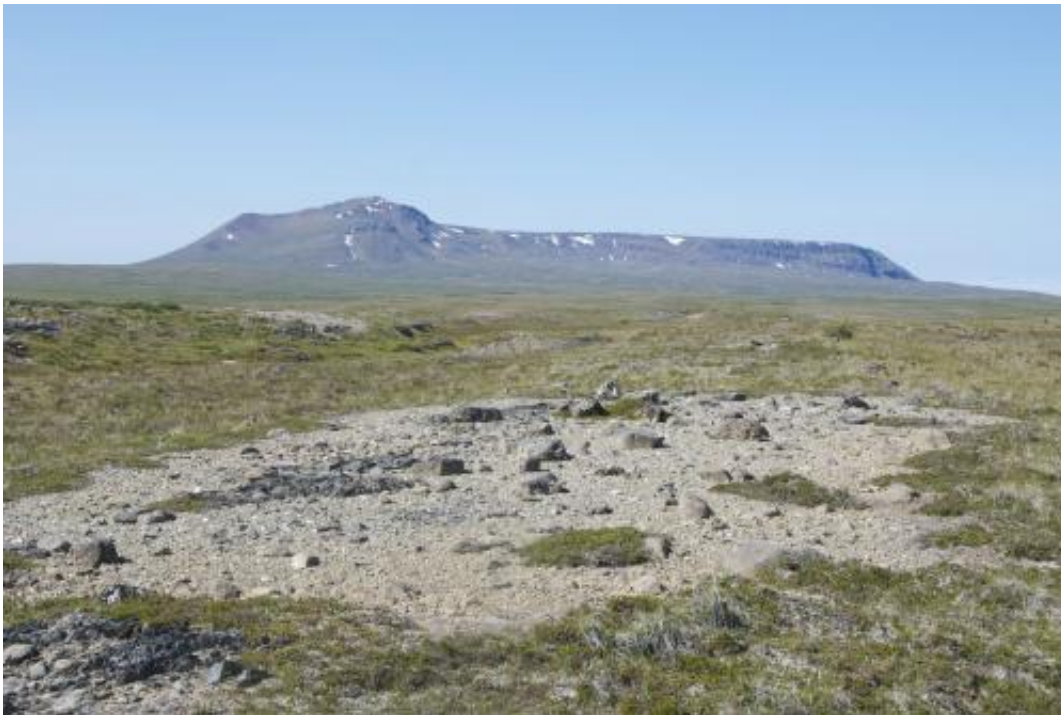


Canada's distinctive tuya volcanoes reveal glacial, palaeo-climate secrets

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Kima'Kho tuya forms a high relief structure covering 28 square kilometers rising 1,946 meters above sea level on the Kawdy Plateau near Dease Lake. Credit: UBC

Deposits left by the eruption of a subglacial volcano, or tuya, 1.8 million years ago could hold the secret to more accurate palaeo-glacial and climate models, according to new research by University of British Columbia geoscientists.

The detailed mapping and sampling of the partially eroded Kima' Kho tuya in northern British Columbia, Canada shows that the ancient regional ice sheet through which the volcano erupted was twice as thick as previously estimated.

Subglacial eruptions generate distinctive deposits indicating whether they were deposited below or above the [waterline](#) of the englacial lakes—much like the rings left on the inside of a bath tub. The transitions from subaqueous to subaerial deposits are called passage zones and define the high stands of englacial lakes. The depth and volume of water in these ephemeral lakes, in turn, gives researchers an accurate measure of the minimum palaeo-ice thicknesses at the time of eruption.

"At Kima'Kho, we were able to map a passage zone in pyroclastic deposits left by the earliest explosive phase of eruption, allowing for more accurate forensic recovery of paleo-[lake levels](#) through time and better estimates of paleo-ice thicknesses," says UBC [volcanologist](#) James K Russell, lead author on the paper published this week in *Nature Communications*.



UBC geologists examine pyroclastic deposits near summit of tephra cone on south side of Kima'Kho. Key attributes of these deposits established that they were deposited above the level of a surrounding englacial lake. Credit: UBC

"Applying the same technique to other subglacial volcanos will provide new constraints on paleoclimate models that consider the extents and timing of planetary glaciations."

While relatively rare globally, tuyas are common throughout Iceland, British Columbia, Oregon, and beneath the Antarctic ice-sheets. Kima'Kho tuya forms a high relief structure covering 28 square kilometres rising 1,946 metres above sea level on the Kawdy Plateau near Dease Lake. The plateau hosts six other tuyas.

"We hope our discovery encourages more researchers to seek out pyroclastic passage zones," says Lucy Porritt, a Marie Curie Research Fellow at UBC and University of Bristol. "With more detailed mapping

of glaciovolcanic sequences, and the recognition of the importance of these often abrupt changes in depositional environment, our understanding of glaciovolcanic eruptions and the hazards they pose can only be advanced."

Provided by University of British Columbia

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