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Why is Shirase Glacier turning its flow direction eastward?

Kazuki Nakamura, Koichiro Doi, Kazuo Shibuya

We applied an image correlation method to Japanese Earth Resources Satellite-1 (JERS-1) synthetic aperture radar (SAR) data to examine flow velocity within Shirase Glacier, Antarctica. From the grounding line to the downstream region of the glacier, the obtained ice-flow velocity was systematically higher on the western streamline than the eastern. The differences between the two streamlines were 0.31 km/a in 1996 and 0.37 km/a in 1998, significantly larger than the error estimate of 0.03 km/a. The direction of ice flow was about 312° at the grounding line and changed to 327° at 10 km, 346° at 20 km and 2° at 30 km downstream from the grounding line. The observed eastward change in flow direction can be explained by an asymmetric deepening of bedrock topography of the eastern side and by tributary inlets.

Estimation for seasonal changes in the flow of Shirase Glacier using JERS-1 / SAR image correlation.

Kazuki Nakamura, Koichiro Doi and Kazuo Shibuya

This paper presents detailed results of seasonal ice flow velocity variation for Shirase Glacier using the Japanese Earth Resources Satellite-1 (JERS-1) synthetic aperture radar (SAR) data. We estimated ice flow fields by an image correlation method. The obtained ice flow velocity increases rapidly from the upstream region (1.18 km/a) towards the grounding line and becomes stagnant there (2.32 km/a), accelerates gradually to 2.62–2.82 km/a in the downstream region, then becomes further faster to 3.05–3.50 km/a in the terminus of the floating ice tongue. As for seasonal variation at the floating ice tongue, the annual difference between 1997 (3.11 km/a) and 1998 (3.50 km/a) is significant, reflecting possible acceleration of the ice flow velocity in relation to disappearance of floating ice tongue between April and May of 1998.

New insight into the crust and upper mantle structure under Alaska.

Cheng Qi, Dapeng Zhao, Yong Chen and Natalia A. Ruppert

We determined the three-dimensional P-wave velocity structure to a depth of approximately 200 km beneath Alaska, using 438,146 P-wave arrival times from

10,900 earthquakes and using an irregular grid parameterization method. Our results suggest that the subducting Pacific slab under Alaska can be divided into three different parts. The western part has features similar to those in other subduction zones. In the central part a thick low-velocity zone is imaged at the top of the subducting Pacific slab beneath north of the Kenai Peninsula, which is believed to be most likely the oceanic crust plus an overlying serpentinized zone and the coupled Yakutat terrane subducted with the Pacific slab. In the eastern part, significant high-velocity anomalies are visible to 60-90 km depth, suggesting that the Pacific slab has only subducted down to that depth.

How can we observe the underwater feeding behavior of endotherms?

Yasuhiko Naito

Recent technological advances have led to rapid progress in our understanding of diving behavior of marine animals and marine birds, but additional research is required into feeding behavior to determine the timing of prey ingestion, prey mass, and prey type. In the present study, I review the previous methods including the stomach temperature method, the oesophagus method for marine birds, the beak magnet sensor method and so on. I suggest also the necessity of their further development in field studies, and propose new practical methods involving the measurement of jaw movements underwater.

Microtopographic analysis of plant distribution in polar desert.

Masaki Okuda, Satoshi Imura and Masaharu Tanemura

We suggest methods for analyzing how plant species are distributed in relation to microtopography in a research area divided into a quadrat lattice using contingency tables. The methods are applied to data of the microtopography and distribution of 3 mosses in continental Antarctica.

Habitat and leaf cytogenetic characteristics of Deschampsia antarctica Desv. in the Maritime Antarctica.

Parnikoza I. Yu, Miryuta N. Yu., Maidanyuk D. N. et al.

Antarctic hairgrass (Deschampsia antarctica Desv.) in the Maritime Antarctica was ecologically studied in relation to soil conditions, viral contamination, cell nucleus area, and relative DNA content. Analysis of average nucleus area and relative DNA content of plant materials collected from six different localities shows that Antarctic hairgrass lives upon soils that are variable with respect to trace elements, pH, and other soil characteristics. The hairgrass is susceptible to a number of viruses, and shows substantial variation in DNA content and nucleus size.