Education IPY

Two linked projects from Norway

- IPY-Norway web resource centre for schools
 - International global school campaign

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International global school campaign





Project outline 1

- Schools take flesh sample of local fish
- Schools sends sample to NILU laboratory
- NILU analysis all samples for dioxin related pollutants – bioassay measurement technique
- Schools retrieves raw data result
- Schools retrieves relevant findings from Arctic and Antarctic observations of similar compounds







Background





Builds on years of experience

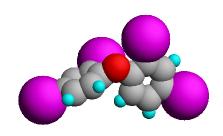
Yearly campaigns with hundred of schools in Norway where pupils performs a national scientific study.

- GLOBE Arctic project 2000-2004
 - POPs in The Arctic.





The Arctic POPs project



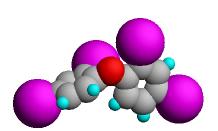




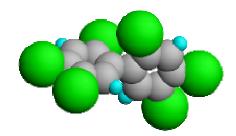


POPs investigated

Brominated flame retardants
 (PBDE 47=
 2,2',4,4'-tetrabromdiphenylether)



PCBs as reference group



Brominated flame retardants

Used in electronic equipment, textiles, and furniture to prevent fires

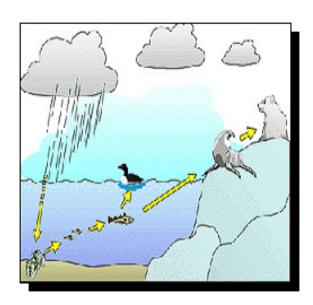
Electronic parts of colour televisions and personal computers Textile coatings; sofas, in seats of cars, buses, and aircraft.





The Arctic POPs project

- Investigate the distribution and level of selected POPs in the Arctic region
- Increase the knowledge of POPs and general environmental science in the involved schools
- Contribute to the documentation of new POPs in the Arctic, needed for international political processes





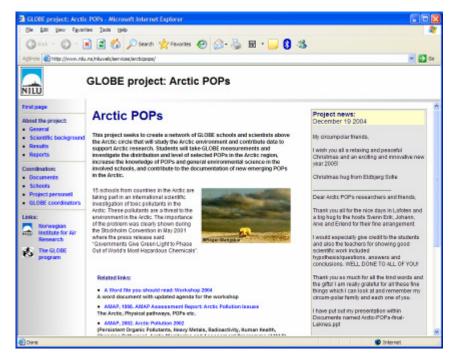
Details on planned project





Sign up and communication

- All registration on project web pages
- Communication through e-mail and bulletins
- PR in cooperation with GLOBE
- Up to 10 schools per country can participate (due to cost of lab analysis)



New web solution to be built, building on solution developed for previous project

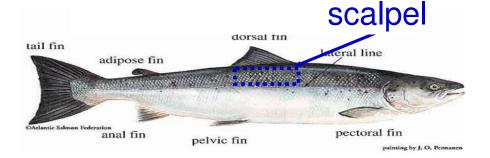




The sampling and sending

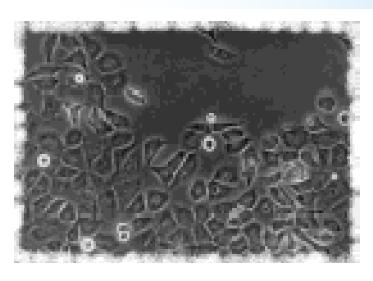
- Schools receives a package with sampling kit and detailed instructions
- Schools catches fish in local lake/sea
- Selected metadata about the fish is registrated on sampling sheet to be sent together with the fish sample
- * 100 g of flesh from below dorsal finn to be packed in accordance with instructions and sent in provided packing material in stamped envelope provided.
 with sterile

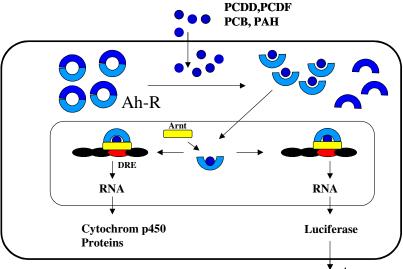






Bioassays analysis at NILU





http://www.biodetectionsystems.com

Bioassay methods are based on the cellular mechanism of dioxin toxicity. Dioxin-like compounds bind to a cytosolic protein, the arylhydrocarbon (Ah) receptor, then the receptor—chemical complex migrates to the cell's nucleus and binds with the Ah-receptor nuclear translocator protein (Arnt). This Ah receptor—Arnt complex interacts with specific DNA sequences and alters gene expression of regulated genes. One of the most studied of the family of regulated proteins is the cytochrome P450 gene product CYP1A1.





With those analysis:

- ❖ Samples tested for effect on AH receptor in other words a health related effect
- ❖ Dioxin and dioxin-like compounds being the most toxic environmental pollutants – are tested for.
- This technique is very suitable for screening of many samples
- * The technique is relative new and very suitable for educational purposes since it measures an actual health effect.





School evaluations

- * What are levels in the local fish from our school?
- What are the levels from the Arctic and Antarctic results provided?
- Our schools compared to the Polar findings?
- What are the differences in our results compared to average results, max, min etc?
- Why is it likely we have the results we have?



Through an interactive report generator on the web pages the schools can make their own scientific report with graphs, pictures and evaluations

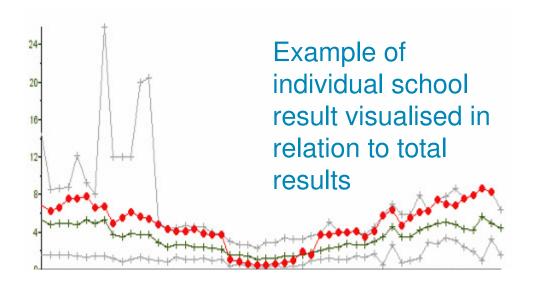






Results visualisations

All results will be made available on the Internet pages and visualised with graphs, figures, tables and maps



Schools can also download the results in excel format and use this for making own calculations and visualisations





Project reporting

- The scientists will make one common report on all findings
- Relevant scientific results will be published in international journals.

NATURE 2002—1, 692004—VIOCKNELL—120074 letters to nature and all that the observed anomalies constitute a recurring extreme state of the global troposphere-stratesphere system in morthern winter that is related to strong Il Niko events. Neighbor on the park 1986s observed one mails high values of Extreme climate of the global troposphere and stratosphere Action with the early William interest with match high relation of that shows one match after in Edogo, the Life of primary an explanation, A this state these, exceptional district conditions were registered at the facilities arise, it were never analysis or large-early content. Moreover, a polotogal II Niko occurred in 100-44, which were the produced of the content of the con-tent of the primary of the content of the content of the district, and the numbers chancedwork. In order to study this which is deadly in the few counted districts and executions of all the colors are consistent of the content of the content of the colors and the study of the first in these counted districts and translational off. in 1940-42 related to El Niño period in detail, we have compiled, digitized and re-evaluated all equilible total scene observations. One arrived term of thousands. of grop-steated height (GPII) and temperature profiles from radio construct monthly mean fields of GPH and temperature for the northern accurately is up to the 100 MPs level in the lower reason galaxy (around 16 few altitudes). Here we are low they date are espare the results to more record data and a disease model The Hill Miles were intered in a more 1994, worked following for harmage feet and harmaly with explicit planting, and point privil. Supplementary Fig. 12. The characterist in contains in the mortism extrated pairs founded before legan in Discontine 1990 and model between February and april 1942, with a considered providers, when give period (Experiments, Fig. 1). In the Beloving we focus on the state of the privil Complements, Fig. 11. Although the El Niko/Southern Oscillation phenomenous is the most prominent mode of about variability building is westler and climate in large parts of the world, its affects on Europe and and details in large parts of the world, for effective or Empoy and the high-bitted contractive in the proof of the proof of the high-bitted contractive in the proof of the proof of the high-bitted contractive in the proof of Top percentage on process of a confidence makes to the septiments of the percentage of the percentage





Station in Antarctica







Station in Antarctica







Station in Arctic - Svalbard







Toxic compounds in Polar air

