The glacier retreated by around 600 metres between 1910 and 2010. We found that the Turgen glacier has lost 19% of its surface area since 1970. Actually, we found that the glacier’s surface area has decreased by 35%.

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Pixel analysis of down-wasting

1. Establishing a point of reference
   - 3D imagery of the landscape was collected in 2010 at the same angle as the photos
   - This is used to calculate the distance between the glacier’s surface and the ridge:
     - Distance = 300 metres, accurate to ±16m

2. Measuring height in terms of pixels
   - Repeat photos taken in 2010
   - Height measurement is converted from metres into pixels:
     - 300 metres in the 3D imagery = 262 pixels in the photograph

3. Comparing height across photos
   - Original photos taken in 1910
   - Height is measured in terms of pixels:
     - 199 pixels = 228 metres
   - 1910-2010 height difference is calculated:
     - 228m (1910) - 300m (2010) = -72m

The glacier down-wasted by 72 metres between 1920 and 2010, to an accuracy of ±16m.

For a more accurate measure of glacial retreat, a 2010 research project sought to compile multiple sources of data. This included the addition of primary data, as well as repeat photography for an extended timeline of evidence.

A topographic map from 1992 provides secondary evidence of the overall shape and size of the glacier. Russian maps from 1970 provide further historical evidence where satellite imagery is not available.