Rewriting Glacial History In Pacific North America

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Although the story on glacier fluctuations in northwestern North America over the last 10,000 years has remained largely unchanged for decades, new evidence discovered by a University of Alberta researcher will rewrite that glacial history and offer clues about our climate history during the last several thousand years.

Glacier fluctuations are sensitive indicators of past climate change, yet little is known about glacier activity in Pacific North America during the first millennium A.D. Alberto Reyes, a PhD student in the Department of Earth and Atmospheric Sciences, and his research team have found evidence for a regionally-extensive glacier expansion in the first millennium AD, suggesting that climate during the last several thousand years may have been even more variable than previously thought. The research appears in the journal Geology.

Reyes and his collaborators--the main ones were Dr. Dan Smith from the University of Victoria and Dr. Greg Wiles from the College of Wooster in Ohio--looked for a variety of clues in the field to help figure out the timing of past glacier fluctuations. At almost all of the glaciers studied, surface evidence prior to the "Little Ice Age" had been destroyed because glacial advance during that time had been so dramatic.

Most of the evidence they found was in the form of buried soils and logs covered by glacial sediments. "In some cases, entire forest stands were buried by sediments and their trunks sheared off by advancing ice," said Reyes, who initiated the work while a master's student at Simon Fraser

University.

Samples were then sent off for radiocarbon dating and when the results came back, the researchers were able to tell a story about when each individual glacier was expanding. Reyes had earlier noted the first millennium AD glacier advance at the glacier he was studying for his master's thesis, which jumped out because it was not thought that glaciers in the region were expanding at that time.

After pouring over old data and early results of new research, the team found that many other glaciers had advanced during that period. "If only one or two glaciers are advancing at any particular time it is not really significant," said Reyes. "But when many glaciers across a wide region are advancing with some degree of synchronicity, there is likely something going on with regional climate that causes the glaciers to advance."

Reyes was surprised that the regional nature of this first millennium AD glacier advance remained unrecognized for so long. He suspects some of the earlier reports that hinted at the existence of an advance stayed under the radar because they did not fit into the established chronology of past glacier activity.

The glacier data reported by Reyes and colleagues, together with other clues of past climate, support an emerging idea that climate in the North Pacific region has cycled from warmer to colder intervals several times over the last 10,000 years.