Spatial ecotoxicology under climate change: Tracking mercury contamination across Arctic marine food webs

Jerome Fort*[1], David Grémillet[2], Hallvard Strøm[3], Helgason Hálfdán[3], Maria Gavrilo[4], Gilg Olivier[5], Dietz Rune[6], Anders Mosbech[6], Merkel Flemming[6], Kyle Elliott[7], Mallory Mark[8], Provencher Jennifer[9], Françoise Amélineau[2], Wojczulanis-Jakubas Katarzyna[10], Kitaysky Alexander[11], and Paco Bustamante[1]

[1]LIttoral ENvironnement et Sociétés [La Rochelle] (LIENSs) – CNRS : UMR7266, Université de La Rochelle – Bâtiment Marie Curie Avenue Michel Crépeau 17 042 La Rochelle cx1 - Bâtiment ILE 2, rue Olympe de Gouges 17 000 La Rochelle, France

[2]Centre d'Ecologie Fonctionnelle et Evolutive (CEFE) – Campus CNRS, UMR 5175 – 1919 route de Mende;34293;Montpellier Cedex 5, France

[3]Norwegian Polar Institute – Norway

[4]Arctic and Antarctic Research Institute (AARI) – Beringa Street 38, 199397, St. Petersburg, Russia

[5]Biogéosciences – Université de Bourgogne, CNRS : UMR6282 – 6 Bvd Gabriel 21000 DIJON, France

[6]Aarhus University [Aarhus] – Nordre Ringgade 1 DK-8000 Aarhus C, Denmark

[7]Department of Biological Sciences – University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada

[8]Acadia University – Canada

[9]Department of Biology, Carleton University (Carleton University) – Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, ON, K1S5B6, Canada

[10]University of Gdansk – Poland

[11]University of Alaska Fairbanks – United States

Abstract

Arctic marine ecosystems are threatened by increasing risks of chemical contamination under the combined effects of climate change and human activities. Rapid change of the cryosphere is for instance releasing large amounts of contaminants trapped in sea-ice, permafrost and terrestrial glaciers over the last decades. Sea-ice disappearance is opening new shipping areas to polluting human industries. The general warming of ocean water masses is affecting the cycle of some contaminants, thereby increasing exposure of marine organisms. In that context, providing a large-scale and comprehensive understanding of the Arctic marine food-web contamination is essential to better apprehend impacts of anthropogenic activities and climate change on the exposure of Arctic species and humans to contaminants. Among contaminants which could have high impacts on Arctic organisms, biodiversity and ecosystems, mercury (Hg) has raised major environmental concerns. Based on a large, pan-Arctic scale approach combining Hg analyses with biotelemetry, and by using the seabird community as bio-indicator of the environmental global contamination, we aim at (1) monitoring spatio-temporal variations of Hg in Arctic biota. (2) Defining Arctic hotspots of Hg contamination and highlighting sensitive areas that require particular attention and protection. (3) Identifying non-Arctic sources of Hg contamination for migratory Arctic predators.

*Speaker

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