

Statements from Rovaniemi 2018 Observer Special Session: Observer States

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AC SOM (Rovaniemi, 2 Nov. 2018)
Italy's statement on Biodiversity in the Arctic

Italy has recently appointed an expert to the CAFF working group, who participated in the last meeting in Unalaska at the beginning of September. CAFF was the only Arctic Council group without Italian experts. Now, we have a [reference for](#) all the six working groups and in some expert groups and task forces.

The decision to participate to CAFF works shows our intention to intensify the cooperation within the Arctic Council on biodiversity and ecosystems, in connection with the researches already underway in the framework of national projects and international initiatives, such as the Horizon 2020 projects, INTERACT and ECOPOTENTIAL, Team-FISH and the GEO Global Ecosystem Initiative.

Climate change, pollution, land-use change and the establishment of invasive species populations all conspire to threaten ecosystem integrity and biodiversity, leading to the potential loss of relevant ecosystem services.

In the Arctic, the effects of climate change are especially significant, and are associated with severe deglaciation processes such as permafrost thawing and snow and glacier melting. Biogeochemical cycles (the fluxes of carbon and other elements across the environment) are altered by the rising temperatures and the consequent destabilization of permafrost and reduction of snow cover.

For these reasons, it is necessary to (a) monitor the state and changes of ecosystems and biodiversity across a number of different environments in the Arctic, (b) develop understanding and quantitative models of the processes at work, (c) obtain estimates of the future conditions of the ecosystem and biodiversity under different climate change scenarios, and finally (d) devise measures to reduce the loss of biodiversity and ecosystem integrity.

Along these lines, current Italian research on Arctic ecosystems and biodiversity includes:

1) Study of carbon fluxes and carbon sequestration in Arctic tundra, with a focus on Spitzbergen Island in the Svalbard archipelago. Here the question is to foresee the future response of the metabolism of different arctic plant species to the temperature and atmospheric carbon dioxide increase. Methods include vegetation surveys to monitor biodiversity changes, isotopic methods, and eddy covariance and flux chambers techniques to estimate carbon and water fluxes.

2) Analysis of the chemical, physical and genetical properties and changes of the biocrust at different distances from the glacier edge, to understand how deglaciation

processes affect the microbial biodiversity of the soil crust and the functioning of this essential part of the ecosystem.

3) Establishment of a full Critical Zone observatory in the Bayelva basin (Ny Alesund, Svalbard), to study weathering processes, soil formation, soil-vegetation-atmosphere fluxes and the interaction between biotic and abiotic components in a situation of rapid deglaciation and severe temperature rise. The goal of this activity is to monitor and understand how climate change affects this basic life support system of terrestrial ecosystems in the Arctic.

4) Study of the relationships between anticipation of spring and changes in the arrival date of migratory birds in the sub-Arctic, with the negative effects of the mismatch for species which are unable to cope with the changes in the establishment of spring conditions, and assessment of the impact of climate change on fish physiological performance, including tolerance limits, resilience and damage repair ability.

5) Analysis of the release of organic molecules (for example, lignin) in the fjord waters by permafrost thawing, and assessment of the related effects on the marine ecosystem.

6) Integrated study of Kongsfjorden, Svalbard, linking atmospheric, land, cryosphere, marine and biological processes, analyzing how the fjord environment is changing and what effects these changes may have on ecosystems and biodiversity.

Our intention is to integrate our expertise in the Arctic Council works, in close connection with all the relevant partners, to help preserving Arctic biodiversity and ecosystem integrity.