

23.11.2007 | in current news

## Schiff Lecture looks at the effect of climate change on the Arctic

The 17th annual Harold I. Schiff Lecture on Tuesday, Nov. 27, will look at the accelerated pace of climate change in the Arctic, compared to the rest of the world, and what that will mean for the future of the region and international politics.

Paul Shepson, adjunct professor of chemistry in York's Faculty of Science & Engineering and director of the Purdue Climate Change Research Center at Purdue University in Indiana, will present his lecture titled "Climate Change, and Atmosphere-Surface Interactions in the Arctic".

Shepson's presentation will look at the consequences of climate change on sea ice, snow pack, permafrost and the plant and animal life that depend on the Arctic. He will discuss current research activities of the international project Ocean-Atmosphere-Sea Ice-Snowpack (OASIS) which looks at the chemical exchange between the surface and the atmosphere in the Arctic. The international collaborative study, began in 2003 following a workshop with Arctic researchers at Purdue.

### Right: Paul Shepson

As part of OASIS, Shepson is studying the effect of changes in the Arctic on the way toxic air pollutants such as mercury are removed from the atmosphere. Currently each spring, the sun and other atmospheric chemical species like ozone react with sea salt on the frozen ocean to bring about the release of bromine or other halogens into the atmosphere which in turn destroy the lower atmospheric ozone and mercury.

"This was a Canadian scientific discovery that changed the way scientists think about atmospheric chemistry in polar regions," says Shepson. "It is a natural process; however, it is likely to change dramatically as sea ice retreats."

For this process to occur a frozen surface is needed and it works best with freshly frozen ice, what's known as first-year sea ice. There is more first-year ice every year as the multi-year ice, built up over many years, is decreasing because of climate change. Every fall there is more open ocean, which freezes in the winter into a thin layer of new ice.

"Eventually, when the sea ice is gone, this process of ozone and mercury depletion will stop, but in the meantime there is more first-year ice on the Arctic Ocean. So for a few decades these processes may increase leading to input of more mercury into the ocean and surrounding ecosystems," says Shepson.

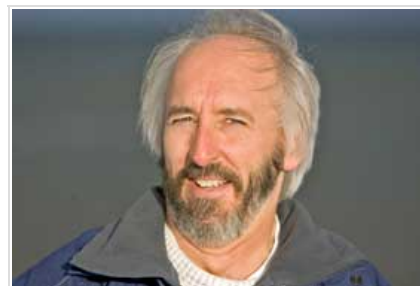
### Right: Shepson's group and a team of Inuit volunteers haul his tethered balloon from a hangar to the Arctic Ocean research site, where they study the vertical structure of ozone

Just what the increase of mercury will do to the ecosystem is currently being studied. The depletion of the lower atmospheric ozone, however, is a good thing as it's a biosphere toxin, but the effect on the Arctic when that process slows is still unknown.

What is known is that as the sea ice retreats, the reflectivity of the surface also decreases causing sunlight to be absorbed rather than reflected.

"That leads to faster warming, which leads to faster sea ice retreat, and so on," says Shepson.

The rest of the world, the atmosphere and the oceans, will also heat up as a result and that could have dramatic consequences for native Arctic peoples and surrounding plant and animal life, including polar bears, ringed seals, ice algae and anything else that relies on the current food web there. It could also open up new shipping routes in the Arctic and that has Shepson worried about the impact on the environment in the polar region.



For now researchers can only hypothesize about some of the effects climate change will have on the Arctic, but change is happening quickly, says Shepson, and the answers won't be long in coming.

He says one of the most important aspects of this research is the opportunity it gives him to engage the public in the topic of climate change.

In the spring of 2008, Shepson will be aboard the Amundsen icebreaker as part of an International Polar Year project called OASIS-CANADA to conduct further atmospheric chemistry research in the Arctic.



**Left: Paul Shepson stands on the Arctic Ocean near the Barrow lead at Barrow, Alaska, during a field campaign. The Barrow lead is a break in the ice about 1-km long used as a migration route for bowhead whales in the spring.**

The Harold I. Schiff Lecture was established in 1990 to celebrate, honour and remember Harold I. Schiff, founding dean of York's Faculty of Science in 1968. Schiff is well-known for his contribution to the development of techniques for measuring trace constituents in the upper atmosphere and to the interpretation of the physics and chemistry of the stratosphere.

While at York, Schiff was Chair of the Department of Chemistry and director of the Natural Science Program in 1964, dean of the Faculty of Science 1965 to 1972, and director of the Centre for Atmospheric Chemistry 1985 to 1989.

In 1987, Schiff helped hire Shepson as an assistant professor in York's Chemistry Department. When Shepson left for Purdue University in 1994, he was acting director

of the Centre for Atmospheric Chemistry.

The lecture, which begins at 2:30pm in the Senate Chamber, N940 Ross Building is organized by the York University Centre for Atmospheric Chemistry. The lecture is free and open to the York community.

For more information about the Harold I. Schiff Lecture, e-mail [cac@yorku.ca](mailto:cac@yorku.ca). For more information about the [International Polar Year \(IPY\)](#), [OASIS](#), [IPY-Canada](#), or the [Shepson Atmospheric Chemistry Group](#) at Purdue University, visit their Web sites.

*By Sandra McLean, York communication officer*

*For more University news, photos and videos, visit the [YFile](#) homepage.*