雪氷写真館⑬ 2009 年 8 月，世界一長い山岳氷河，パミール高原フェドチェンコ氷河への遠征/Expedition to the Fedchenko Glacier, Pamir Mts., World's largest alpine glacier August 2009

Fig. 1. (a) Flying over Fedchenko Glacier to a base camp site in a Russian Mi8-MTV helicopter operated by the Tajikistan military, which is the only way to access the glacier. (b) Unloading at the base camp; more than 3 tons of expedition supplies were brought by helicopter.

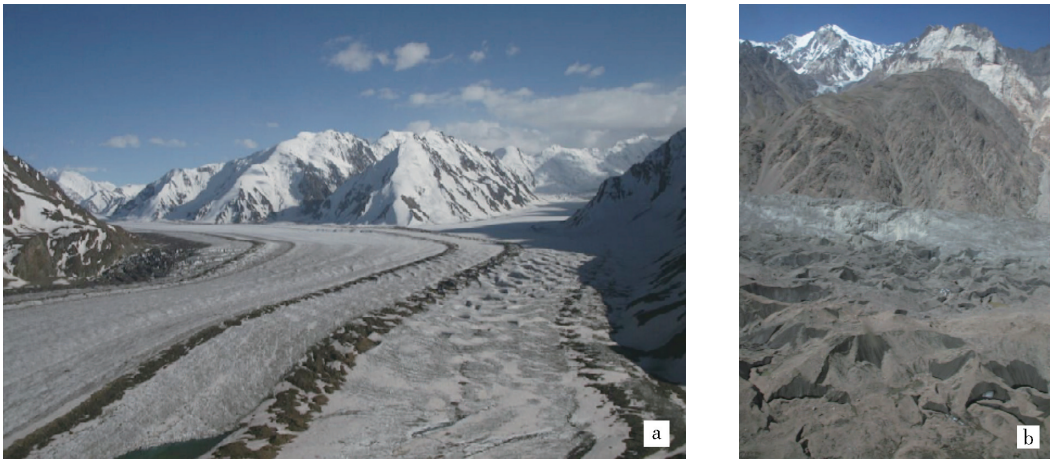

Fig. 2. (a) Oblique aerial photograph of the middle section of the Fedchenko Glacier (38°49′ N, 72°12′ E) taken from an altitude of about 4350 m above sea level (a.s.l.) on 17 August 2009, looking south (the tributary Elena Rozmirovich Glacier can be seen on the right, a small supraglacial lake - on the bottom left). At this confluence the highest speed of ice flow has been observed (up to 250 m per year). (b) Oblique aerial photograph of the debris-covered lower part of the glacier (39°02′ N, 72°18′ E); taken from an altitude of about 3300 m a.s.l. on 30 August 2009, looking west. A trim line is clearly seen on the side of the valley, marking the height of the glacier surface at the end of Little Ice Age.

Fig. 3. (a) Tents of the main camp at 4916 m a.s.l. (the Abdukagor Pass lies to the right; the highest peak is 5761 m). (b) Drilling tent and two labs dug in the snow for ice-core processing (site No. 1).

Fig. 4. Participants of the expedition to the Fedchenko Glacier at the base camp (4916 m asl) on 29 August 2009 (from left to right): Dr. V.B. Aizen (leader and principal investigator), Dr. S. Matoba, E.A. Podolskiy, Dr. C. Mayer, S. Okamoto, Dr. A. Lambrecht, V. Kim, Dr. K. Fujita, V.V. Sokolova, D. Bodington, E.V. Korotkikh, B.O. Grigholm, Dr. N. Takeuchi. Absent: Dr. A.B. Surazakov.

These photographs provide some insight into the international expedition of August 2009 to the Fedchenko Glacier, the World's largest alpine glacier at mid-/low- latitudes (length, 77 km; ice thickness, >900 m; surface area, 649 km^2). Organization of the expedition required complex logistics and heavy negotiations with local Tajikistan authorities to receive permission to work in Pamir and to find an appropriate helicopter and qualified pilot that could land at over 5000 m a.s.l. The expedition team surveyed two areas of the glacier (3800–4200 m and 4800–5400 m). The following tasks have been accomplished: an AWS with a snow-accumulation sensor was installed upon the glacier at about 5000 m a.s.l.; five geodetic bench-marks established in 1929 and 1958 by Soviet–German scientific expeditions were found and geo- referenced on rocks surrounding the glacier. Tens of kilometres of glacier thickness were surveyed by radar (GPR) and geo- referenced with a differential global positioning survey (DGPS). This was conducted to study the depth and internal structure of the glacial ice mass, and to find an appropriate site for deep ice-coring; and for a ground calibration for the TerraSar-X elevation product, as well as other remote sensing applications that have been provided with high resolution maps of the glacier surface topography; 14 m ice-cores were recovered at elevations of 4920 and 5000 m a.s.l.; hundreds of snow/firn samples were collected from snow pits for isotope/geo- chemical and biological analyses (micro-flora and micro-fauna, e.g. red snow algae) to study their spacial variability. Samples of rocks from the glacial abrasion knobs and glacier surface were collected in order to understand the properties of cryoconites, and surface exposure dating (using cosmogenic nuclides). The unique data collected in the field will prove invaluable for the following (the third) international scientific expedition to the Fedchenko Glacier in 2011-2016 to drill the deepest (up to 900 m) ice-core at mid-/low- latitude glaciers, that will provide an unprecedented archive of climatic and environmental history of Central Asia during the past thousands of years.

E. A. Podolskiy (Nagoya University)
and V. B. Aizen (University of Idaho) on behalf of all members.