
Karstifiable rocks
(potential karst aquifer)
Continuous carbonate rocks
Discontinuous carbonate rocks
Continuous evaporite rocks
Discontinuous evaporite rocks
Mixed carbonate and evaporitic rocks
WOKAM database;
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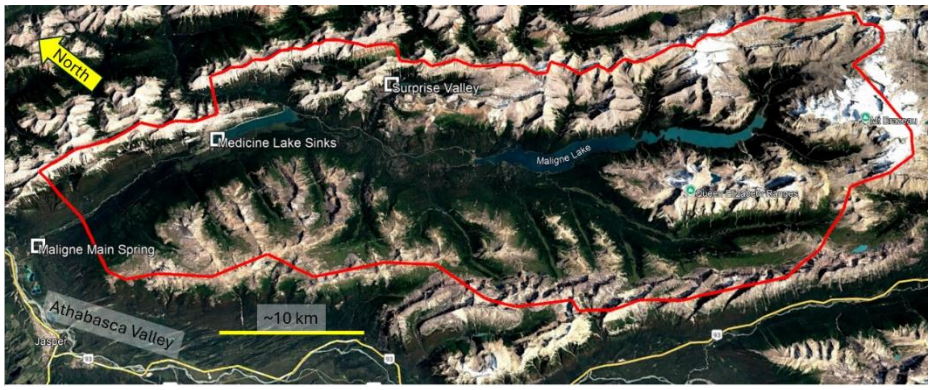
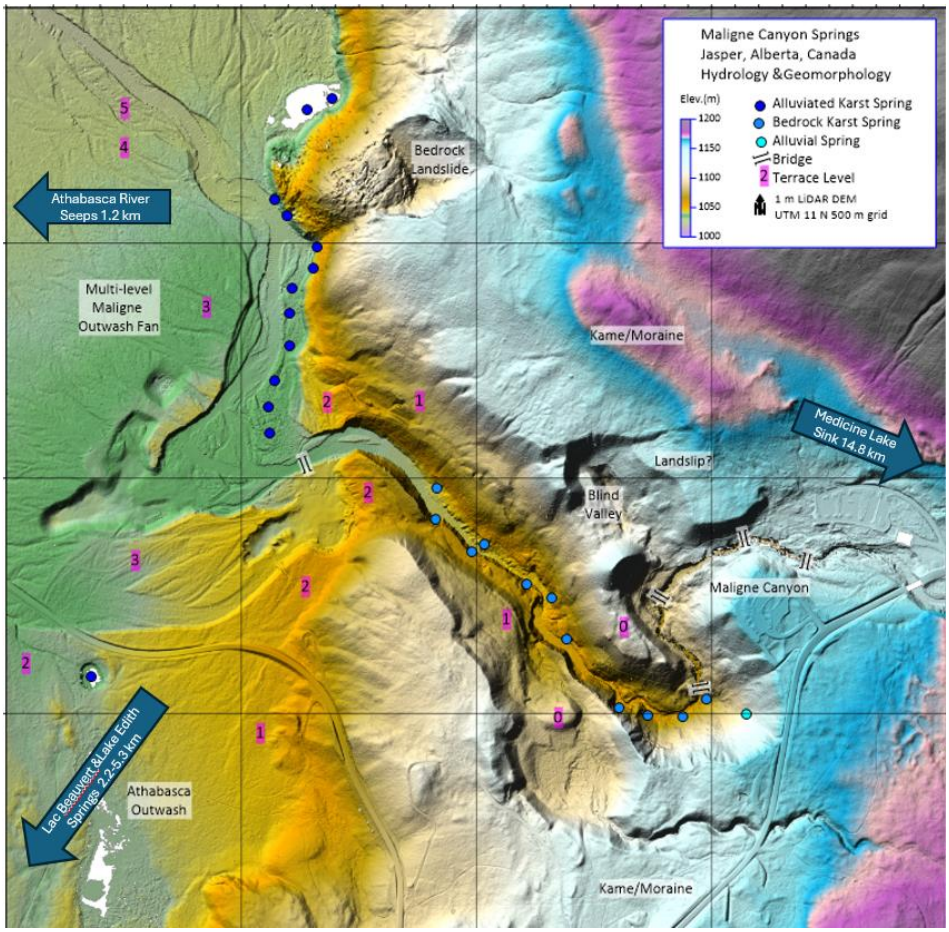
ARTIC OCEAN
GREENLAND
BAFFIN BAY
BEAUFORT SEA
USA
CANADA
HUDSON BAY
LABRADOR SEA
Maligne
Castleguard springs
USA
ATLANTIC OCEAN
0
1.800
3.600
Km

Country	MIKAS springs	Coordinates / Nearby City	Spring discharge (Q in l/s,min/av/max) / tapped or not	Criteria* in order / Main justification */ H-historic, A-aesthetic, S-scientific, E-Economic, Ec-ecologic	Data collected by
Canada	1. **Maligne**	52°55'7.86"N 118° 0'32.18"W Z = 1043-1117 m asl Alberta, Jasper National Park Maligne basin (Athabasca)	1000/ - /42000 Not tapped	***S, A, E*** *Maligne springs constitute the largest documented freshwater karst springs in Canada. The sink-to-rising system is long (>14km) and large (170 m^2 cross sectional area). The karst waters appear to be dynamically linked to high conductivity alluvial aquifers which may account from historically low tracer recovery. The form, function and origin of the karst have been strongly influenced by glacially mediated conditions in both the Athabasca and Maligne valleys, but remain enigmatic. The sink point at Medicine Lake and the springs in Maligne Canyon are spectacular natural features. Currently protected as a National Park, although this does not necessarily afford protection from intrusive tourist facilities.*	Water Survey of Canada, Jasper NP, C.C. Smart
	2. **Castleguard springs (Big spring)**	52° 3'39.30"N 117°13'6.66"W Z = ~1662 - 1745 m [Big Spring 1742] m asl Alberta, Alexandra-North Saskatchewan	<100/ - /~20000 [Big Spring 0-8 m^3/s] Not tapped	***S, E, A*** *The system of perennial-seasonal-intermittent springs with estavelles. Includes the longest cave in Canada, terminating 300 m below the Columbia icefield surface. Castleguard springs are the largest documented springs draining a glacier. Unique and rare cave-adapted species are recorded from Castleguard Cave indicating a poorly understood subglacial ecosystem that is drained to the springs. Banff National Park. First Nations of the Stoney Nakoda (also known as Îethka), Ktunaxa, and Secwépemc peoples, as well as the Tsuut'ina Nation. There is no easy access to the site.*	C.C. Smart

MIKAS – Maligne spring



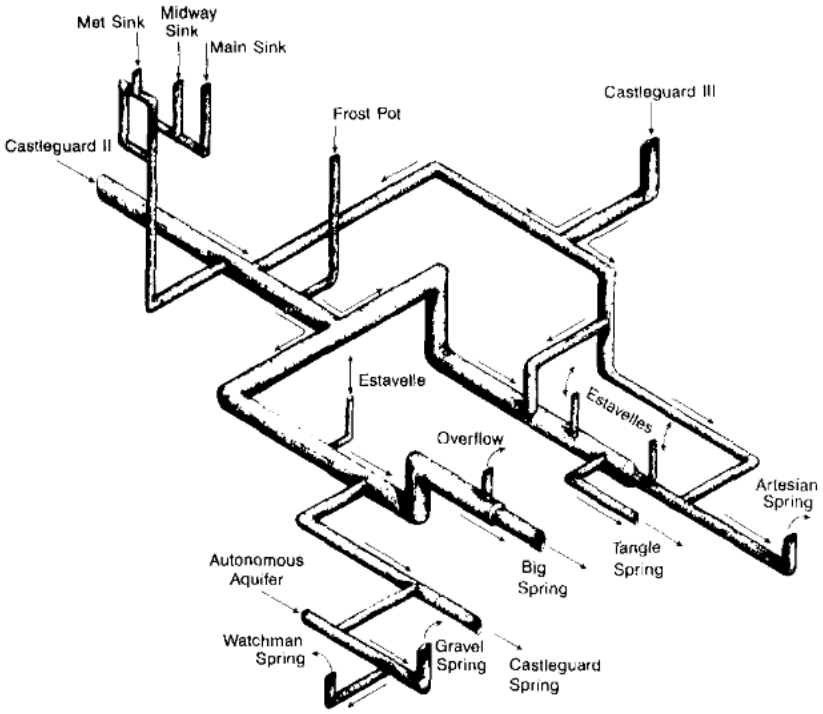
Google Earth Image. The main karst sectors are Surprise Valley and the Maligne Valley between Medicine Lake and the springs. Maligne Valley hangs some 120m above the present Athabasca valley.



LiDAR colour relief map of the Maligne Canyon springs. Traced conduit outlet springs occur over a 50 m elevation range. Numerous lower altitude alluvial springs are likely lowest elevation outlets, but have not been positively traced. The karst conduit likely terminates under the bedrock landslide, but at some depth below the current valley fill.

Maligne spring main outlet (photo by C.C. Smart)

MIKAS – Castleguard springs



From Smart 1983 (reproduced in Smart 1988) A sketch structural model of the Castleguard Aquifer. Not to scale and limited to monitored sites.

Castleguard Big Spring 22 July 2023. [Sara McLean with permission.] Several fracture springs are seen right of the main outlet. Turbid water in the foreground is Castleguard Glacier runoff. The small clear stream is fed by the overflow outlet to Big Spring.