

Project information

Keywords

Human biomonitoring, PCBs, pesticides, PFASs

Project title

Human biomonitoring and mechanistic modelling of organic compounds across time (1986-2007) in 30 year old Tromsø men. (HUMOR)

Year

2016

Project leader

Linda Hanssen, NILU; Torkjel Sandanger, UiT

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

69,649°N and 18,955°E (Tromsø county)

Participants

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Karoline Solvoll (Medical Student, UiT)

Pierre Dumas, Pierre Ayotte (INSPQ), Quebec, Canada

Flagship

Hazardous Substances

Funding Source

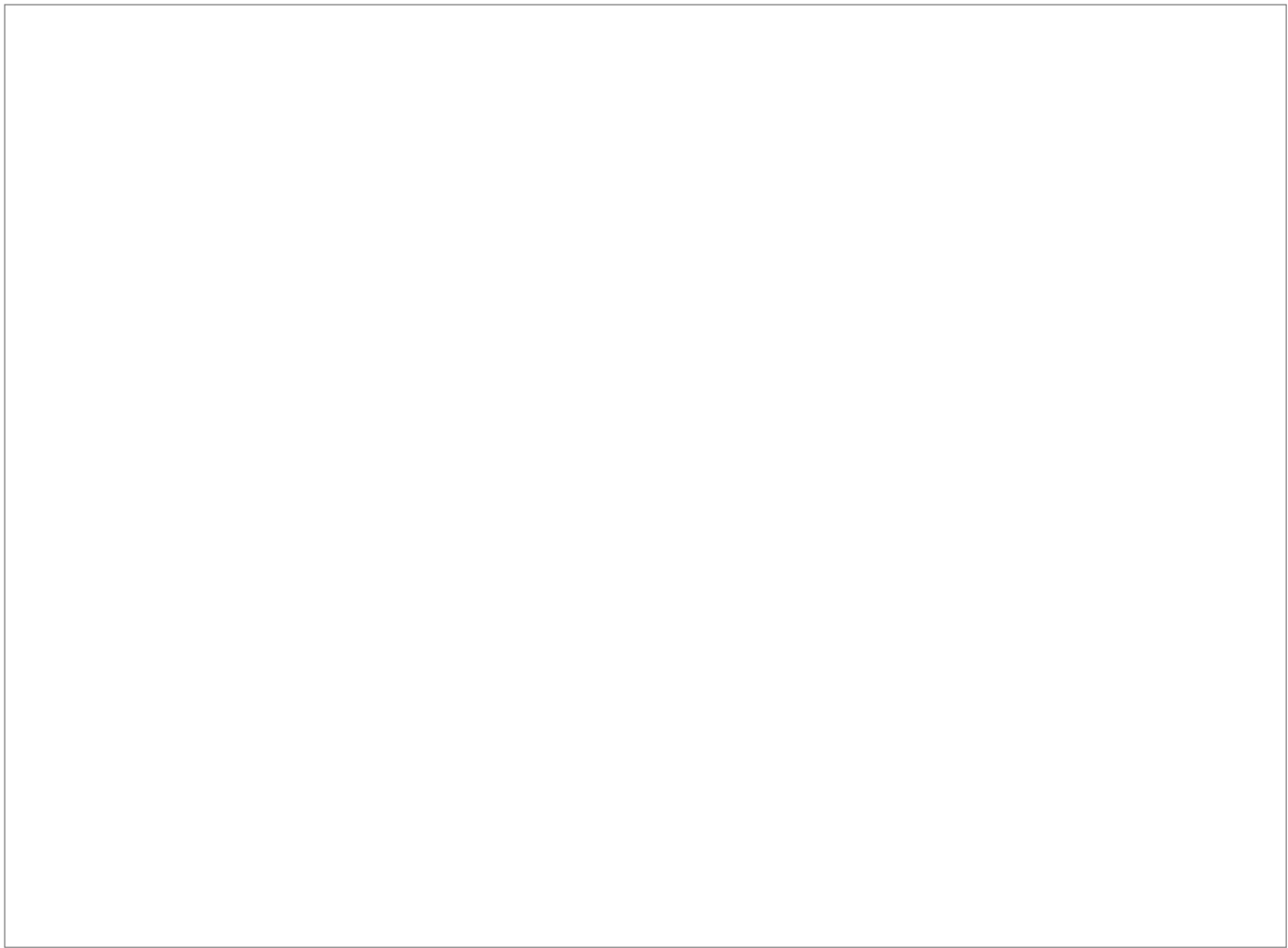
None

Summary of Results

Samples have been analysed for a suite of polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs) and per- and polyfluorinated alkyl substances (PFASs). Further, measured concentrations of four selected PCBs will be compared with concentrations predicted by mechanistic exposure modelling.

Analysis of PFASs showed that changes in concentrations are in coherence with use and emissions of these compounds. The concentrations in 30 year old men from northern Norway are lower than what was reported for a longitudinal study where the study group consisted of older men. We believe that the measured concentrations in these men are generalizable to other men and females of the same age living in Norway. This study have given us valuable data for historic exposure of PFASs, and shows that when regulations restricts emissions of a compound the concentrations in the population will decrease.

The samples have also been analysed for a wide range of PCBs and pesticides. As an example, the PCB 153 concentration is presented in the attached figure. The figure shows that the average concentration of PCB 153 for men born in 1956 are higher compare to those born in 1987. This is also predicted by the CozMoMAN model. To be able to complete the model simulations we need additional information from UiT with respect to the lipid weight. This work will be completed by the end of this year.



Master and PhD-students involved in the project

Karoline Solvoll, a medical student at UiT used some of the PFASs data in an obligatory research project (20 ECTS). The report was approved by the faculty. The student participated in analysis and some statistical processing.

For the Management

This project use a multidisciplinary approach employing chemical analyses, emission-based mechanistic modeling and epidemiological statistics to expand the understanding of human exposure.

Men, born between 1956-1977, have experienced a diverse exposure of organochlorines and fluorinated compounds. Since they are of reproductive age, they could serve as a proxy for the female population at the same age and living in the same area. This further give an indication of the exposure to the fetus.

Predictions obtained from unique biomonitoring data and models can serve as useful tools for assessing past, present and future exposures in human biomonitoring studies as well as indicate effectiveness of chemical management.

Published Results/Planned Publications

The funding of this project was not big enough to complete the two planned publications with tentative titles;

- Repeated measurements of per- and polyfluoroalkyl substances (PFASs) from 1986 to 2007 in 30 year old males from Northern Norway
- Investigating intergenerational differences in 30 year old males from Northern Norway due to variable emissions

Communicated Results

None so far.

Interdisciplinary Cooperation

Analytical/environmental chemistry, environmental modeling

Budget in accordance to results

Budget is presented below, however some changes have been made. Activity 1 and 2 was moved to NILU and activity 4 was moved to UiT. Activity 5 changed from APN to NIVA, due to changes in personell.

Activity	Cost (NOK)	Number	Total
1: PCB and OCP analysis Quebec (WP 1) (UiT)	800,-	180	144 000,-
2: Shipment (WP 1)	2500,-	1	2 500,-
3: PFAS analysis (WP 2) (NILU)	1350,-	180	243 000,-
4: Modelling hours (WP 3) (NILU)	1355,-	15	20 325,-
5: Personnel (WP 4) (APN)	1355,-	30	40 650,-
6: NILU share PFAS analysis (WP 2)			-50 000,-
7: Sum			400 475,-

Funding provided by the Fram Centre helped fund costs associated with chemical analysis, as well as research hours for modeling and evaluation of the data.

Could results from the project be subject for any commercial utilization

No

Conclusions

The multidisciplinary approach used in this project, where chemical analysis, emission-based mechanistic modelign and epidemiological statistics are combined together and expand the understanding of human exposure.

The results from this project are of importance since the historic exposure of POPs in humans are measured. The results shows that the concentrations in humans decrease after the emissions to the environment has ceased. This means that chemical management are of importance for human exposure.

