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Workshop on observation and documentation of Cultural Heritage Sites in Svalbard

March 24th, 2021





OUR RESPONSIBILITY.

As a company with the Cornerstones of our brand • We explore, we care, we educate, we inspire, we empower

As stakeholder promoting the long-term protection of the polar environments

- Adhere and follow National and International Law Follow IAATO and AECO guidelines and procedures
- Promote safe and environmentally responsible operations
- Invest in the understanding and conservation of the areas we visit

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Giving back

- Provide our ships as platforms of opportunity
- Participate in Citizen Science projects









OUR ONBOARD SCIENCE GENTERS

Specially designed areas for the enrichment and education of our guests

- The Science Centers are equipped with microscopes, museum quality exhibits and sample sets for guest interpretation and use
- Our Science Center resources, in-house education programs, and collaborations, combined with structured, interactive learning opportunities, facilitate important research while positively affecting our guests' attitudes and behaviours after they return home











GITZEN SCIENCE

Citizen Science Project are an integral part of our Science Program

- Active public involvement in scientific research in partnership with accredited scientists
- Helps scientists in data-collection or data-processing
- Beneficial for participants as learning opportunity, a way to build social networks, and a path to increase capacity for environmental advocacy
- Projects have to be embedded into the schedule of activities to ensure consistency and quality
- Science Coordinators: Science Program and overseeing all scientific activities on board is their priority
- Several options available and we try to run at least 2 different projects on every trip
- We are constantly looking for, or developing new projects to support

The Citizen Science Polar Collective works together with expedition cruise operators and scientists to create opportunities for research and public education through citizen science, they assisted us in the selection of projects when we launched our Science Program



CITIZEN SCIENCE





Association of Arctic Expedition Cruise Operators



Sea Leopard



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Globe Cloud Observer

eBird eBird





FJORDPHYTO

Data collected by Antarctic travelers as they visit various fjords along the Antarctic Peninsula throughout the austral summer. Citizen scientists are helping researchers understand how melted glacial water can influence and change the population of phytoplankton in fjords and what impact this might have on the polar coastal ecosystem.

- Staff members, trained in the protocol by Allison Cusick, assist our guests in the collection of oceanographic data and biological samples
- Collection provides an opportunity to investigate the microscopic ocean life in the Science Center
- Provides our participating guests with a meaningful experience •
- Has engaged around 2500 travellers from all participant operators since the launch of the program in 2016





SECHED S

This Global Seafarer Study of Marine Phytoplankton is a survey to help monitor changes in plankton. The project began in February 2013 and it will continue indefinitely to create a long-term study of phytoplankton in the World's oceans.

Plankton is the basis of the food chain, and their distribution, abundance and seasonality are changing as the temperature of their sea surface habitat is modified by to climate change.

Participating in this study helps to know more about these changes.

The Secchi Depth – defined as the depth when the Secchi Disk disappears from sight when lowered vertically into the seawater from a stationary boat - measures the clarity of sea water, which is influenced by the amount of phytoplankton in the water column.





GLOBE CLOUD OBSERVATIONS

- Clouds have an enormous influence on Earth's energy balance, climate, and weather.
- Clouds affect how much sunlight is being absorbed by the Earth and how much heat is escaping back into space.
- Even small changes in the abundance, location, or cloud type can impact the Earth's climate and weather.
- By observing and recording cloud cover timed to NASA satellite fly-overs, we can help scientists understand how surface and air temperature are affected by cloud cover, and how clouds will respond to a changing climate.
- These observations are also important because they expand the reach of scientists who are limited in time, number, and money, and they contribute to a database that has been growing for over 2 decades.







POLAR TAG

- Portal aimed specifically at visitors to the polar regions in an attempt to collect images of animal tag resightings with the goal of creating a better understanding of polar wildlife.
- The data that comes from the submitted photos is shared with collaborating scientists.
- After receiving a submission, the entry and accompanying data are automatically sent to a mailing list of scientists that are deploying tags according to species.



HAPPANHALE

- Assist in tracking individual whales throughout our world's oceans Harness the power of millions of whale watching enthusiasts
- Expand the scientific knowledge of their behaviour and distribution
- Whales are unique and recognizable. Individual whales can be identified by their pigment patterns, by the shape of their fins and flukes, and by distinctive scars.
- By photographing and submitting images of these unique traits, Happywhale can compare these photos to known individuals in whale identification catalogues.

Matched sightings of Oscar (HW-MN0500658





SEA LEOPARD PROJECT

- Better understand the behaviour, ecology, and population dynamics of Leopard Seals on the Antarctic Peninsula
- Promote their conservation and safe human-seal interactions
- Some research has already been conducted on these animals, but there is an important lack of information yet to be learned
- Gather photographs of the left side of the Leopard Seals heads for identification
- Written description of any interesting human/seal or seal/seal interactions and the location where they occur







SNOM ALGA

- Remote sense the coverage and development of algal blooms in the Peninsula's seasonal snowpack using European Space Agency's Sentinel 2 satellite imagery
- Goal: determine if snow algae is the largest terrestrial photosynthetic ecosystem in Antarctica
- Distribution: strongly influenced by marine birds and mammals excrement acts as a natural fertilizer to accelerate algal growth
- Over 60% of blooms were found within 5 km of a penguin colony, near the nesting sites of other birds and areas where seals come ashore
- Positive sightings of red or green snow algae blooms to train their image classification algorithms and ask citizen scientists to log sightings as accurately as possible on their map online.

Green or Red Snow? Let Us Know

RC Field Spectroscopy Facility



coverage and development of alg nsula's seasonal snow pack using ESA nel 2 satellite imagery, and asks the question now algae the largest terre vstem in Antarctica

How You Can Help blooms to train our image classification ms. Please log vour sightings, as accurate as possible, either on this map with a sticker, o sing the QR code to add your sighting to our map





British Antarctic Survey

UNIVERSITY OF CAMBRIDGE Plant Sciences LEVERHULME TRUST_____





Field Spectroscopy Facility

SEABIRD SURVEYS FOR ASI - EBIRD

- Partnership between the US non-profit organization Oceanites, various academic institutions and eBird
- The goal is to collect data throughout the Antarctic Peninsula and surrounding island groups, both at sea and on land
- Seabirds represent only 10% of the bird species, and they exploit 70% of the earth's surface, the oceans
- This huge environment is divided into numerous small habitats and birds use these habitats differently
- We invite our guests to help us perform small scale surveys while at sea or on shore, which help scientists understand how birds are using these different habitats throughout the Antarctic Season, providing valuable information about their life cycles.









BIRD OBSERVATIONS - EBIRD

- eBird transforms the global birding community's passion for birds into a powerful resource for research, conservation, and education, playing an increasingly important and diverse role in applied science and conservation eBird data contribute to hundreds of conservation decisions and peer-reviewed papers, student projects, and help inform research worldwide Applications of eBird data range from research and monitoring to conservation planning, habitat protection, and informing law and policy (Sullivan et al. 2017)
- When a checklist is submitted to eBird, the observations available to the global community of researchers, educators, conservationists, birders, and anyone else with an interest in birds
- Data are freely available for download





eBird data around the world

CRUSE#SCIENCE PROJECT

Cruise#Science citizen Science Project: Marine climate sampling in Svalbard

- Climate change around Svalbard is monitored through citizen science
- In addition to determining climate change effects in the Arctic, this project allows to increase our guests' understanding of scientific methodology, their knowledge and awareness of the Arctic environment
- UNIS students join circumnavigation trips in Svalbard and engage with guests involving them in the scientific protocol of sample and oceanographic data collection
- Samples are analyzed under the microscope in the Science Center
- So far, the project has included 11 trips, with 457 samples taken at 97 sampling stations and over 60 demonstrations and lectures offered to guests





DENTIFY SOURCE OF PLASTICS

Citizen Science Project developed in collaboration with NIVA

- FerryBox: continuous, multi-spectrum oceanographic sampling capability, including microplastics
- Plastic samples collection on beaches following NOAA Marine Debris Shoreline Survey Guide
- Identification of plastics by guests using a pocket Near Infra Red scanners linked to NIVAs data cloud, increased awareness of the extent and type of plastic pollution in the marine environment

ONGOING ON BOARD MS ROALD AMUNDSEN

Norwegian Institute for Water Research

Association of Arctic Expedition Cruise Operators

CONCLUSIONS AND WAY FORWARD

- Citizen Science projects are becoming very popular and a welcome addition to the experience on cruise ships: huge potential
- Staff has to be given time and resources to run the projects and make sure data is collected and transferred correctly so it can be used
- Monitoring of historic/cultural sites could be done by taking photos and recording descriptions of the overall state of structures throughout the operations season, on a yearly basis.
- Such a monitoring involves the governments of all cultural sites in question
- A platform to gather monitoring data is requires (Leo was approached in 2019, but it is NOT a data repository, it is a collection of recordings of unusual events)

CONNECT WITH VOUR INNER SCIENTIST

