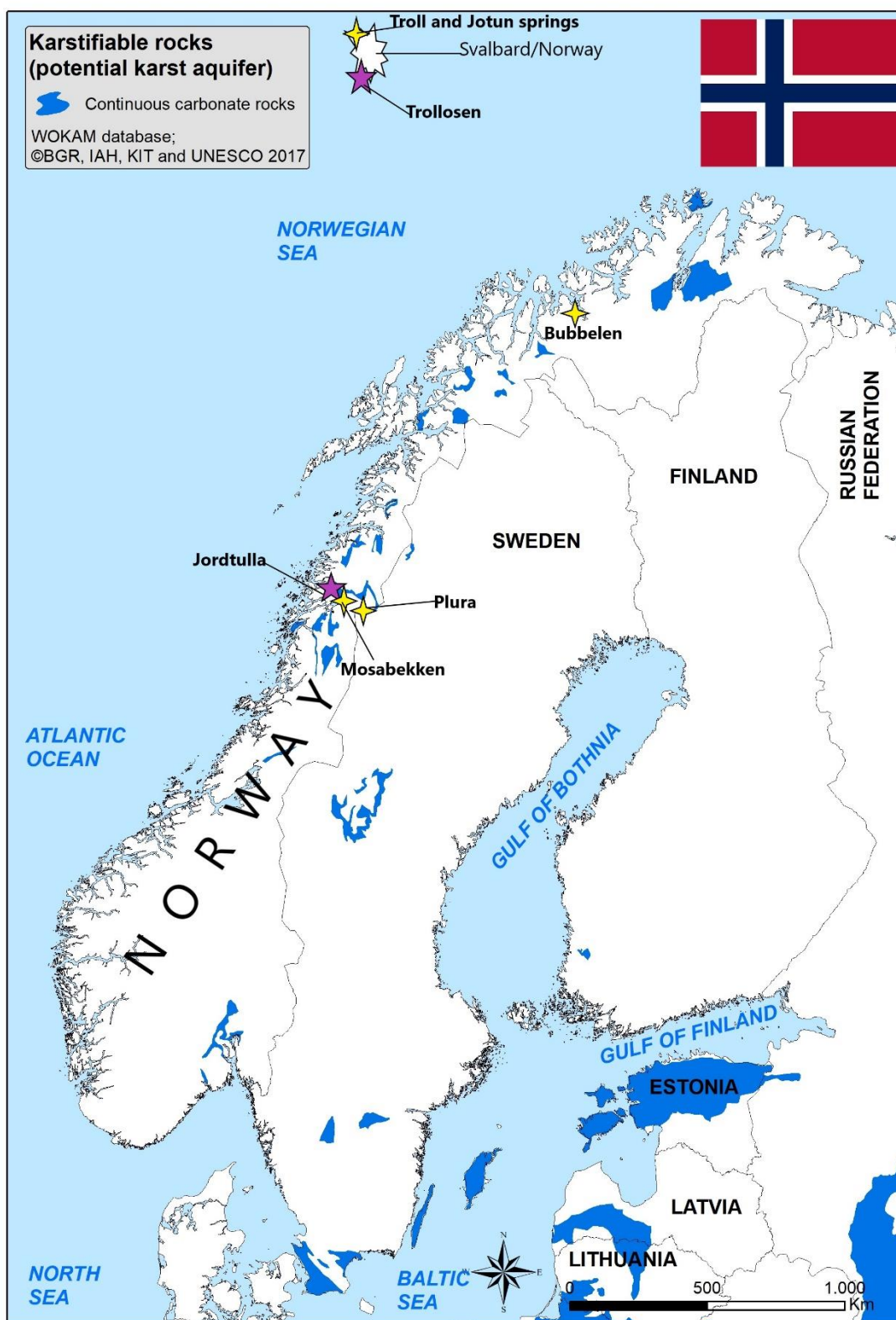


**Karstifiable rocks  
(potential karst aquifer)**

 Continuous carbonate rocks

WOKAM database;  
©BGR, IAH, KIT and UNESCO 2017

 Troll and Jotun springs  
Svalbard/Norway  
 Trollosen



| Country                                                                                     | MIKAS springs                       | Coordinates / Nearby City                                                                                                                                                | Spring discharge (Q in l/s,min/av/max) / tapped or not                   | Criteria* in order / Main justification<br>*/ H-historic, A-aesthetic, S-scientific, E-Economic, Ec-ecologic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Data collected by                               |
|---------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Norway<br> | 1. Jordtulla spring and Juta spring | N66°30'13.47"<br>E 13°53'11.44"<br>and<br>N66°30'50.34"<br>E 13°53'15.40"<br>Z = 125-127 m asl<br><br>Rana, North Norway,<br>Mo i Rana,<br>Tributary to<br>Glomåga River | >100 / - / 35000 (Jordtulla)<br>>10 / - / >1000 (Juta)<br><br>Not tapped | <b>S, A</b><br><i>The catchment of these two springs is of calcite marbles, Scandianvian Caledonides. Jordtulla-Fiskepøla is the underground outlet of Lake Glomdalsvatn. In the catchment is the upper Glomdal karst with the Pikhågan stripe karst with surface and subsurface karst features and Storbekksystem karst aquifer which is drained through Juta spring, into the lake. The catchment comprising a series of caves including Pikhåggrottene, Fosshølet, Trudehola, Kalkrastgrotta and Storbekkgrotta. The spring and catchment are located in the Svartisen and Saltfjellet national park and Storbekkgrotta is preserved and closed by gates.</i>                                                                                                                                                                                                                     | Stein-Eril Lauritzen, Rannveig Øvrevik Skoglund |
|                                                                                             | 2. Trollosen                        | N76°42'38.2"<br>E16°15'19.1"<br>Z = 1 m asl<br><br>Svalbard, southern Spitsbergen, Longyearbyen                                                                          | 20 000 l/s summer,<br>1000-4000 l/s winter<br><br>Not tapped             | <b>S, Ec, A</b><br><i>This thermal – glacial spring is possibly one of the largest karst springs in the Arctic. It is issuing from marbles of Early Ordovician age (belonging to the basement), overlain by shale of Triassic age. Located along a vertical fault line. The spring convey a mixture of deep, hot brine and glacial meltwater. Accordingly, winter discharge is low (1000-4000 l/s), "hot" (7-8°C) and dominated by bluish, opaque sulfidic brine (<math>EC \leq 5</math> mS/cm) and close to saturation with respect to <math>CaCO_3</math>. Summer discharge is up to 20 000 l/s, temperature around 3-4°C, conductivity drops to less than half (1-2 mS/cm) and the water is grey and turbid and undersaturated with respect to <math>CaCO_3</math>. Sulphide and sulphate are of microbiological origin (Lauritzen and Bottrell, 1994; Reigstad et al. 2011).</i> | Stein-Eril Lauritzen, Rannveig Øvrevik Skoglund |

## MIKAS – Jordtulla spring and Juta spring



*Jordtulla spring*

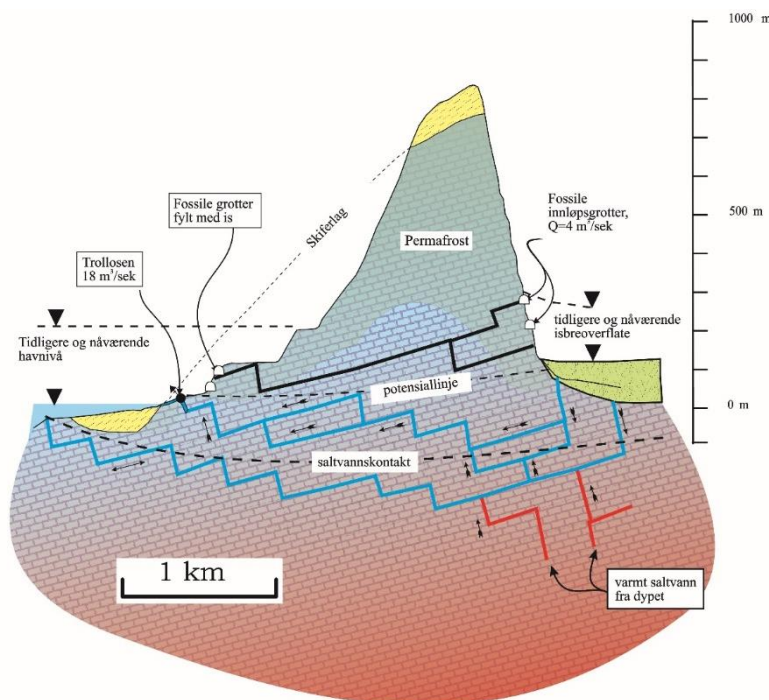


*Juta spring*

## MIKAS – Trollosen



*Trollosen at south Spitsbergen. View from the shoreline towards the 800 m a.s.l. Hilmarfjellet mountain. The outlet is at a tectonic contact between Triassic shales (left) and Caledonian marbles (right). Discharge about 10 000 l/s. Person for scale. Photo: SE Lauritzen*



*Subpermafrost karst drainage through Hilmarfjellet, south Spitsbergen (Lauritzen, 1991, 1998, Lauritzen and Bottrell, 1994). Glacial meltwater mixed with hot brine emerges at a large karst spring at sea level. Drainage fra the nearby glacier is pirated to the spring. Dye transit time between glacier and spring is more than 30 hours. (Figure and text from Lauritzen and Skoglund, 2013.)*