Research Note

Gygrekjelda, a new warm spring in Bockfjorden, Svalbard

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The note informs about a new warm spring west of Jotunkjeldene with larger water discharge and much less sinter deposits than the other springs in Bockfjorden.

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Introduction

The warm springs in the area of Bockfjorden were first discovered and described by A. Hoel in 1910 (Hoel & Holtedal 1911, 1913) and were later on described by Werenskiold (1920), Orvin (1944), Liestøl (1977) and Banks et al. (1997). Their location near to the Quaternary volcano, Sverrefjellet, indicates a volcanic origin (Skjelekvåle et al. 1989). The location is shown in Fig. 1.

Six springs, named Trollkjeldene, are located about 5 km south of Sverrefjellet. According to Hoel & Holtedal (1911), the southernmost of these springs was the warmest with a temperature of 28.3°C. Temperatures were measured in all springs in 1977 (August 2) and revealed temperatures between 15°C and 24°C. Similar temperatures were measured in the summer of 1997. Large calcareous sinter terraces and basins have been built up in connection to Trollkjeldene. The present water discharge is very small for all the springs here. The current extent of the travertine complexes appears disproportionately large relative to the current rate of spring overflow (Banks et al. 1997).

Two springs, named Jotunkjeldene, are located about 2 km north of Sverrefjellet. Temperatures of respectively 12°C and 23°C were measured in 1977 (August 1). Rather large deposits of calcareous sinter (travertine) also occur around these springs. The water discharge today is very small, especially for the westernmost spring.

A new spring, Gygrekjelda

During fieldwork in 1995 a new spring was discovered about 1 km west of the westernmost spring of Jotunkjeldene near the southern terminal moraine of Friedrichbreen. According to A. Krasil'ščikov (Pers comm. 1995), however, Russian geologists have known about this spring for some years. No analysis of water, sinter deposits or vegetation connected to the spring and its stream have been performed.

The main purpose of this note is to inform about the existence of this up to now undocumented spring in Bockfjorden. The outlet of water is about 40 m above sea level (Fig. 2), and the water runs as a small stream (Fig. 3) to the sea. Visual estimation of water discharge usually has a high degree of unreliability, but 10 l/s should be considered as indicative for the magnitude of outflow from the new spring. The highest temperature measured was 13.8°C, and the water temperature gradually decreased to 6.0°C before the water reached the sea. Temperatures were measured on August 6 1995, when the air temperature was 2.1°C. Thin concretionary deposits of calcareous sinter occur in and along the stream from the outlet of the spring to the sea. Small basins have thus been formed as can be seen in Figs. 2 and 3.

Green masses of algae occur in many places in the stream along its course to the sea, and the sides of the stream are usually covered by yellow

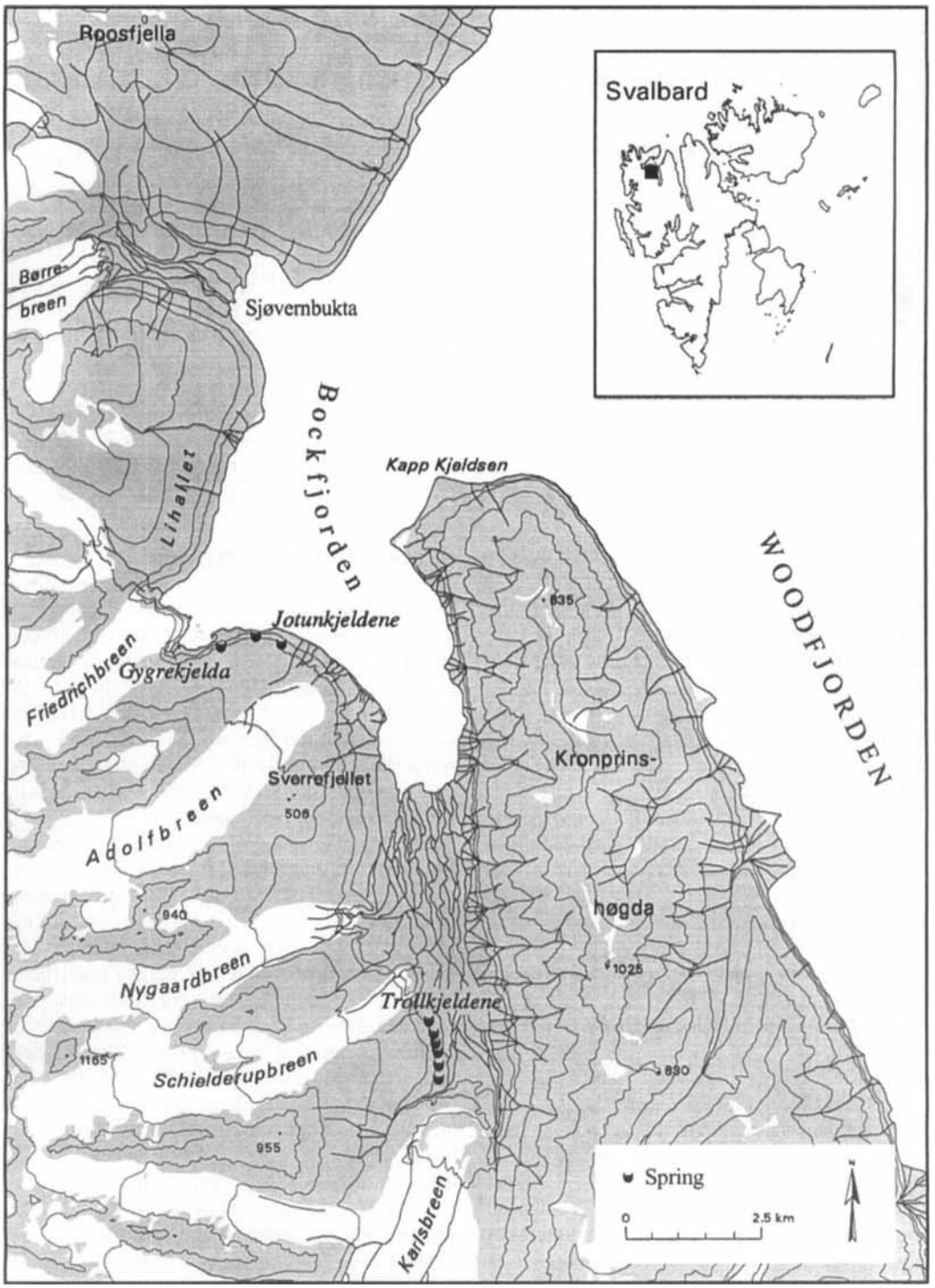

Fig. 1. Location map showing Bockfjorden and the warm springs there.

Fig. 2. Photograph of the outlet area of Gygrekjelda.

Fig. 3. Photograph of the stream from Gygrekjelda.

and green mosses. The stream is thus easily recognisable in the landscape and it is therefore surprising that it has not been mentioned previously in any publication or report from the Bockfjorden area. The location of the new spring is so close to Jotunkjeldene that it could either be considered as a third spring of Jotunkjeldene or given an individual name. There are significant differences, especially in age and water discharge, between the new spring and the other springs in Bockfjorden. Therefore we find it most appropriate and practical to introduce a new name, Gygrekjelda, to this spring. (In Norse mythology, "Jotun" is giant and "Gygr" is giantess).

The springs in Bockfjorden are thought to have been active during the entire Holocene. Gygrekjelda, however, seems to be much younger than the other springs. The most probable history of Gygrekjelda is as follows: The original Gygrekjelda with its sinter deposits was located so close to Friedrichbreen that it was covered by moraine during the Little Ice Age glacier advance. After that, Gygrekjelda found its new and present outlet outside the moraine. This means that the present position of Gygrekjelda and its stream are most probably younger than 1000 years and perhaps as young as 100 years. It is certainly younger than a large driftwood log which was found outside the moraine nearby. This log must have been pushed by the glacier from sea level up to its present location about 40 m a.s.l. It revealed a radiocarbon age of 1320 ± 40 years (T-12368).

Gygrekjelda also differs from the other springs in Bockfjorden through its considerably larger discharge of water which results in a stream of warm water to the sea. Subterranean conditions, and not local topography, are the most probable explanation for the differences in water discharge between individual springs.

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