

Long-Range Transported Contaminants in Northern Finland (LAPCON)

The Finnish Arctic Strategy, the National Programme on Dangerous Chemicals, and the Strategic Approach to International Chemicals Management requires a status assessment of contaminants in Northern Finland (Fig. 1). The existing information and need for future steps will be provided in this study (LAPCON).

Monitoring data of airborne contaminants have shown the presence of harmful substances in Northern Finland. For example, level of mercury (Hg) concentration measured from precipitation indicates 7 % annual increase (Fig. 2). Some of the substances have not been found in remote places until recently suggesting they are sufficiently persistent and undergo long-range transport. Only some of these chemicals have been included in the Stockholm Convention on Persistent Organic Pollutants (POPs). In comparison with other Arctic regions, little data are available on new contaminants, such as brominated or fluorinated substances, in Northern Finland.

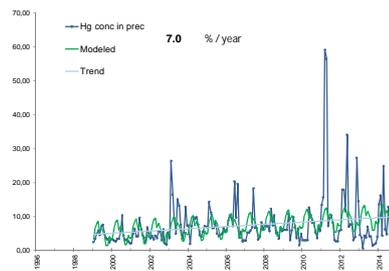
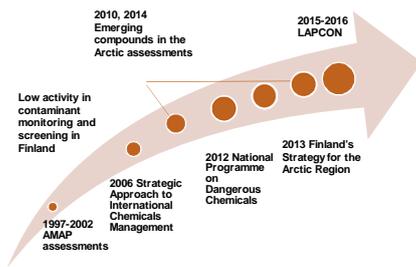
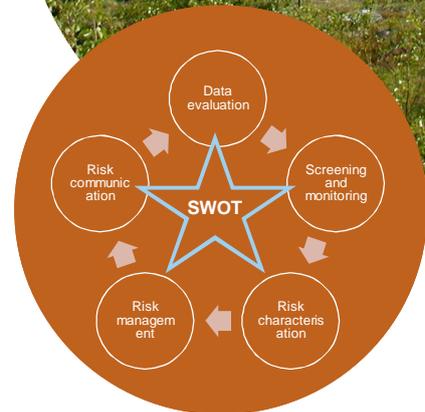
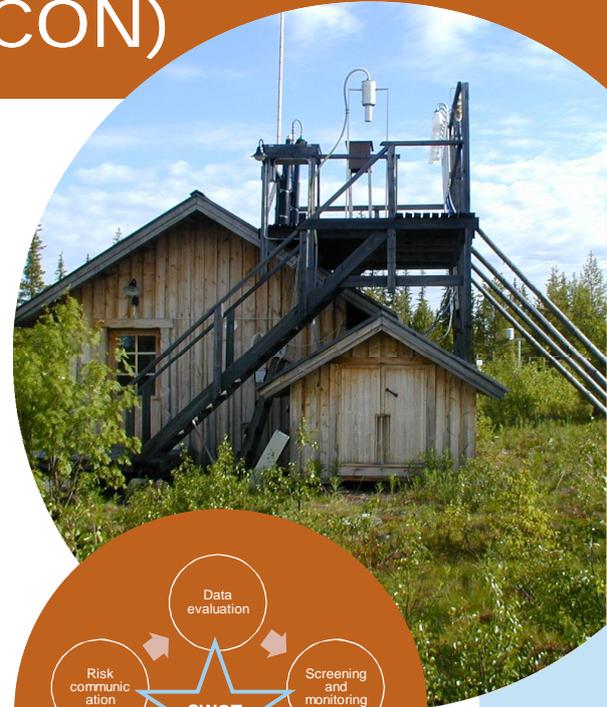


Fig. 1. Assessments and strategies guides the activity in contaminant screening and monitoring.

Fig. 2. Hg concentration (in ng/L) in precipitation shows 7% annual increase at Pallas, Finland, in 1996-2014 (measurements made by IVL and FMI).



Aims

- Up-to-date exposure and monitoring data assessment, including
 - Sources and levels of contaminants
 - Environmental fate
 - Human exposure
 - Knowledge gaps and future actions
- The studied contaminants are listed in the Stockholm Convention or they are included in the AMAP report Contaminants of Emerging Concern in the Arctic.
- Based on the assessment the priority contaminants will be identified, the possible risks are evaluated and road map for risk management of critical substances, environmental monitoring, biomonitoring and risk communication will be presented.

Approaches

- Time trends of contaminants (mainly legacy POPs) will be analyzed using linear regression (with GLS and ARMA) and source analysis with positive matrix factorization (PMF) method combined to wind and trajectory analysis.
- Aquatic effects of both legacy and emerging contaminants will be assessed e.g. by comparing concentration data against recent environmental quality standards developed under European Water Framework Directive.
- Evaluation of human health risk potential will be based on published concentration and exposure data and specific toxicological characteristics of the substances.
- SWOT analysis on different management options

Societal benefits

- New chemicals are used worldwide in consumer goods (e.g. flame retardants and plastic additives) and knowledge of the risks they possibly cause is needed.
- Releases and concentrations of legacy POPs are declining, but new chemicals, that often have similar characteristics, are constantly entering the market. Reliable, comparable and nationwide knowledge is needed to focus research and mitigation actions if there is a risk that emerging contaminants exist in harmful concentrations in the Northern parts of Finland → extremely important for those substances which are not monitored.
- Without knowledge of contamination level, exposure can't be assessed and governmental actions to ensure healthy environment is impossible.

References

Arctic Monitoring and Assessment Programme AMAP Assessment 2014: Contaminants of Emerging Concern in the Arctic -manuscript

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