



The ship has now been confirmed to be the Erebus!

## Update on the Franklin Expedition

By Ann McMillan

The whole world is a-twitter with news that one of Sir John Franklin's lost ships (either the HMS *Erebus* or the HMS *Terror*) has finally been found! In true Canadian tradition, the expedition team that found it is made up of a multi-disciplinary partnership involving many public and private interests, all working together for a common goal. Acting Regional Director, George Schlagintweit of the Canadian Hydrographic Service, a branch of Fisheries and Oceans Canada, is thrilled to have included members of his staff in this historic expedition. For an insightful look into the role played by the Canadian Hydrographic Service, check out the following articles:

[www.insidehalton.com/news-story/4861921-burlington-s-scott-youngblut-honoured-to-be-part-of-franklin-shipwreck-find/](http://www.insidehalton.com/news-story/4861921-burlington-s-scott-youngblut-honoured-to-be-part-of-franklin-shipwreck-find/)

[www.thestar.com/news/canada/2014/09/09/the\\_star\\_with\\_the\\_franklin\\_search\\_how\\_the\\_franklin\\_wreck\\_was\\_finally\\_found.html](http://www.thestar.com/news/canada/2014/09/09/the_star_with_the_franklin_search_how_the_franklin_wreck_was_finally_found.html)

[www.thestar.com/news/world/2014/09/03/charting\\_canadas\\_waters\\_a\\_painstaking\\_process.html](http://www.thestar.com/news/world/2014/09/03/charting_canadas_waters_a_painstaking_process.html)



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- *Building a Research Station in Canada's North*

### WORKING GROUP

The working group for this issue is:

- **Martin Taillefer – Chair**
- **Andrew Bell – CMOS Executive Director – SIG Advisor**
- **David Fissel, Ann McMillan, Doug Bancroft, Helen Joseph – Members**
- **Tess Maheux – Assistant Editor**

# Who Owns the Pole?

By: Paul LeBlond, Galiano Island, British Columbia

Nobody yet. Although some Arctic nations have expressed claims to the North Pole, recognized national jurisdictions are limited to 200 nautical miles exclusive economic zones: most of the Arctic Ocean remains "open sea". However, both Canada and Russia have long claimed sectors reaching all the way to the pole; more recently, Canada has extended its claim to include the pole itself. (Arctic Claim Will Include North Pole, Baird Pledges, Globe & Mail, Dec 9, 2013).

Increased interest in mineral and oil resources, as well as the opening of new navigation routes in a warming Arctic, have generated a renewed concern for territoriality. Canada current leadership of the Arctic Council as well as enhanced scientific attention to the area, through programs like Arctic Net and Takuvik, have focused public interest on the Arctic regions.

Jurisdictional disputes will hopefully be settled in time within the framework of UNCLOS and through collaboration within the Arctic Council. However, the idea of ownership or exclusive jurisdiction over the North Pole itself raises some interesting questions.

What is the North Pole? A point on the surface of the earth, where the axis of rotation of the planet meets the surface. Geographically, it's the point where the meridians meet. A geometrical point has no area, so that ownership of the pole would presumably imply ownership of an area which surrounds it. Given competing claims, such ownership might well have to be shared.

There is a further complication. The North Pole is not always at the same place! Because the Earth is not a perfect sphere, it wobbles, like a top. The main wobble is the approx. 435 day 'Chandler wobble'. Recent geophysical evidence suggests that it is due to motion of the crust of the Earth floating over the hot liquid mantle of the Earth's deep interior. In addition, there is a contribution from seasonal mass redistribution in the atmosphere and the oceans. Together, these effects produce a nearly periodic circling movement of the pole of about 10 m in diameter. In addition, the pole is gradually shifting westward (by 20 m since 1900) partly because of the melting of the Greenland ice sheet.

So, ownership of the North Pole would necessarily include a sufficiently wide area around it to encompass its periodic wandering as well as its expected drift over a prolonged period. A radius of a kilometer surrounding the current average position would amply suffice for a century.

Rather than arguing over ownership of such a small area, Arctic nations might consider sharing it with the world for everyone's benefit by dedicating it to scientific research and setting up a North Polar observatory, a counterpart to the Amundsen-Scott South Pole Station. The technical difficulty of establishing a permanent station in a seasonally ice-covered, deep-water location would of course present a significant challenge to human ability. While the idea might seem visionary at this time, so would have been that of a South Pole station a hundred years ago. It might be worth thinking about.

## Meet the Professor



Paul LeBlond is a Canadian ocean scientist, born in Quebec City in 1938 and is now residing on Galiano Island, British Columbia. A graduate of McGill University and the University of British Columbia, LeBlond taught physics and oceanography at the University of British Columbia where he is now an emeritus professor. His work on ocean waves and currents has taken him to research institutes in Germany, France and Russia and was applied to practical problems through his industrial consulting activities and membership in fisheries conservation councils. In parallel to his academic work, he developed a keen interest in unidentified marine animals, inspired by the work of Bernard Heuvelmans. He participated in the creation of the International Society of Cryptozoology in 1982 and was a co-founder the British Columbia Scientific Cryptozoology Club in 1989. LeBlond is a Fellow of the Royal Society of Canada and of the Canadian Meteorological and Oceanographic Society as well as a foreign member of the Academy of Natural Sciences of the Russian Federation.

# ARCTIC CHANGE 2014

$\triangleright \rho \triangleright^{\epsilon_b} C^{\epsilon_b} \rhd \Gamma^b \quad \rhd \rho \rho' \sigma \triangleleft^{\epsilon_b} \Pi \dot{r}^c$

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# Organic Contaminant Measurements in Air at Alert, Nunavut and Little Fox Lake, Yukon

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## Background

- NCP is Canada's National Implementation Plan of Arctic Council's Arctic Monitoring and Assessment Programme (AMAP) (Fig. 1).
- As the master station under NCP, the Alert Global Atmospheric Watch Station (Fig. 2) (82° 30' N, 62° 20' W), operated by Environment Canada, is the world's longest running arctic air monitoring station for persistent organic pollutants (POPs) (1992-ongoing) (Fig. 3,4).

## POPs and other priority pollutants

- Industrial chemicals (PCB transformers, flame retardants, stain repellent, non-stick coatings etc.)
- Pesticides (DDT, chlordane etc.)
- Combustion by-products (PAHs, dioxins etc.)



## Long-range Transport of POPs to the Arctic

- POPs can be carried by air and ocean currents to the Arctic (Fig. 5).
- Air is the most rapid route of transport for these pollutants (Fig. 6).
- High levels found in some marine mammals.
- Northerners consume country food that may contain POPs.
- POPs show up in the Arctic where they are rarely used.



Fig 5. The Grasshopper Effect of POPs

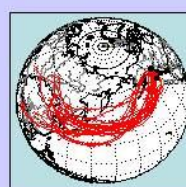


Fig 6. Asian air masses bringing pesticides banned in Canada (e.g. DDT) to the Yukon in 5 days

## Contributions to Domestic and International Initiatives

**Domestically** – Canadian Environmental Protection Act (CEPA) 1999; Chemicals Management Plan; Canadian Arctic Contaminants Assessment Report (CACAR) 1997, 2003, 2011  
**Internationally** – Global Monitoring Plan of the UNEP Stockholm Convention on POPs; UNECE Convention on Long-range Transboundary Air Pollution POPs Protocol; AMAP Assessments in 1997, 2002, 2010 2015

## Time Trends at Alert

### Lindane

- agricultural insecticide
- phased out in Canada in 2004
- bans and use restrictions started in Europe in the 1990s
- listed for global control in May 2009
- accelerated decline (Fig. 7a)

### Endosulfan

- insecticide and acaricide
- listed for global ban in May 2011
- will be phased out in Canada by December 31, 2016
- no decline 1993-2001
- started to decline 2002-2010 (halving in about 7.5 years) (Fig. 7b)

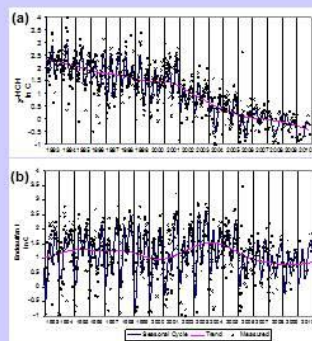


Fig 7. Trends of (a) lindane and (b) endosulfan measured in air at Alert

## Acknowledgements

Funding from Northern Contaminants Program (AANDC) and Chemicals Management Plan (EC)

Thanks to the following organisations/parties for support of data collection:

- Canadian Forces Station Alert
- Council of Yukon First Nations
- Yukon Contaminants Committee
- Yukon College
- Niqit, Avatittinni Committee
- Inuit Circumpolar Council
- All site operators & students

## Innovation

- A novel flowthrough air sampler designed for use under remote cold environment to capture POPs was developed by Environment Canada scientists and the University of Toronto (Fig. 4).
- Without the need of power supply, this sampler can collect large volumes of air, by guiding air through the sampling medium with the help of vanes and its aerodynamic shape, which is required for detection of organic chemicals, usually present at low concentrations in remote sites.
- A vortex rotor on top of the sampler is used to calculate air volume (Fig. 8).
- The sampler was used at Alert (Fig. 4), Antarctica, the European Alps and in Tibet.
- Since August 2011, this sampler is used at the Yukon station of Little Fox Lake for air monitoring of POPs (Fig. 8).

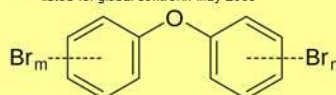


Fig 8. Flowthrough air sampler at Little Fox Lake, Yukon

## Early Results from Little Fox Lake

### Polybrominated diphenyl ethers (PBDE)

- flame retardants
- bans and use restrictions started in Europe and US in the 2000s
- listed for global control in May 2009



### Brominated flame retardants (BFRs)

- organobromine compounds
- commonly used in electronic products

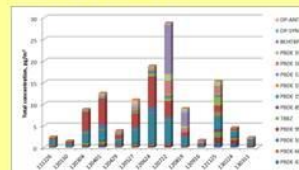


Fig 9. Relative concentrations of PBDEs and selected FRs [DP=Decachlorane Plus; BEHTBP = bis(2-ethyl-1-henyl)tetra-bromo-phthalate; TBZ= 2-ethylhexyl-2,3,4,5-tetrabromobenzoate]

### Relative concentrations of selected FRs

[ATE=aryl 2,4,6-tribromophenyl ether; PBT=poly(butylene terephthalate); BTBPE=1,2-bis(2,4,6-tribromophenyl)ethane; DP604=Decachlorane 604]

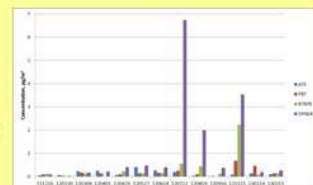
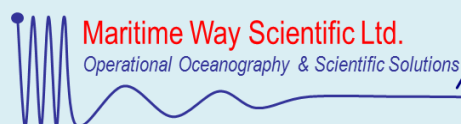


Fig 10. Relative concentrations of selected FRs



## Building a Research Station in Canada's North

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### **2015 Northern Science Award.**

The Northern Science Award is presented annually to an individual or a group who have made a significant contribution to meritorious knowledge and understanding of the Canadian North. In the spirit of the last International Polar Year (2007-2008) the Northern Science Award recognizes the transformation of knowledge into action.

This year marks the 30th anniversary of the award, which comprises the Centenary Medal, which was created to commemorate the 100th Anniversary of the first International Polar Year, 1882-1883, and a prize of \$10,000.

The deadline for nominations is January 31st 2015

### **Le Prix de la recherche scientifique sur le Nord**

La Commission canadienne des affaires polaires souhaite annoncer que la période de mise en candidature est maintenant ouverte pour l'édition 2014 du Prix de la recherche scientifique sur le Nord.

Le Prix de la recherche scientifique sur le Nord est présenté chaque année à une personne ou à un groupe qui a apporté une contribution importante à la connaissance et à la compréhension du Nord canadien. Dans l'esprit de la dernière Année polaire internationale (2007-2008), le Prix de la recherche scientifique sur le Nord vise à souligner la transformation du savoir en action.

Cette année soulignera le 30e anniversaire du prix, qui comprend la Médaille du centenaire, créée pour commémorer le 100e anniversaire de la première Année polaire internationale, 1882-1883, ainsi qu'une bourse de 10 000 \$.

La date limite de réception des candidatures est le 31 janvier 2015.

Pour plus de renseignements, visiter le site Web de la Commission canadienne des affaires polaires à [www.polarcom.gc.ca](http://www.polarcom.gc.ca), ou communiquer avec :

For more information, visit the website of the Canadian Polar Commission at [www.polarcom.gc.ca](http://www.polarcom.gc.ca), or contact:

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