SCAR's Environmental Code Of Conduct For Terrestrial Scientific Field Research In Antarctica

(revision 12 January, 2009)

Background

1. The SCAR Environmental Code of Conduct provides guidance for scientists undertaking terrestrial scientific field research in Antarctica. Reference was made to the need for this Code during CEP IX (Paragraph 132), where SCAR offered to make a version available. The Code has been reviewed by the SCAR community and COMNAP, and was approved by the XXX SCAR Delegates Meeting in Moscow July 2008).

2. The requirement, expressed in this code of conduct, of avoiding the introduction of propagules of alien species is common in several management plans for Antarctic Specially Protected Areas and in operational procedures of research stations. However, it is expressed in differing terminologies and wording in various protocols. A unified code of conduct for fieldwork anywhere in the Antarctic, including protected areas, using a common terminology is now provided.

Introduction

3. Antarctica contains many unique geological, glaciological, and biological features. This landscape and its biological communities have limited natural ability to recover from disturbance. Many features could be easily and irreversibly damaged. This Code of Conduct provides recommendations on how scientists and/or associated personnel can undertake scientific field activities while protecting the Antarctic environment for future generations. These protocols ensure that human presence will have as little impact as possible. All personnel undertaking scientific research should be familiar with this Code of Conduct.

4. The Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) provides a basis for environmental protection and management in the Antarctic. Climate change and increasing pressure from human activities suggest that comprehensive guidelines are needed to protect the unique features of Antarctica. This Code of Conduct complements the relevant sections of the Protocol and provides guidance for researchers conducting land-based field research (limnological, terrestrial, coastal/littoral, glaciological, biological and geological) in the area of land and permanent ice south of 60 degrees south. A 'field' activity is defined here as any scientific activity, and the logistics to support this activity, which is conducted in the natural environment, irrespective of its duration.

5. All countries with permanent and summer scientific stations are encouraged to include this Code of Conduct within the operational procedures of the Station and to ensure that personnel undertaking or supporting field scientific research follow this Code of Conduct.

6. It is recommended that this Code of Conduct be followed by all personnel undertaking scientific research to the maximum extent possible and as long as it does not affect the safety of the expedition.

General Guidelines

7. Antarctic scientists potentially have a higher chance of carrying alien propagules[1] to Antarctic [and sub-Antarctic] ecosystems than other Antarctic travellers because their field of study often takes them to alpine or northern polar habitats. In the process of conducting research within these habitats Antarctic scientists can inadvertently entrain propagules on clothing, equipment and equipment cases. If these items are then taken to the Antarctic and they have not been cleaned/ sterilised to remove or kill the propagules, an opportunity to transfer such material to Antarctica is created. The ecological potential for establishment of northern polar or alpine taxa is great as such species are adaptated to cold environments. Equipment should be properly cleaned before it enters the Antarctic.

8. The implications of human transfer of taxa between locations can range from the modification of the genetic structure of populations to changes in local biodiversity and subsequent flow-on effects on community dynamics. Human transfer may involve species (or their propagules) from sites outside Antarctica, and such species would in most cases be considered alien. However, species indigenous to Antarctica, or that live both in Antarctica and in non-Antarctica areas can also be moved around. Many such species show strong genetic variation between different sites within Antarctica. Therefore, care should be taken not to move indigenous species around either. Such accidental movement of indigenous biota would compromise scientific studies of molecular adaptation, regional evolution and biogeography and reduce the inherent value that Antarctica offers as a system with limited anthropogenic influence.

[1] Propagule: means of propagation, e.g. seed, spore, egg, live insect

9. Your field activities in Antarctica should be designed to have as little environmental impact as possible.

Before going into the field

10. Report your planned activity to your National Operator as thoroughly as possible and well in advance, in order to allow an assessment of the environmental impact you may cause on the field site(s) you visit, as required by Annex I of the Protocol for Environmental Protection.

11. Everything taken into the field must be returned to your station for proper cleaning where that is feasible and safe to do so.

12. To avoid introduction of alien species, chemical contamination, and transfer of materials between sites,
    (i) Ensure that all your equipment and clothing, including footwear, is thoroughly cleaned.
    (ii) Avoid taking unnecessary packaging and materials into the field. Several products used for packaging are prohibited in Antarctica, such as polystyrene beads or chips
    (iii) Wherever possible, all precautionary measures should be taken to ensure collection and removal of human waste and grey water.

Once in the field

13. You should take particular care in areas with sensitive biological or geological features such as bird and seal colonies, roosting areas, vegetated areas, freshwater lakes and ponds, sand dunes, screes, fluvial terraces, ice core pyramids and ventifacts.

14. Avoid areas where wildlife is easily disturbed, especially during the breeding season. Remember than you are only allowed to cause disturbances to wildlife if scientifically justified and if you have been issued with a permit by an appropriate national authority

15. Even if you have a permit, avoid unnecessary disturbance to Antarctic flora and fauna.

16. Take only those samples (geological material, biological material, ice) for which you have permits and protect resources by taking as small a sample as possible.

17. You should map, record (preferably using GPS coordinates), and report to your national operator the location of any spill, camp site, soil pit, drilling site, sampling site, or any other disturbance for the benefit of future researchers.

18. You should try to minimise your impacts when moving around in the environment:
    (i) Stay on established trails when available.
    (ii) Avoid walking on vegetated areas, streambeds, lake margins, and delicate rock and soil formations.
    (iii) Restrict ground vehicle usage to snow and ice surfaces, or designated tracks, wherever possible.
    (iv) Where feasible, use recognized helicopter landing sites and ensure that markers for helicopter pads are clearly visible from the air.
    (v) Minimise the disturbance to wildlife by following the ATCM guidelines for operations of aircraft near concentrations of birds.
    (vi) You should restore any disturbances caused by your activity.
    (vii) Algae and invertebrates live beneath stones. Moving rocks and stones should therefore be minimized.
    (viii) Do not build cairns.

Management of scientific field sites

19. Prior to conducting any scientific activity, it is essential that you carefully consider and clearly define the scope of your activity, including its area, duration, and intensity.

20. Be aware of the cumulative impacts of the activity, both by itself and in combination with other activities within the region. Consider lower impact alternatives to the activity and re-use of existing facilities wherever possible.

21. In order to minimise environmental impacts of your field activity you should:
    (i) Choose sites as close as possible to your research station, use existing pathways
    (ii) Limit the number of visitors to your field site to the number of people required to carry out the fieldwork.
    (iii) Where possible avoid areas that are especially vulnerable to disturbance such as vegetated areas, breeding sites, patterned ground, and water bodies.
    (iv) Re-use existing sites wherever possible.
    (v) Make sites no larger than needed for the proposed scientific activities.
    (vi) Keep your site tidy during use.

(vii) Avoid activities which could result in the dispersal of foreign materials into the environment. In particular, avoid the use of spray paint, and conduct activities such as sawing or unpacking inside a tent or hut.
(viii) Secure equipment from being blown away or stolen by inquisitive birds (e.g. skuas, penguins).
(ix) Ensure there is the capacity to prevent and respond promptly and effectively to any environmental accident or incident.

22. Restore sites as far as feasible when your work is complete and take GPS coordinates for future reference. Remember that sites may require subsequent monitoring to comply with the Protocol for Environmental Protection

23. As it is important to prevent the introduction of foreign materials and contaminants into the environment:
(i) Avoid materials liable to shatter at low temperatures, e.g., polyethylene-based plastics.
(ii) Take care when handling fuel, chemicals and isotopes (stable or radioactive).
(iii) Store and handle fuel and chemicals using appropriate containers.
(iv) Use drip trays where possible when handling fuels or other liquids and take special care when handling fuel in high winds.

24. You should report any environmental accident or incident to your national operator.

25. If you plan to install equipment in the field:
(i) Ensure an environmental impact assessment is undertaken prior to any installation, as required by Annex I to the Protocol for Environmental Protection.
(ii) Clearly identify any equipment by country, name of the principal investigator and year of installation, and state the duration of the deployment.
(iii) Make sure installations can be retrieved and removed when no longer required, unless it is impractical or result in a higher environmental impact.

26. Do not displace materials or collect samples of any kind, except for scientific and educational purposes.

27. When taking samples from live animals ensure that the requirements set out in the "SCAR Scientific Code of Conduct for Experiments on Animals" (in preparation) are followed.

Field camps

28. Camping and scientific equipment should be cleaned before being brought into the Antarctic or before being transferred between sites.

29. Minimise the environmental footprint of your field camp by:
(i) Locating it as far as feasible from lake margins, stream beds and associated fans, and vegetated areas, to avoid damage or contamination.
(ii) Taking special care to ensure that no food or wastes are accessible to animals.
(iii) Re-using campsites whenever possible.
(iv) Keeping it tidy during use and restoring it, as far as is feasible, after use.
(v) Using solar and wind power as much as possible to minimize fuel usage.

30. Ensure that equipment and supplies are properly secured at all times to avoid dispersion by high winds or helicopter downdrafts. Remember that in some locations high velocity katabatic winds can arrive suddenly and with little warning.

31. Remember that if you are working in an ASPA or ASMA the management plan may have additional requirements for field camps and you will need to follow any conditions contained in your entry permit.

Habitat specific guidelines

Lakes and streams

32. Choose sampling equipment which is the least destructive, when the aquatic or coastal environment is to be sampled. Sample carefully and avoid cumulative impact. Dredges, trawls and box corers should be used as little as possible, avoiding excessive and unnecessary sampling.

33. Aquatic ecosystems in Antarctica are extremely poor in nutrients (except those with animal influence) and thus very sensitive to anthropogenic pollution. All visitors must take care to eliminate or minimize releases of human waste wherever possible.

34. You should avoid walking in the stream and lake beds, or too close to their margins as this may disturb biota, affect bank stability and flow patterns. When a crossing must be made, use designated crossing points if available, otherwise walk on rocks.

35. Minimize the use of vehicles on lake ice if possible. If access to the water body is required for scientific research, use non-motorised boats whenever possible.

36. Ensure that all sampling equipment is tethered or otherwise secured and does not contaminate the water body.

37. Clean all sampling equipment before using it in another water body in order to avoid cross-contamination. Alternatively, use separate equipment in different sites.

38. Wherever possible you should use flumes, not weirs, when monitoring streams, or ensure that the stream will remain as it was before the study.

39. You should try to avoid the use of stable isotope tracers at the complete ecosystem level, use them as much as possible only in closed vessels. You should consider naturally occurring tracers. Radioactive isotope tracers should never be used, except in closed vessels. No stable or radioactive isotope tracers waste should be disposed into ecosystems. You should document all tracer use (location, type of tracer, amount).

40. To avoid introduction of contaminants or disturbance of the stratification of the water body and its sediments:
(i) Do not swim or dive in lakes, unless it is required for scientific purposes.
(ii) Remove all unwanted water and sediment materials from the site, even on permanently ice-covered lakes, rather than discharging them back into the lake.
(iii) Ensure that you leave nothing frozen into the lake ice that may ablate out.
(iv) Consider using ROV's as a tool for underwater and under-ice research in lakes and coastal/littoral habitats.

Terrestrial environments

41. Terrestrial vegetation includes very slow growing species. Damage by trampling will remain for years or even decades. Many terrestrial invertebrate species live in soils and feed on soil algae.

42. You should use existing paths in order to avoid disturbing large areas of vegetation and soil.

43. Clean all equipment and footwear, as far as is feasible, between sites to avoid transfer of propagules among sites.

44. When sampling in vegetated areas ensure that the vegetation is replaced and the site restored as far as is feasible.

45. Limit the use of mechanical equipment for sample collection, whenever possible.

46. When sampling soil in desert areas, use groundsheets to contain excavated material to minimise the extent of damage to the desert pavement. Backfill soil pits and as far as feasible replace the desert pavement materials at the soil surface to restore the site appearance.

47. Do not disturb or remove rocks, fossils, or ventifacts unless it is necessary for your research.

Glaciers and ice fields

48. Remember that the use of water in hot water drills could contaminate the isotopic and chemical record within the glacier ice.

49. Given that the hydrological systems under glaciers and ice sheets are connected to the wider environment and downstream contamination could occur, exercise caution when using chemical-based fluids to drill to the base of an ice sheet.