東シベリア、スンタル・ハヤタにおける氷河調査、2012-2014

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Glaciological observations in Suntar Khayata, east Siberia, 2012-2014

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Since Northern Hemisphere high latitude regions are noticeable trend of global warming and climate change, appearance of its impact is interest. Northeastern Eurasia is area of blank of observational research. One of a few regions studied in the past is Suntar Khayata in east Siberia, where Russian scientists carried out wide range of study during IGY (1957-1959). Suntar Khayata region, located in the latitudes between 62° and 63° north and in the longitudes between 140°22´ and 142° east, forms a divide between the Arctic Sea and the Sea of Okhotsk. Oymyakon depression, known as the cold pole in the Northern Hemisphere, is located to the northeast. Glacier inventory of this region was prepared based on the aerial photographs taken in 1944-1947 (Koreisha, 1963). Total number and area of glaciers were 205 and 206.28 km^2. Three glacierized region are recognized, namely Northern massif, Central massif and Southern massif. The highest elevation of each massif is 2959 m, 2933 m and 2944 m. Five glaciers (No. 29 to 33) were observed in Northern massif including No. 31 which was intensively studied during IGY. We carried out glaciological observations such as mass balance (stake method), ice thickness measurement (radio-echo soundings), and topographic survey (by GPS) in July/August in 2012, 2013 and 2014. Automatic weather stations were also set on/around the glaciers. We generated DEMs of surface and bed of the Glacier No. 31 using ice thicknesses obtained by radio-echo soundings and surface elevations by GPS survey, then we estimated the volume of the glacier to be 0.20 km^3 (area: 3.02 km^2, mean thickness: 62 m). Surface flow velocities on Glacier No. 31 were found to be 1 to 2 ma^{-1} (2014/2014) along the stake line, which showed high reduction since IGY. Ice thicknesses in its tongue reduced by 110-60 m (terminus to upstream) since 1957. Glacier-wide mass balance in 2012/2013 was -1.04 m w.e. for a glacier complex (Glaciers No. 29, 30 and 31). This value shows more negative state than those in 1957-1959. It can be considered that the glaciers did not have accumulation area in 2012/2013. Using four years' mass balance values (1957-1959 and 2012/2013) and climate records at Oymyakon, we tried to reconstruct mass balance history of Glacier No. 31 since IGY. Preliminary result of a regression analysis showed almost continuous negative state in mass balance and its cumulative value reached to -35 m w.e. during the period. In order to evaluate this value, we have been trying to get geodetic mass balance since IGY by comparing surface elevation in IGY and one in 2013.

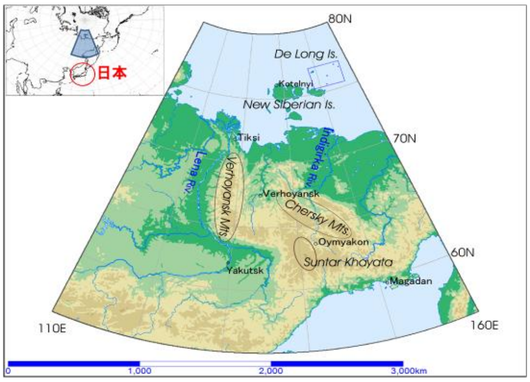

Fig. 1 Map showing mountainous regions in east Siberia
Our *in-situ* study area is Suntar Khayata.

Fig. 2 Photograph of Glacier No. 31 taken in 2013
This glacier was intensively studied by Russian scientists during IGY.