



Proposal for Arctic Ecosystems Monitoring in GEO Workplan

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GEO Context for Ecosystems



Observations are needed on the area, condition, and natural-resource stock levels of ecosystems such as forests, rangelands, and oceans. GEOSS implementation will seek to ensure that methodologies and observations are available on a global basis to detect and predict changes in ecosystem condition and to define resource potentials and limits. Ecosystem observations will be better harmonized and shared, spatial and topical gaps will be filled, and in situ data will be better integrated with space-based observations. Continuity of observations for monitoring wild fisheries, the carbon and nitrogen cycles, canopy properties, ocean colour, and temperature will be set in place.

GEOSS 10-Year Implementation Plan, Section 4.1.7

- Adheres to the “The Global Earth Observation System of Systems (GEOSS) - 10-Year Implementation Plan” Ecosystem SBA objectives: Ecosystems
- Inline with, contributing to, and complement the current Ecosystems Tasks
 - Ecosystem Observation and Monitoring Network
 - Ecosystem Vulnerability to Global Change
- The proposed sub-task is also contributing directly and indirectly to other areas such as Biodiversity, Water, and Climate SBAs.

GEO Workplan v0 (as modified in Geneva)



Task DS 13 – Global Ecosystems Monitoring **Summary of Activities**

Activity 1: Develop a standardized, robust, and practical global ecosystems classification and map at management-appropriate scales for the planet's terrestrial, freshwater, and marine ecosystems (continuation of EC-09-01a).

Activity 2: Implement a global gap analysis of the representation of ecosystems in protected areas

Activity 3: For key ecosystems (e.g. moist forests, dry forests, Arctic ecosystems, wetlands, mountains, Mediterranean ecosystems, etc.) develop and initiate an operational monitoring program to assess changes in, for example, ecosystem extent, condition, structure, function, composition, and delivery of ecosystem services.

Activity 4: Develop a conceptual framework and program design for using earth observations to monitor the production and delivery of ecosystem goods and services from ecosystems to consumers as a potential model for global implementation.

Issues and Motivation



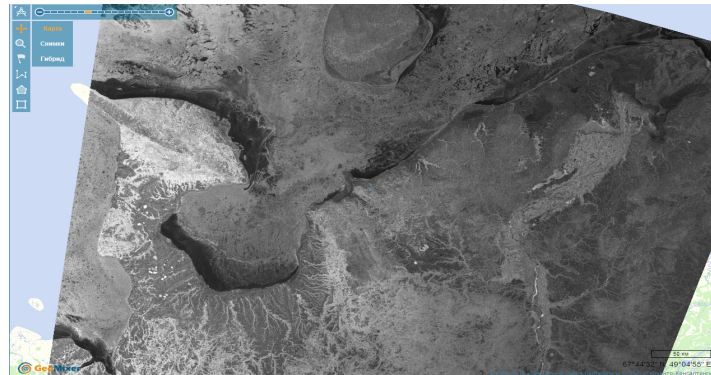
- **Why the Arctic**
 - Vulnerability to climate change
 - Growing pressure on ecosystems
 - Lack of knowledge (measurements, monitoring, prediction, etc.)
- **Needs for a better ecosystem monitoring approach**
 - Current monitoring approaches don't address time and geographical scale challenges of monitoring integrity of Arctic ecosystems
 - Variables not measured in situ in sufficient density to support decision making
- **Why EO**
 - Provides robust, repeatable, and reliable observations over long time-scales and large spatial-scales
 - In situ monitoring is essential, but too expensive to be sole monitoring solution
 - Complementary data source for harsh, inhospitable and hard-to-access areas

Activity Goal and Objectives



- Arctic Ecosystem Monitoring activity will coordinate to:
 - Improve effective use of satellite-based Earth Observation information and tools for land and marine ecosystem monitoring (i.e. habitat, permafrost, coastal environment, marine food web)
 - Increase capacity of land and resource management systems to mobilize and apply the best available information
 - Align diverse user requirements, improve data use efficiencies, increase capacity, ensure interoperability, expand human capital, and guide proof of concept of multiple applications

RSAT Arctic ice image



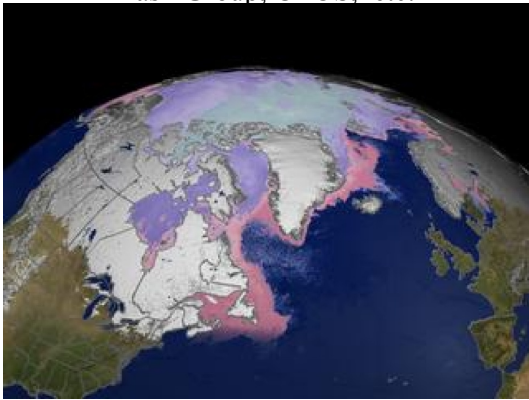
Implementation Strategy and Timeline

- **KO + 6 months:** Development of an Arctic Ecosystem Monitoring Charter to address project coordination framework and provide high level implementation plan with expected results, outcomes and schedule
- **KO + 12 months:** Development of an Issues Document and associated Science Plan
- **KO + 18 months:** Identification of current and potential implementation projects, programs, platform and vehicles in support of the task - build on existing regional nodes objectives, activities, and resources for coherent reporting
- A series of workshops and meetings focused on enhanced coordination and meeting outreach objectives to local communities during 2nd and 3rd year
- A final Symposium to assemble progress and provide way forward at end of year 3

Linkages and Cross-Cutting Components



- Arctic Cooperation and policy framework (circum-Arctic, regional, and national)
 - i.e. Arctic Council, International Maritime Organization, etc.
- Arctic Science organizations
 - i.e. IPY, WMO, International Arctic Science Ctee of ICSU, etc.
- Other GEO SBAs and activities
 - i.e. Biodiversity, Climate, Water, etc.
- Other Observations activities
 - i.e. Expert Panel on Polar Observations, Research and Services (EC-PORS), Polar Space Task Group, CEOS, etc.



IPY Arctic Sea Ice Satellite
Snapshot courtesy Earthzine

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Canada 

Action Sought



- Endorsement of activity by CEOS, GEO secretariat and Arctic Nation members
- Seeking Co-leadership for DS-13 activities
- Seeking enhanced collaboration with:
 - Other space agencies through CEOS
 - Arctic Stakeholders and Authorities
 - Existing communities of practice
 - Other GEO SBAs
 - Other observation activities

