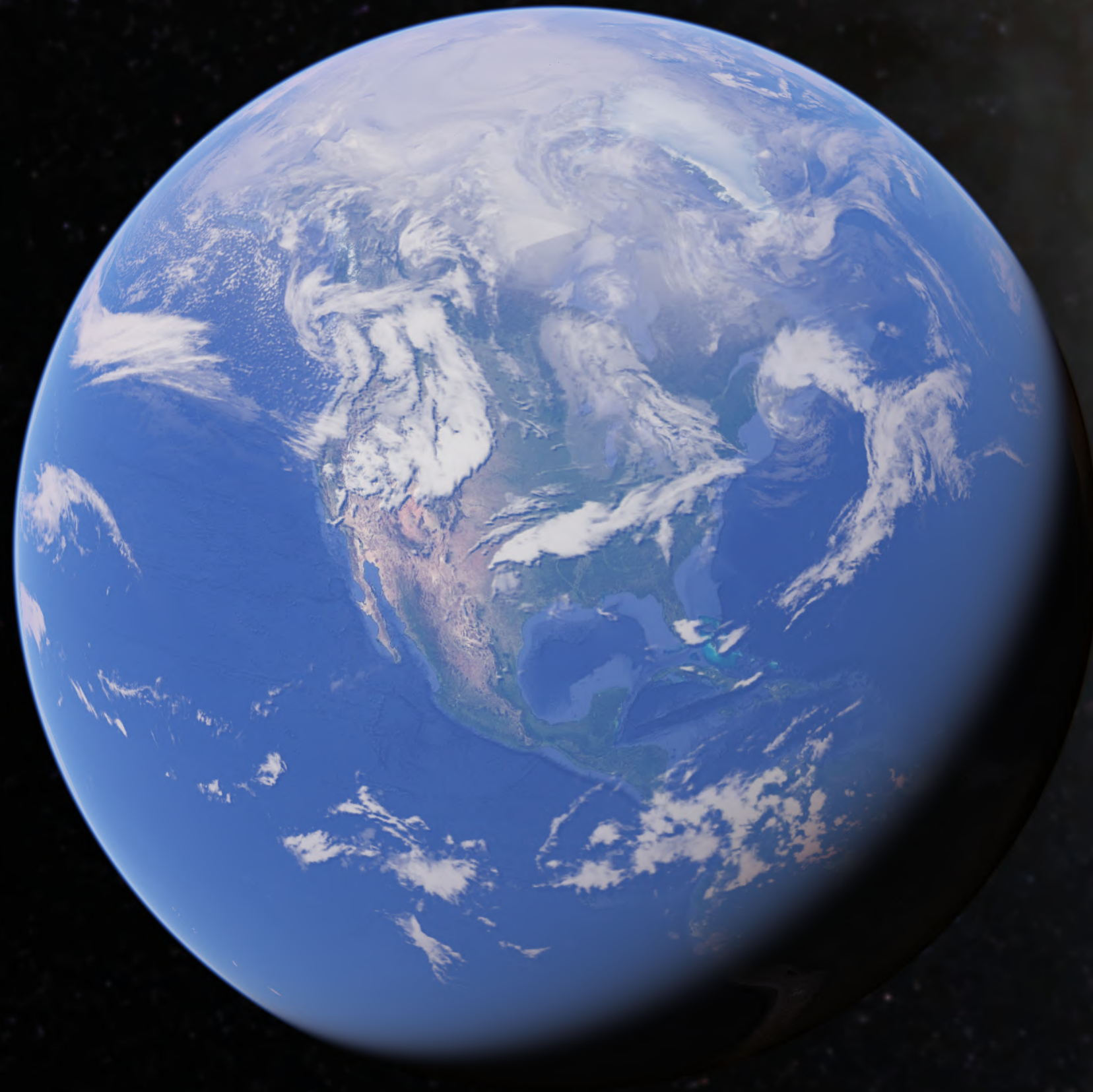
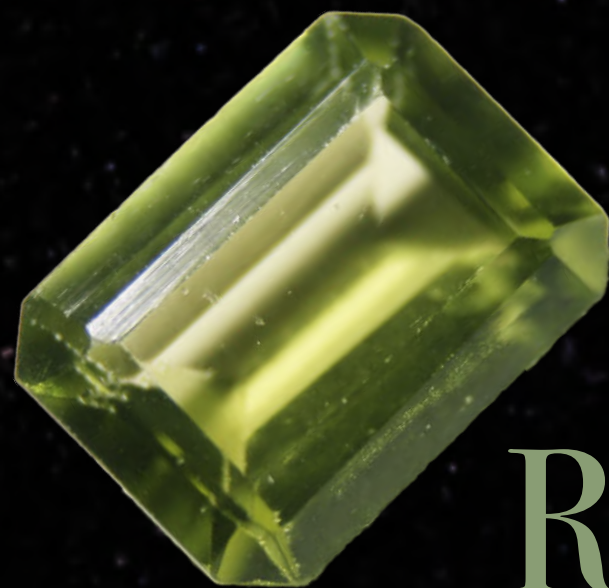




Around the
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. . . in 80

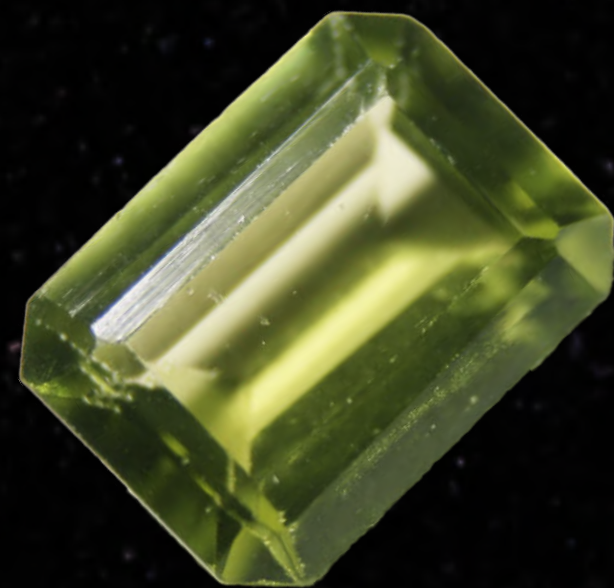


Rocks, Fossils, & Formations!



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Oceania - Plus



Roseann Hanson

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Quick Geology Reminders, or *What is a Rock?*

- **Rocks** are made up of *minerals*.
- **Minerals** are made up of *elements*: iron, magnesium, calcium, silicon, etc.
- **Minerals** become **rocks** through **formation processes** in the earth
 - *“Think of minerals as cooking ingredients and rocks as the finished dish.”*
– Geologist-artist Vojta Hybl
- There are 3 major **rock** types based on those processes:
 - **Igneous**
 - **Metamorphic**
 - **Sedimentary.**

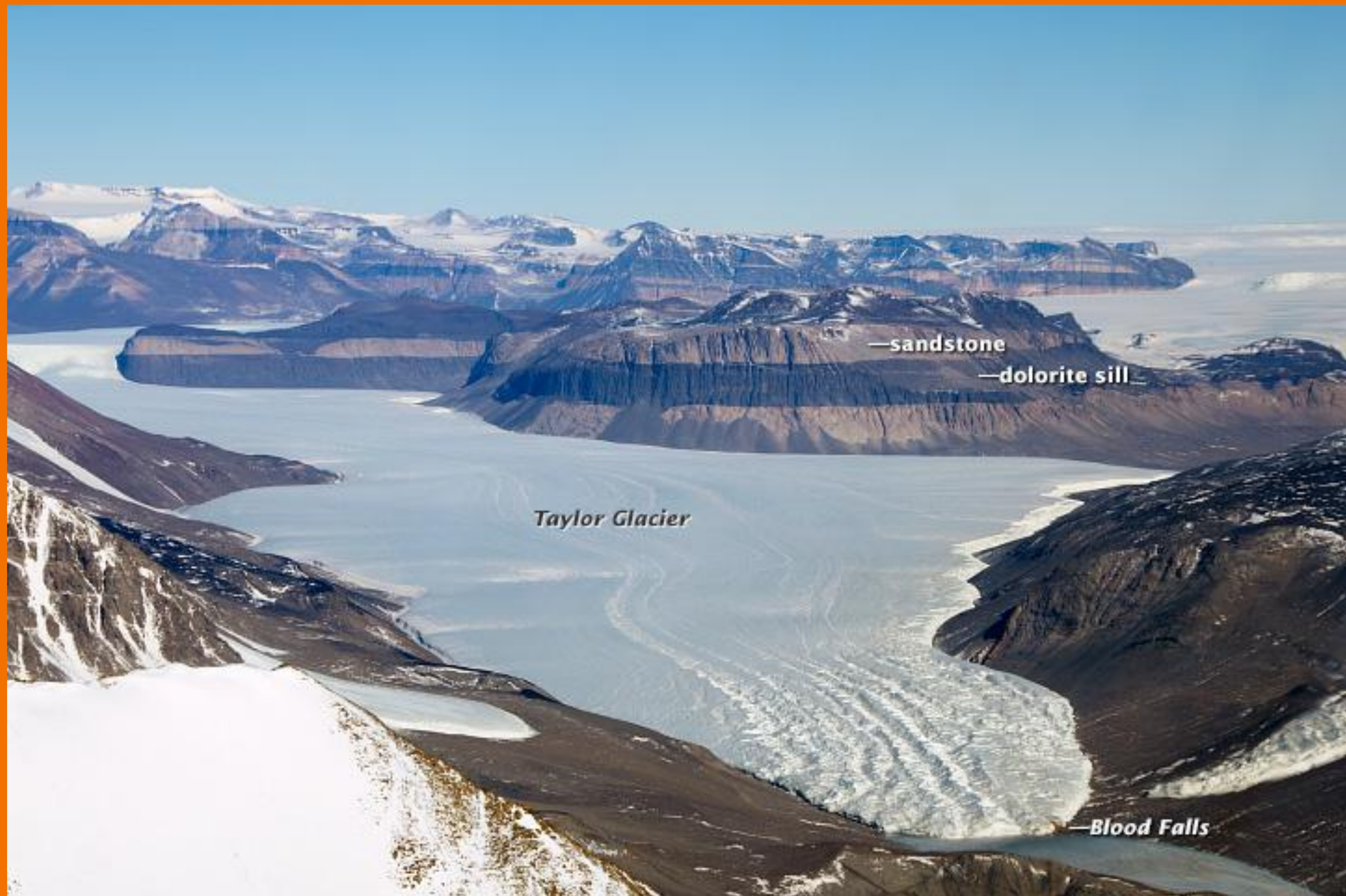
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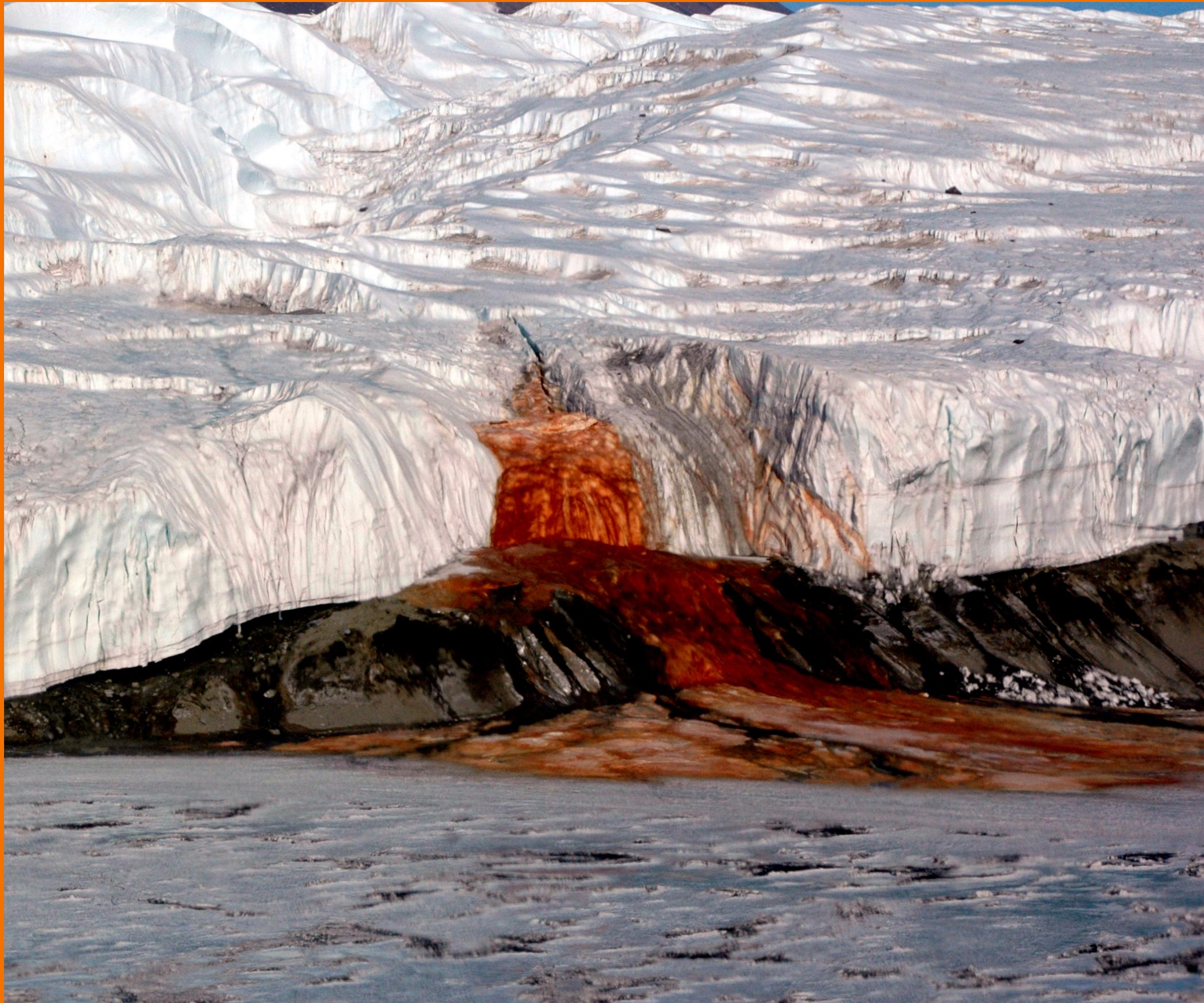






By National Science Foundation/Peter Rejcek





**Blood Falls, Taylor Glacier,
Antarctica**
 Fe_2O_3 (iron oxide)

- Iron-rich, hypersaline water sporadically emerges from fissures in ice cascades.
- Soluble ferrous ions trapped in ancient seawater pocket during Miocene (5 mya).
- At least 17 different microbes but almost NO oxygen.
- May use sulfate to respire with ferric ions and metabolize trace levels of organic matter trapped with them.
- Such a metabolic process has never before been observed in nature.





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Wave Rock, Australia
Katter Kich to the Ballardong
(Granite)

- 15 m (50 ft) high X 110 m (360 ft).
- 2.63 byo biotite K-feldspar porphyritic monzogranite; part of Yilgarn Craton.
- N side of a solitary hill (“Hyden Rock”) which is an *inselberg* (flared slope at base).
- Stripes = chemical weathering.
- Ballardong believe it was created by Rainbow Serpent, dragging her swollen body over the land after she had consumed all of the water.



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White Opal – Coober Pedy, Australia

Hydrated silica ($\text{SiO}_2 \cdot n\text{H}_2\text{O}$)

- Mohs 5 to 6.5.
- Australia = 95% of world's supply of opal and largest percentage still comes from 70 opal fields around Coober Pedy.
 - Formation: silica gel filled crevices in host rock. Silica forms tiny spheres.
 - Play-of-color caused by diffraction of light in silica spheres, stacked like tiny Ping-Pong balls in a box.
 - Bedouins believed that opals contained lightning and fell from the sky during thunderstorms.















Deer Cave, Sarawak, Malaysia

Limestone (CaCO_3)

- Asian and Australian tectonic plate movement caused crust to buckle and elevate, creating Borneo and Mulu Mts. (5 mya).
- Now in Gunung Mulu National Park.
- Named for native deer (*Cervus unicolor*) who enter for salt.
- Approx. 3 million bats (over 30 species) live inside Deer Cave.
- Hosts the *troglobiont* freshwater crabs of the genus *Cerberusa*.









***Pounamu, Greenstone,
Nephrite Jade***
Calcium, Magnesium, Iron

- Nephrite has crystals that are interwoven and fibrous.
- The Māori name for the South Island of New Zealand is *Te Wai Pounamu* ("The greenstone waters").
- *Pounamu* plays a very important role in Māori culture and is a *taonga* (treasure).
- *Poutini* is a *taniwha* (giant water being) who protects people and the *mauri* (life force) of *pounamu*.





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Moeraki Boulders, NZ

Calcite septarian concretions
(CaCO_3)

- Carbonate-rich concretions that contain a hollow core and angular cavities or cracks (*septaria*; from Latin *septum* "partition, separating element").
- Date to the Paleocene (56 mya).
- One-third are 0.5 to 1.0 metre (1.6 to 3.3 ft), two-thirds are 1.5 to 2.2 metres (4.9 to 7.2 ft).
- Process that created them remain a mystery.









Mookaite Jasper
Silicified radiolarite

- Found exclusively near Mooka Creek in the Kennedy Ranges of Western Australia.
- Cretaceous period, from deposits of radiolaria and other microscopic skeletons mixed with silica and iron oxides.
- Not a true volcanic jasper, but a fossiliferous radiolarian ooze.
- Mohs = 6.5–7.







Kilauea USGS (public domain).





Pāhoehoe Lava Flow *Basalt*

- Fed internally by streams of lava (molten rock = 800–1,200°C / 1,470–2,190°F).
- *Aphanitic* (fine-grained) extrusive igneous rock (rapid cooling of low-viscosity lava rich in magnesium and iron) = mafic lava.
- Skin on a pāhoehoe flow is deformed by the motion of the underlying molten lava.
- Like “the surface texture of a pan of brownies.” - USGS Hawaiʻi.

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