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Contaminant diversity on Umiujaq territory, Nunavik, Canada

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Umiujaq - four decades since a major territorial change



Umiujaq is established since 1986 on the eastern coast of Hudson Bay, in western Nunavik (56°32'N 76°33'W). Infrastructures and services follow to maintain and develop the community (22.6% population growth 2016-2021). On the periphery are public infrastructures: water pump and drinking water stations, wastewater basin, and landfill ('dump'). They are all open-space places.

The human permanent presence on the territory since sedentarisation has major consequences, amplified by climate warming and global changes.

The socio-ecosystem reactions to these upheavals, natural and anthropogenic, are studied here through the diversity of contaminants identified within the Umiujaq territory.

We focus here on the presence of nanoparticles in sediment, water, plants, bivalves and, as well as on the experience of the 'clean' territory by the Indigenous community members with rivers depending on their uses and practices.



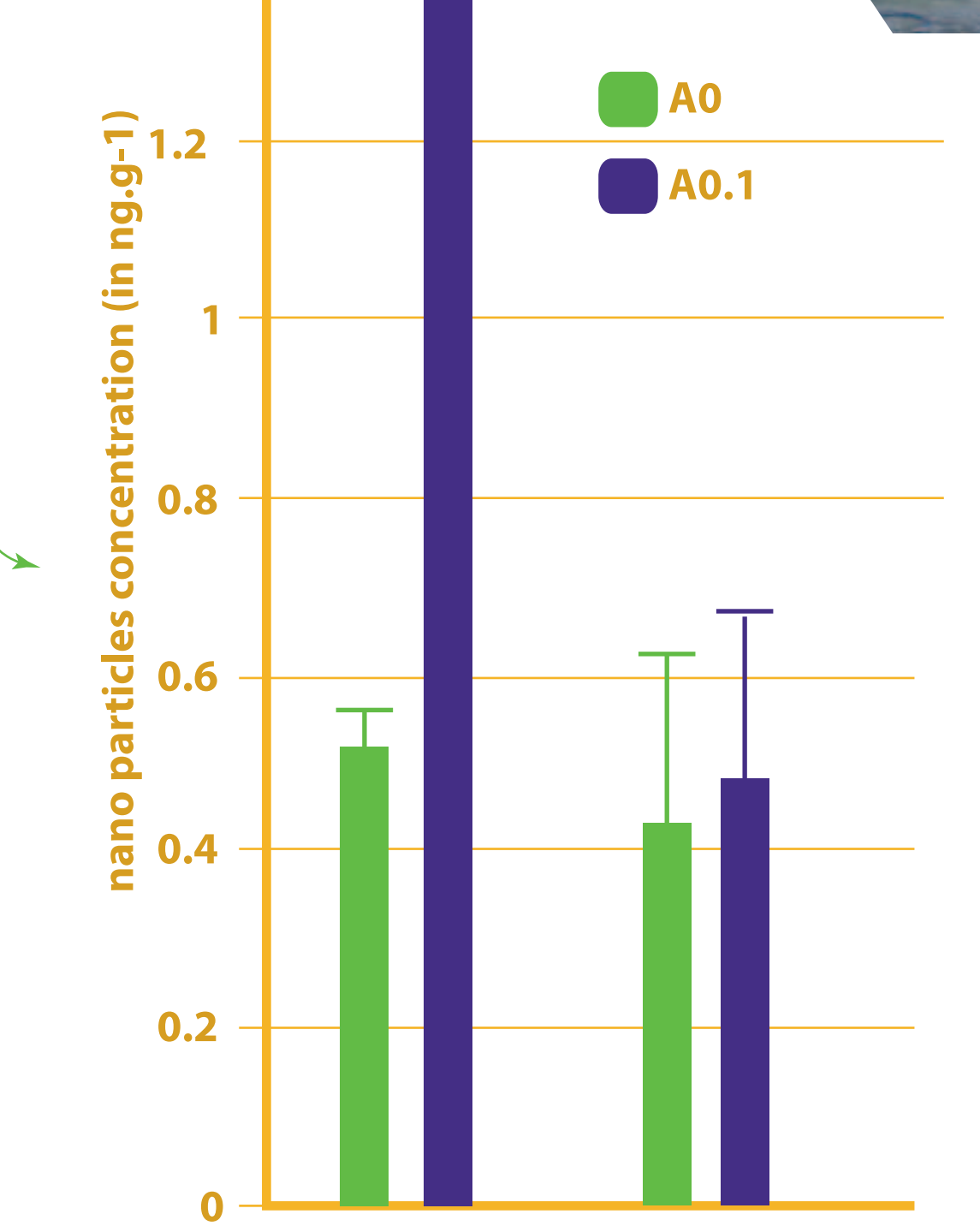
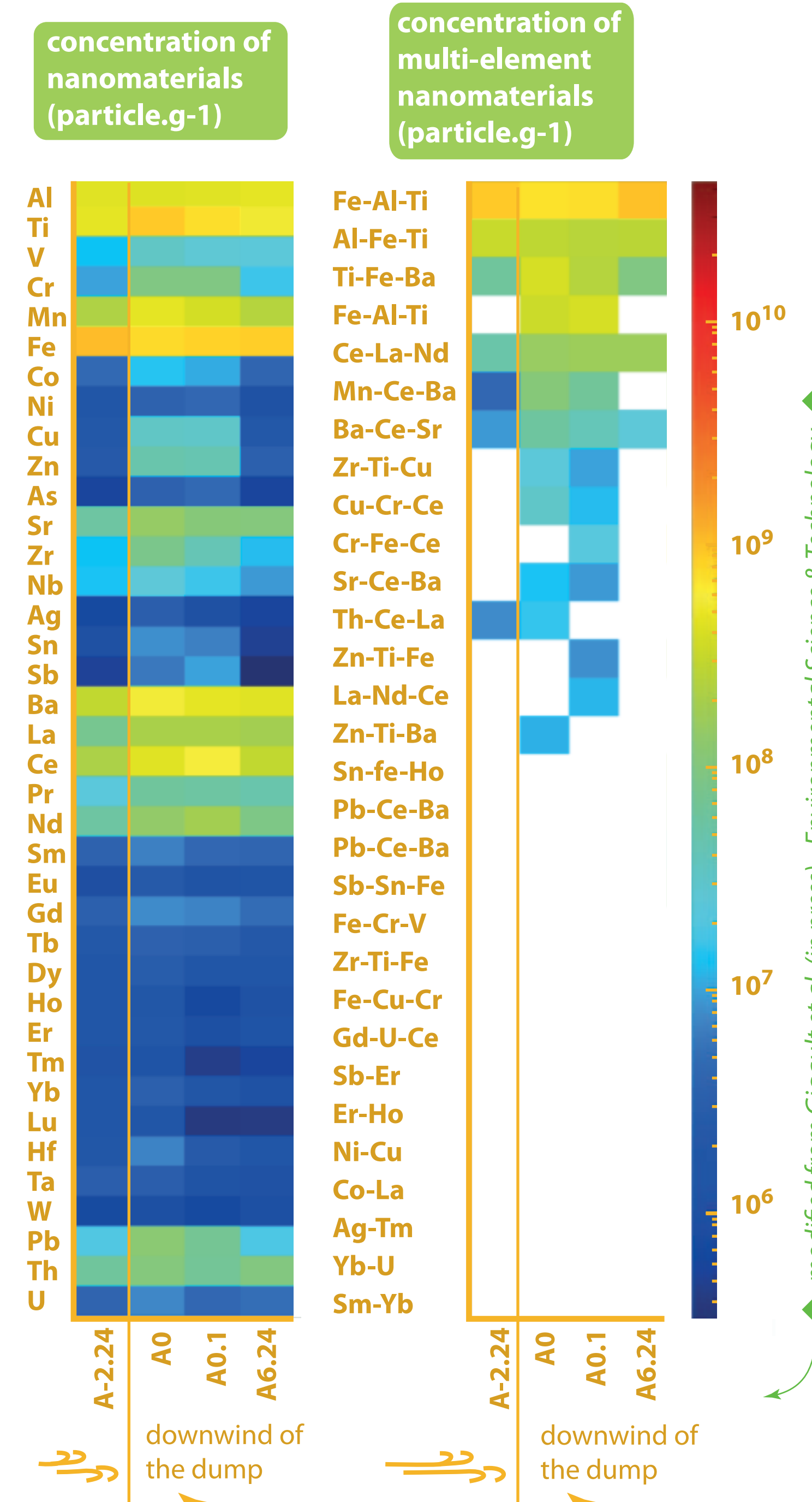
Umiujaq village

wastewater basin

dump: burnt domestic garbage, junkyard for vehicles, household appliances; all kinds of material: metal, plastics, acids, solvents, etc.

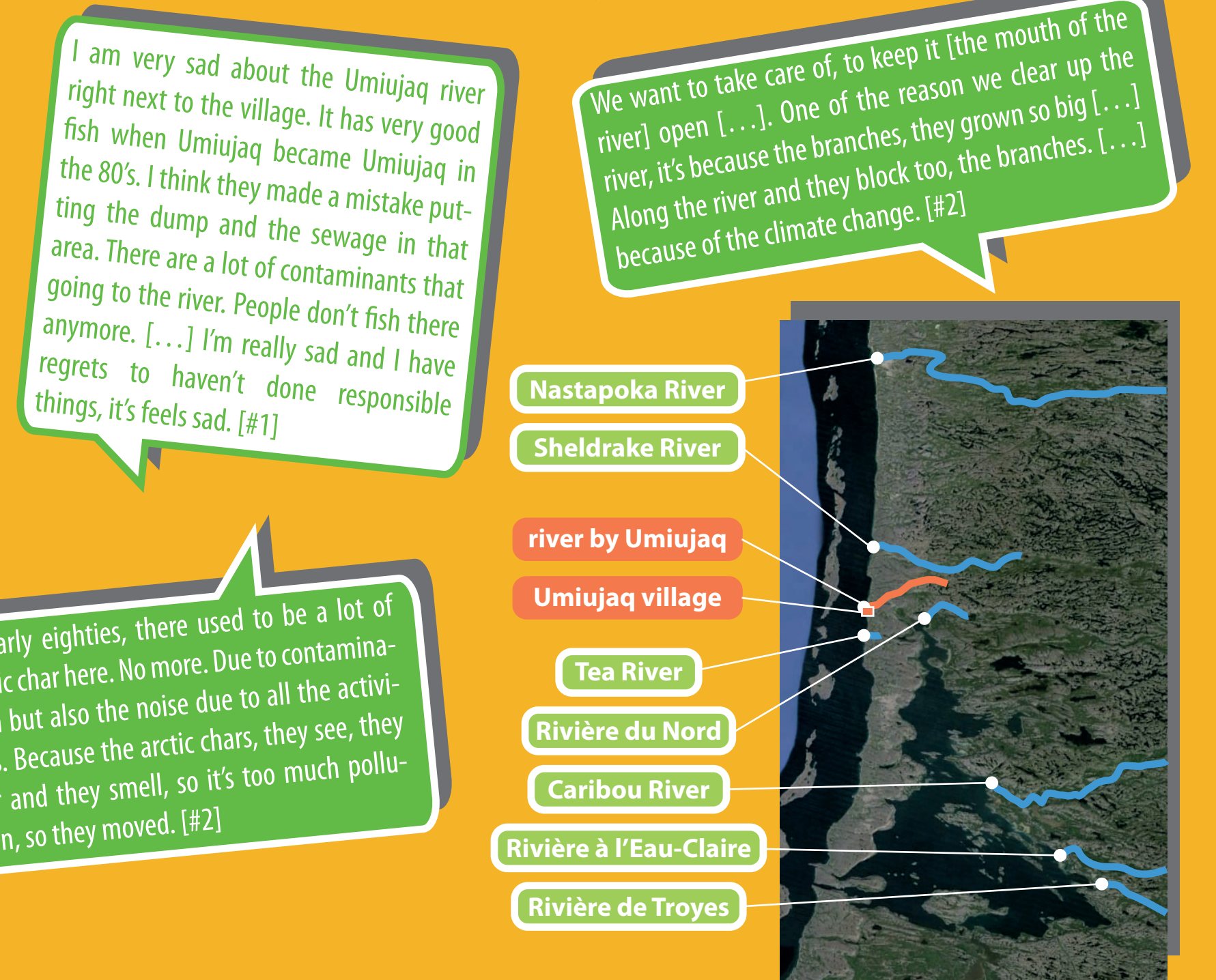
Inuit conception of contamination: from chemical to sensitive and transcendent pollutants

Particle concentration in sampled sediments reaches its peak at the waste dump site, declining with distance from the dump site (A0). There, the particle number concentration of all metal(loid)s - except for Al and Fe due to their naturally high background concentrations in sediments - is 2 to 21-fold higher than those observed at A-2.24, located upwind of the dump site.



Umiujaq inhabitants facing river socio-environmental changes

Permanent human presence on the territory is the primary source of contamination in the Inuit representation of the environment. It has an impact on rivers as a life resource. Vegetation growth too, impeding the walk to the river. As a consequence, the river by Umiujaq is thought to be no longer suitable for consumption, not even for leisure: even swimming is reported 'at risk'. Fishing is just for fun: the catch is given to the dogs.



Zn, Cu, Sb, Cr, Sn, Zr, Pb, and As are signatures of anthropogenic activities; the highest increase (> 6-fold) is from A-2.24 to A0. The decrease of nanomaterials concentration with distance from the dump site documents the anthropogenic origin of the contamination and their release from waste incineration practices. Multimetal clusters also indicate an anthropogenic origin of the contamination, as those are not found in natural ecosystems.

The presence of polystyrene and polypropylene nanoplastics is confirmed in the environment close to the dump site, originating from soots or plastics and polymers.

modified from Chanteloup et al., 2023 - Socio-Anthropologie

