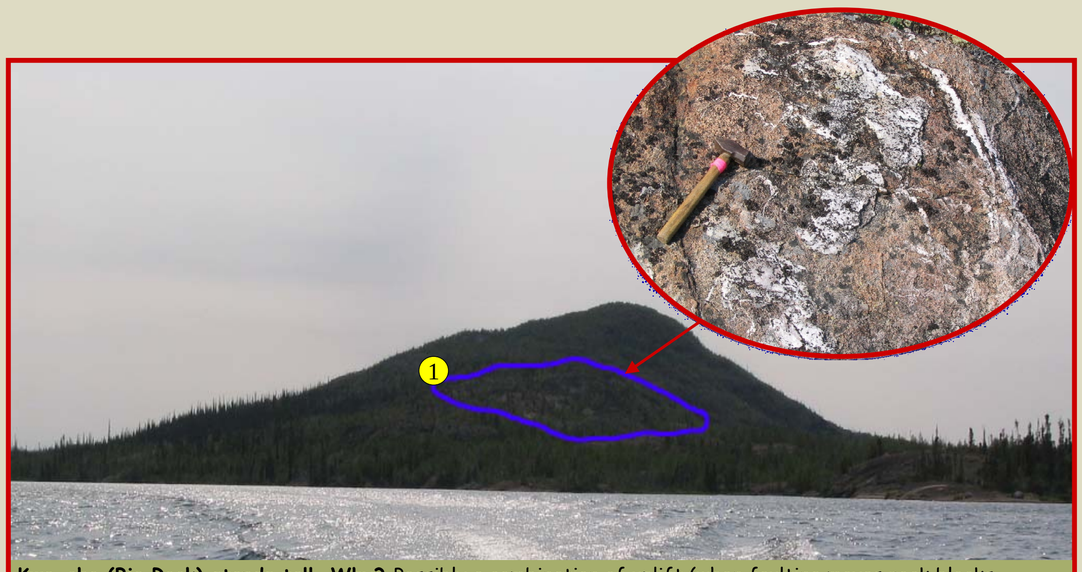
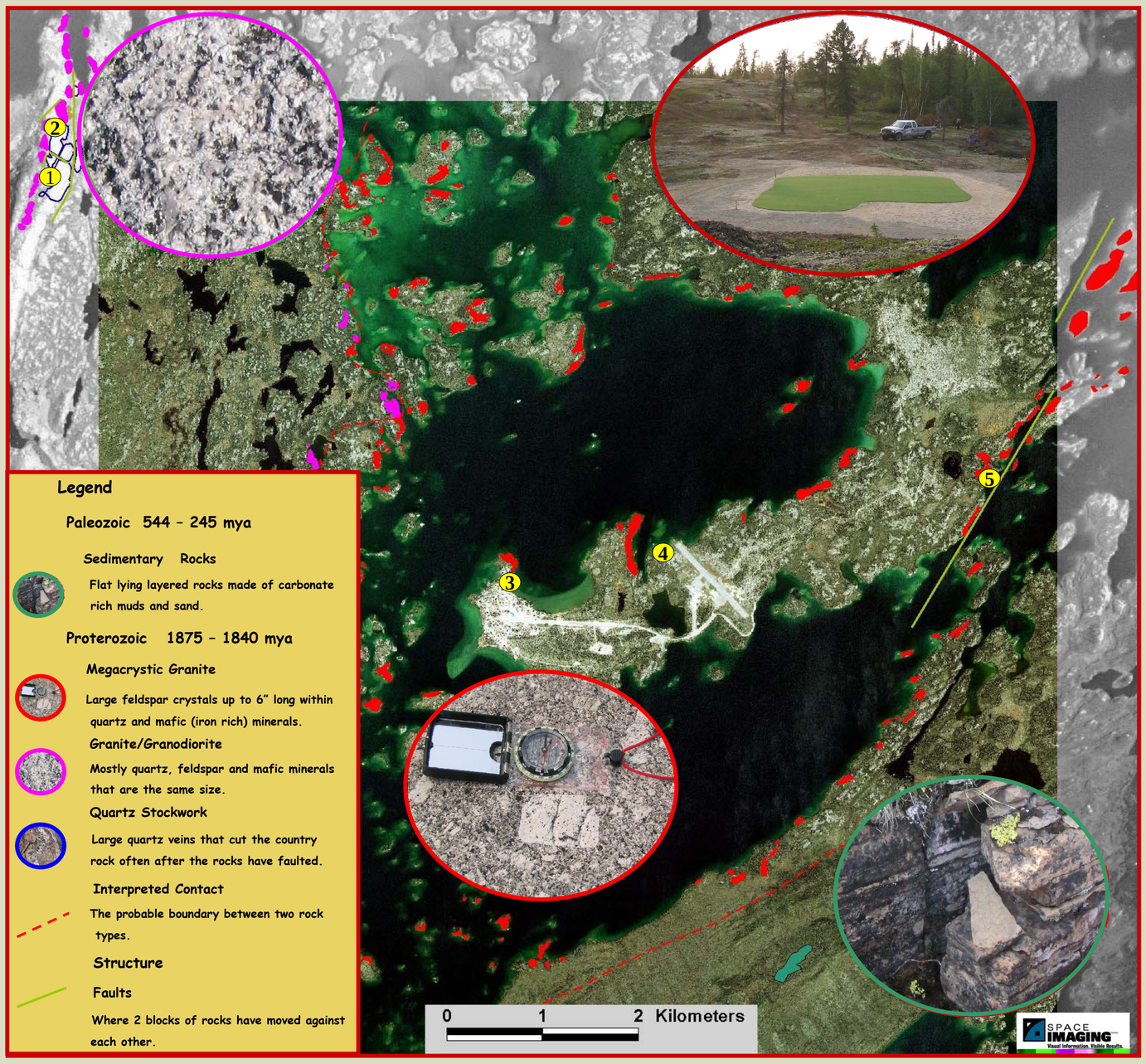
GAMETI, NWT: Community Mapping Project

The community of Gameti (Rae Lakes) sits atop a sinuous esker amid a sea of granite. The surrounding hills have endured millions of years of weathering. Time, glaciers, wind, ice and rain have all left their mark on the rocks leaving behind clues to the formation of this landscape. The glaciers scraped the land away, exposing the ancient rocks as well as depositing the sand and gravel that supports this community.



Kwe-cho (Big Rock) stands tall. Why? Possibly a combination of uplift (when faulting moves rock blocks against each other) and the resistive properties of the rock. Kwe-cho has large areas of quartz stockwork which formed when silica rich fluids moved through fractures in the rock. The silica solidifies into quartz and is very hard and resistant to weathering. Take a look at the white quartz stockwork next time you hike up the hill.



Legend

Paleozoic 544 – 245 mya

Sedimentary Rocks

Flat lying layered rocks made of carbonate rich muds and sand.

Proterozoic 1875 – 1840 mya

Megacrystic Granite

Large feldspar crystals up to 6" long within quartz and mafic (iron rich) minerals.

Granite/Granodiorite

Mostly quartz, feldspar and mafic minerals that are the same size.

Quartz Stockwork

Large quartz veins that cut the country rock often after the rocks have faulted.

Interpreted Contact

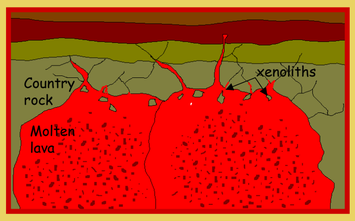
The probable boundary between two rock types.

Structure

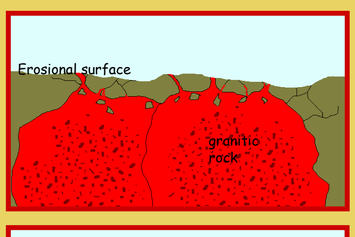
Faults

Where 2 blocks of rocks have moved against each other.

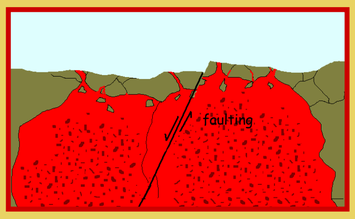
Interpretation of Granitic Intrusions



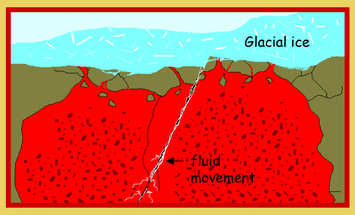
The rocks that surround Gameti are called granites. These are intrusive rocks that formed when molten lava that was deep within the earth rose upward, intruding the country rock. The magma may have risen in pulses over time. As the magma moved upward it incorporated pieces of the country rock. The pieces of country rock that don't fully melt are called xenoliths (foreign rocks).



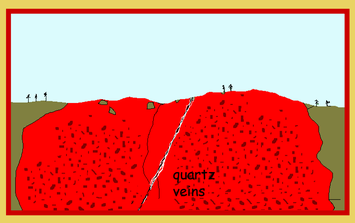
Crystals grow within the hot fluid of the magma chamber. If the magma cools slowly the crystals have time to grow large. As the crystals form, some may settle in layers, others may be altered or rounded. To the west of Gameti, the granites have crystals that are all about the same size.



In Gameti, you see different textures and crystal shapes and sizes. Generally the magma near the edges of the chamber grows smaller crystals because it cools quickly when in contact with the cold country rock.



Movements, such as earthquakes, may cause faulting. Fluids are able to move through these fractures and breaks and deposit minerals – often within quartz veins.

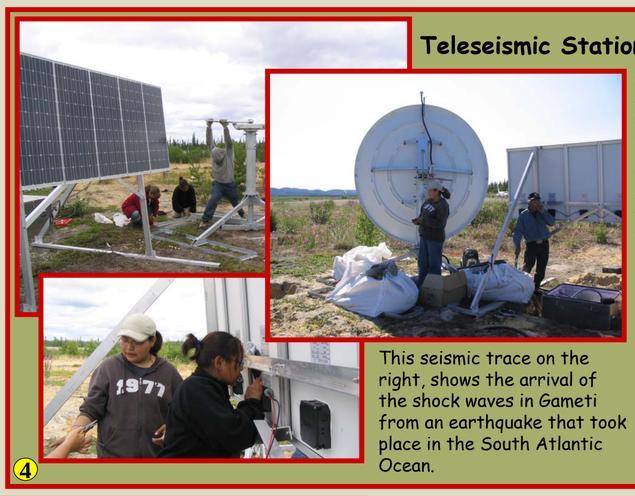


Faulted rock tends to erode since the rock has been ground or broken by the movement. Large scale faults can show up as long linear valleys or breaks in the landscape.

Over time, sediments are deposited and themselves eroded. Glaciers covered this land and ground away at the rocks, removing the sedimentary cover and exposing further the granitic rocks (intrusives). Erosion continues as the ancient rocks are exposed at surface.

Rock Textures: If you look at the rocks by the main dock in Gameti you will notice that they have some rounded feldspar crystals. The pale rim surrounding the crystal is another form of feldspar that has grown around the original crystal. This particular texture is called Rapikivi, so you can call these rocks Rapikivi Granites.

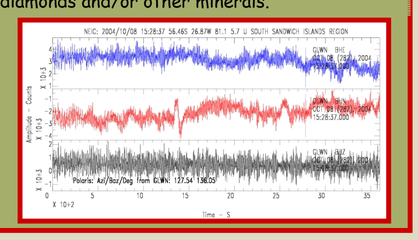
Teleseismic Station



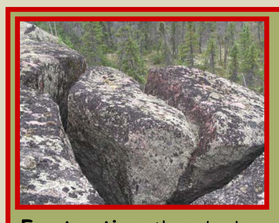
A teleseismic station was set up at the Gameti airport. This instrument measures and records earthquakes from around the world!

Why is that important? The information that the scientists collect can be used to map the structure of the earth beneath. This tool may show features that could be used as indicators for areas that may have potential of hosting diamonds and/or other minerals.

This seismic trace on the right, shows the arrival of the shock waves in Gameti from an earthquake that took place in the South Atlantic Ocean.



Weathering



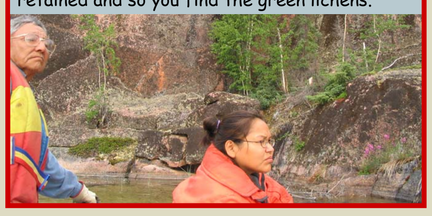
Frost action: these broken rocks are a product of the power of ice. Water enters a crack in the rock , when it freezes, it expands forcing the crack to open further. Over 100s to 1000s of years large blocks can be broken off. These blocks have been subjected to further weathering by wind and rain and are becoming rounded.

Below a feldspar crystal proves to be more resistant to weathering than the surrounding minerals in the rock. The darker minerals are more iron rich and are worn away faster by the elements.

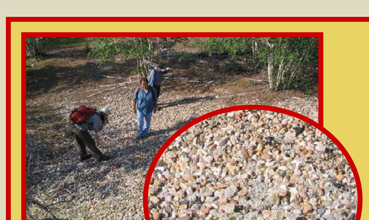
Spalling: the top layer of the rock is peeling off – that's why some rocks crack or sound hollow when you walk on them. This may be enhanced by forest fires super heating the rock and then when rain hits the hot rock, steam forces the layers open. Over time ice action further lifts the rock sheets.

Offset Veins: Here you can see a fault, an area where the rock has moved against itself. The broken vein material shows how far the rock moved horizontally, but it doesn't show us whether the rock blocks have moved up or down. This is a small scale fault. Faults can be regional in scale (see 5 on the map), and can leave deep rifts that can potentially be good fishing spots. Look across the horizon around Gameti – notice any large "breaks" across the hills?

Lichen prefers certain rocks and areas. Dark black lichen is more tolerant to dry conditions so tends to grow on the sides of the rocks. On top of the hills and in hollows, water is retained and so you find the green lichens.



These layered, carbonate-cemented mudstones and sandstones tell us that they were deposited in a marine environment.

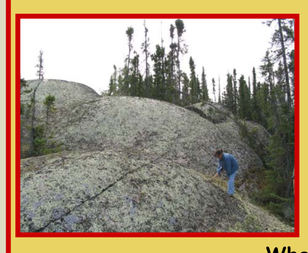


How did these cobblestones get up the hill?

These cobblestones were transported by high energy water that had enough force to smooth and round the rocks. Perhaps a fast moving glacier stream or a waterfall deposited these rocks on big hill.

Glacial Erratics
Roxanne stands on top of a large sedimentary boulder perched on a granite. This rock is called an erratic: it has been transported here by a glacier down ice of it's origin.

Glacial Striations
Rocks imbedded in the ice at the bottom of glaciers scratch and mark the rocks that it moves over. By measuring the direction of the scratches you can determine which way the ice moved.



Whale Backs
Jennifer is standing on a smooth glacially carved rock that has a typical rounded whale back shape.

Faber Lake Pot Hole

This pot hole may have been created by fast flowing glacial meltwater. Rocks in the water were moved around like a whirlpool, grinding away at the bedrock below and eventually leaving a pot hole in the rock.

Gameti: The community sits atop a long ridge of sand, gravel and boulders. This land form is called an esker or What'a. Eskers are formed by streams flowing in ice tunnels beneath stagnant or retreating glaciers. Large amounts of material are deposited this way, and once the glacier melts, what remains is an upside down riverbed. All this till makes for a fine golf course. The inset shows the mix of sand, gravel and boulders in a cut face of the esker.

Recommended citation: Schreiner, D., 2004. Gameti, NWT: Community Mapping Project; NWT Geoscience Office, NWT Educational Publication 2004-1. 1 poster.

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