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Playing Back the Histories of Climate Change

"We know that researchers were in the facility on Friday and there were no problems and then suddenly on Sunday afternoon we had a fire alarm trigger, which was the first we knew we had a problem." (Andrew Sharman, University of Alberta Vice-President of facilities and operations)

The newly built state-of-the-art Canadian Ice Core Archive in the Faculty of Science at the University of Alberta had experienced a massive system failure as its freezer facility increased in temperature from minus 37 to plus 40 degrees Celsius.

The samples were immediately moved out of our problem freezer into our backup and we had technician working through the night to rectify the issues. And by Monday afternoon we had the freezer back up to temperature.

To have concurrent duplicate or even triple failures is absolutely unique.

Approximately 22,000 years of climate history glistened on the floor in an indistinguishable pool of lost data.

"It was pretty depressing to see the sight of things and realise that we thought we had a system that was bomb proof in terms of alert. Every ice core facility on the planet this is their number one nightmare." (Martin Sharp, Glaciologist)

An ice core from the Penny Ice Cap on Baffin Island sustained serious damage. That core lost 66 metres of ice, about one-third of its mass, which equals 22,000 years of evidence.

A core from Mount Logan was also damaged — 16,000 years of the 17,000-year record was lost.

That's one of the issues we have to address, is really whether that melt-effected core is useable for science or not.

Under the conditions of advanced capitalism, the twinned forces of industrialisation and extractivism had already ensured that global warming would reach precipitous

levels in the 21st century, especially in Arctic regions which are experiencing accelerated change at two to four times the global average.

"Because glaciers and ice sheets are melting so rapidly we're losing that record and so being able to preserve it in a place like the University of Alberta and study it is really valuable right now." (David Hik, Northern Alpine and Tundra Ecosystems)

The story of a catastrophic meltdown in the form of a freezer-failure reads as capitalism's inevitable post-script confirming that, indeed, all that was solid now melts into water.

In order for contemporary scientists to build climate models they need to access planetary records that have logged changes occurring over thousands of years.

"To understand the changes in climate we are seeing today, we really need to under the Earth system as it operates as whole. The ice cores themselves provide the highest resolution record of environmental changes over the last several hundred thousand years." (Jeff Kavanagh, Glacial systems)

Yet most instruments for measuring environmental phenomena and meteorological conditions were only invented in the nineteenth century.

Understanding such ancient climates necessitates turning to proxies—Earth's natural media archives.

"Ice cores are like a tape recorder of climatic history and that history is disappearing worldwide." (Andrew Bush, Paleoclimate modelling)

Proxy data refers to information registered and preserved by natural entities, which can serve as an indirect record of local conditions.

Evidence of climactic transformations is buried in deep-sea sediments, trapped in coral reefs, fossilised in pollen grains, frozen in glacial ice, stored in old growth forests, and petrified in the mineral secretions of caves.

These analogue recording devices are the means by which environmental systems can playback the histories of climate change.

"Ice cores are, if you look at the situation globally, one of best repositories of information about past climates and past environments. "(Martin Sharp)

And they certainly give records at much higher resolution than deep-sea sediments for instance, which is the other place that people usually go for these kinds of records. So there is a lot to be learned from those records.

In a series of interviews conducted with climate scientists at the Cabauw Experimental Site for Atmospheric Research in the Netherlands, we also spoke about proxy data, but this time our exchange took an unusual turn.

Instead of a conversation focused on ice cores and tree rings, we discussed cultural objects as a potentially useful source of information about meteorological history.

In particular, the atmospheric archive produced by the prolific 17th century Dutch landscape painter Jacob van Ruisdael, famed for his depiction of clouds.

"If you look around here, you can see its flats, it's a typical Dutch landscape, trees, grass, clouds and lots of sky above your head." (Herman Russchenberg, Cabauw Experimental Site for Atmospheric Research)

We use a painting from the 17th century landscape painter Jacob van Ruisdaelin fact this is what he painted, the Dutch skies. Well, without knowing it he recorded all the complex things about atmospheric research that we're studying. (Arnoud Apitley, KNMI)

Our discussion about Ruisdael prompted another story. Apparently the German artist Joseph Beuys once theorised that the unique atmospheric properties of light, which has inspired Dutch painters since the 17th century, had disappeared with the land reclamation projects of the 1950s.

The air was said to have lost its refractive shimmer due to the diminished number of water molecules carried inland by prevailing winds.

The scientists working at Caboaw take Beuys claim seriously, in that, artists' observations about meteorological conditions are part of a long and respected tradition in the Netherlands.

However these kinds of historical proxies require complex processes of evaluation and assessment in order to translate their, at times, subjective and poetic accounts into the empirical prose that can plug into global climate model simulations. Which are computational architectures of the Earth's dynamic interactions.

Despite these challenges, cultural materials can provide valuable insights about weather and atmospheric chemistry over a wide-range of spatial and temporal scales.

Indigenous knowledge also has an important role to play in furnishing climate scientists with alternate forms of proxy data.

Inuit observations based on inter-generational knowledge of the land, sea, and skies has provided corroborating evidence of overall warming trends in the Arctic regions.

Yet the value of integrating aboriginal traditions and experiences into the datasets of Earth Science has only been of relatively recent consideration.

"Climate change here in the Arctic is particularly rapid. The impacts and effects of climate change challenge and threaten our very right and ability to exist as an indigenous people." (Sheila Watt-Cloutier, Inuit Activist)

The Snowchange Cooperative, a network of indigenous cultures based in the Circumpolar North signals this emergent shift and exemplifies the ways in which indigenous knowledge is being incorporated into research and policies on the causes and impacts of climate change in the Arctic.

"But they are not just only data for some consumption in science or different research activities. So the point here is that traditional knowledge systems have value of their own and very often the collective, the community, the family, reindeer herders, hunters, fishermen, the women choose to share the things that they feel are crucial in their own world." (Tero Mustonen, Executive-director, Snowchange)

You might have a place name in a local language that talks about a place of pine forests and today it's filled with birch or some other type of tree.

This kind of highly localised information can be cross-referenced with other environmental evidence.

While it is clear that indigenous knowledge and art historical materials can supply us with useful forms of proxy data. Contemporary art practices, many of which also have stakes in ecological enquiries, are not necessarily considered proxy worthy.

Scientific instrumentation for sensing, sampling, monitoring, and recording evidence of environmental transformations, has little need for investigative aesthetic practices, save as illustrative.

I believe that the notion of proxy data can be conceptually redeployed to take into account creative projects that proceed from contemporary modes of capture and recording.

Such projects may involve the strategic re-purposing of historical information to make new political claims or they may be organised around the creation of new forms of perception and the production of new forums for public contestation.

Rather than a conventional understanding of the proxy as the means by which power is enacted indirectly—such as proxy wars. Or the means by which a network might function as a covert intermediary—a proxy server.

The concept of the proxy as it relates to climate science is radically trans-disciplinary, in bringing novel events and experiences into productive relay with one another.

Its operative nature is that of knowledge production, not power plays.

“We have discovered that the ocean is also releasing methane in north-eastern Siberia. This is a feedback loop that can’t be stopped and its now going on. We are moving into a future that has no parallel in history whether its oral history traditions or science.” (Tero Mustonen)

The capacity of creative practices and indigenous story-telling traditions to translate and represent complex ecological events beyond the purview of scientific discourse, legal determinations, and financial paradigms, each with their proprietary forms of expertise, suggests that their role as proxies is ever more essential.

My plea for the proxy therefore, "makes a demand to also take cultural matters seriously as a “measure” and “means” of doing contemporary environmental politics.