

I CONVEGNO ISTITUTO DI SCIENZE POLARI

AN ECOLOGICAL APPROACH TO EVALUATE THE FATE AND EFFECTS OF ORGANIC CONTAMINANTS IN POLAR ECOSYSTEMS

*Rauseo Jasmin^a, Spataro Francesca^a,
Barra Caracciolo Anna^b, Grenni Paola^b,
Pescatore Tanita^a, Patrolecco Luisa^a*

^a Institute of Polar Sciences (ISP), National Research Council (CNR); ^b Water Research
Institute (IRSA), National Research Council (CNR); Montelibretti (RM).



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Research Context

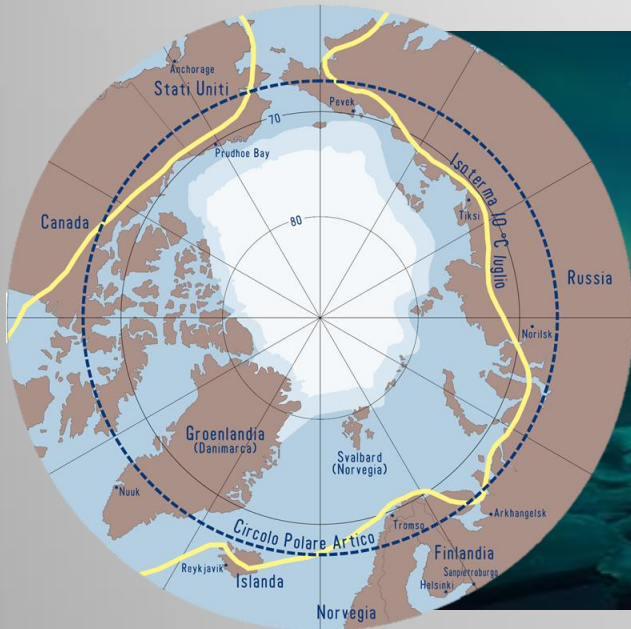
Natural ecosystems are continuously exposed to xenobiotic inputs.

Organic contaminants can be transported from various emission sources to Arctic regions by sea currents, rivers, atmospheric circulation and migratory animals.

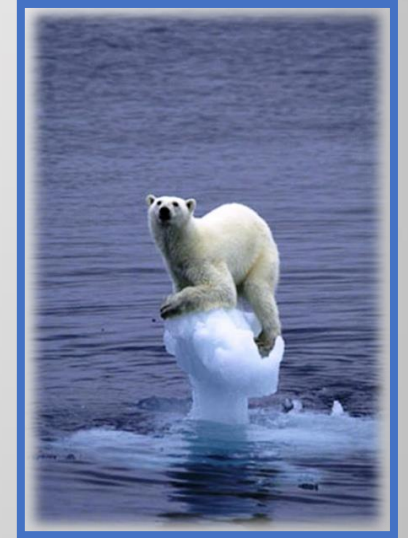
Due to the increasing temperatures, decrease in sea ice coverage and glaciers melting, the contaminants previously trapped into the polar regions may be reactive and may become a secondary source of local pollutants.

Environmental issue

Organic pollutants can have direct toxic effects on particular taxa or trophic groups (invertebrates, microorganisms or plants) or indirect ones by changing predator/prey relationships, causing repercussions on the complex food web, affecting ecosystem structure and functioning.



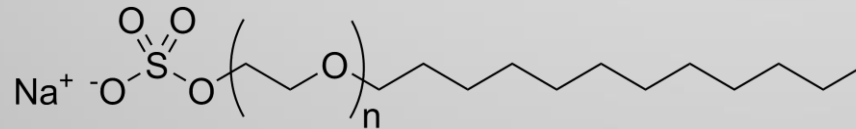
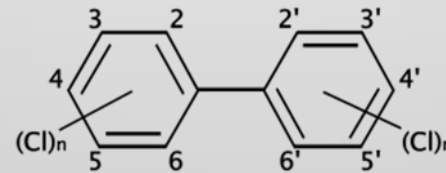
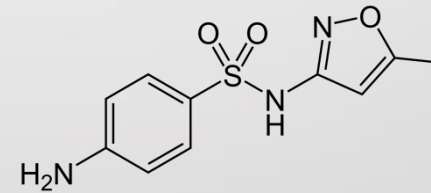
The polar regions are very sensitive to contamination due to the extreme seasonal light variation, low temperatures, short growing seasons, low biodiversity.



Experimental approach



Integrating field monitoring programs to evaluate the occurrence, distribution and trend (e.g. seasonal trend) of selected legacy and emerging organic micropollutants in water, sediment, particulate matter and organisms in polar ecosystems.



2016- today field activities

Future challenges: microcosm experiments

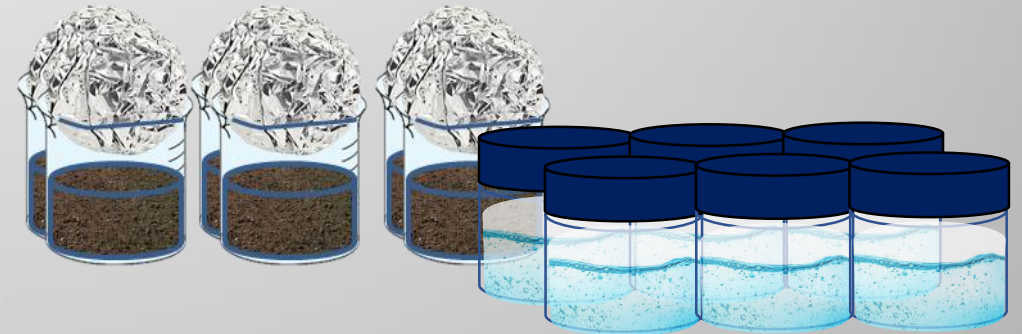
Ecosystem models in which a portion of the natural environment (soil, sediment or water comprehensive of autochthonous microbial communities) is circumscribed and studied under controlled conditions.



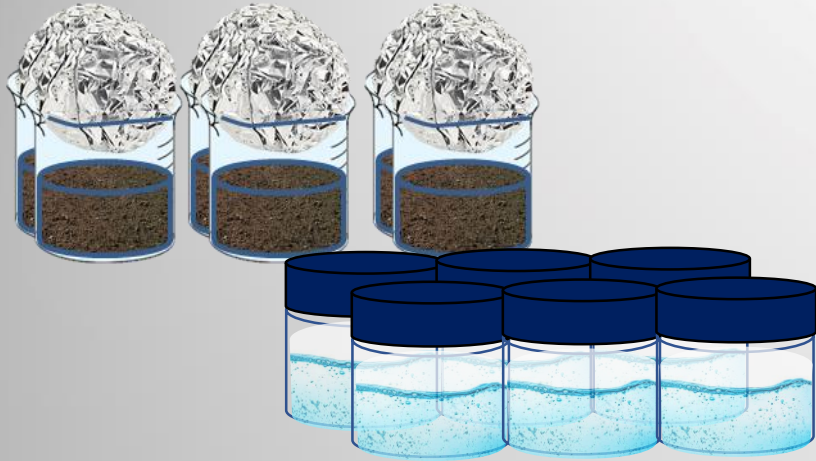
Sampling

Treatment

**Lab-scale
experimental set-up**

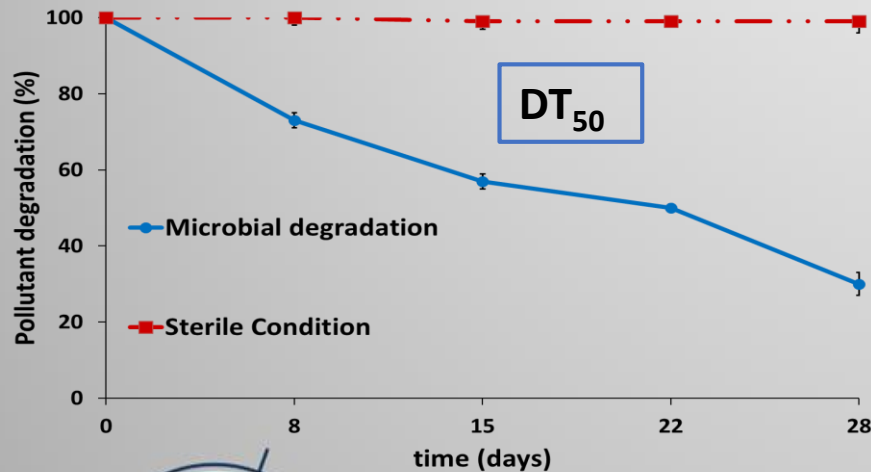


Microcosm experiments



Experimental Conditions :

- presence/absence of one or more contaminants
- presence/absence of natural microorganisms
 - presence/absence of light



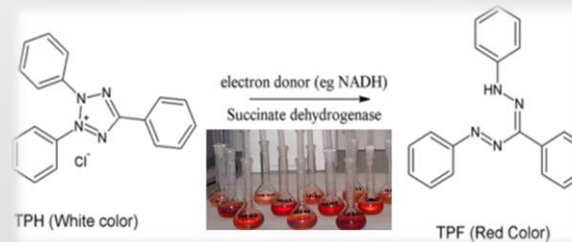
This site-specific approach, by combining multidisciplinary skills, will make it possible to investigate specific processes such as the persistence of organic contaminants in the arctic environment and their effects (as a single compound or in mixtures) on the microbial community and on target organisms (through ecotoxicological tests).

Microbial community structure and functioning

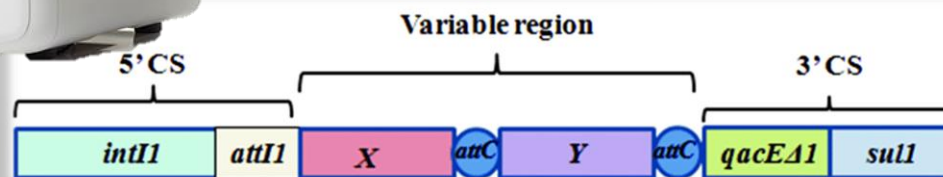
Microbial
abundances
and viability



Microbial activity
determination



Main microbial
group
identification



ARGs analysis to evaluates the relationships between antibiotic concentration and the selection for antibiotic resistance in a mixed microbial community.

Thank you for your attention!

