevation was measured along about 55 kilometres, also the ice thickness was determined on several cross profiles in the accumulation zone and the surface velocity was determined by repeated GPS observations. These new investigations are used for comparison with the existing historical measurements and related to the meteorological measurements from Fedchenko Station, situated at 4200 m elevation close to the glacier margin. The new data also allow the determination of the ice thickness variation and the calculation of the ice flux in the accumulation zone. For this purpose also remote sensing data are used as basis for annual surface velocities. Changes in the glacier geometry are rather minor during the last eight decades, which probably is related to the rather high elevated accumulation basin.