

Long-term strategy for the General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention for the Protection of the Ozone Layer

A. Importance of the General Trust Fund for Research and Systematic Observations Relevant to the Vienna Convention for the Protection of the Ozone Layer

1. The General Trust Fund for Financing Activities on Research and Systematic Observations Relevant to the Vienna Convention for the Protection of the Ozone Layer (the “Trust Fund”) was established to enhance the acquisition of needed stratospheric observations, to foster ozone layer research and development in parties operating under paragraph 1 of Article 5 (Article 5 parties) and countries with economies in transition, and to build scientific capacity in those countries. Supported activities have always been carried out in close collaboration with scientists in parties not operating under paragraph 1 of Article 5 (non-Article 5 parties) and have enabled the acquisition of data from the geographical locations of Article 5 parties in addition to the enhancement of the ozone layer science in Article 5 parties.
2. Most of the activities implemented to date have focused on developing the scientific capabilities of Article 5 parties and countries with economies in transition to measure ozone layer levels from well-placed instrumented sites in those countries and ensure that the measurements are of the highest possible quality, via intercalibrations and workshops. Information from those activities has helped the ground-based ozone column measurements that are one of the two pillars of stratospheric ozone measurement, the other being satellite measurements.
3. With only a very limited amount of funding (approximately \$340,000) since its inception in 2003, the Trust Fund has facilitated the following:
 - (a) Calibration and intercomparison of ozone measurement instruments (Dobson and Brewer) from 15 countries;
 - (b) Training courses and workshops for 21 Article 5 countries and countries with economies in transition;
 - (c) Relocation of Dobson spectrometers (the anchor for satellite validation) in one country.
4. Despite the work accomplished under the Trust Fund, current observations from the geographical regions where Article 5 parties are located, including in the tropics, are inadequate. The importance of this shortage is heightened by the fact that the recovery of the ozone layer is greatly affected by the changing climate and the tropical regions play a significant role in climate change and ozone layer recovery.
5. In addition to the global action undertaken by all 197 parties to the Montreal Protocol to address ozone layer depletion, scientists continue to highlight the importance of closely monitoring changes in the ozone layer and decreases in ozone-depleting substances, to ensure that the ozone layer is healing as expected through the actions taken under the Montreal Protocol.
6. In the light of the above, there is a great need to support and enhance the contributions of Article 5 parties and countries with economies in transition to ozone layer science and observations. Calibrations, intercomparisons and relocations of monitoring instruments, as well as capacity-building activities, are vital. Such activities not only improve global data availability, and hence research results, but also enable Article 5 parties and countries with economies in transition to participate in ozone layer science as equal partners with non-Article 5 parties in shepherding the ozone layer to its recovery.

B. Benefits of a strengthened Trust Fund

7. The beneficiaries of the Trust Fund are not only the emerging scientific workforce of Article 5 parties and countries with economies in transition, but also all scientists and policymakers, who will be in a better position to monitor the results of their actions. Expected benefits include the following:
 - (a) Increased capacity and capability in the fields of systematic observations and research in Article 5 parties and countries with economies in transition and better integration of scientists from those countries into the global scientific community;

(b) Better science-based decision-making at both the international and national levels because of the engagement of scientists from both non-Article 5 and Article 5 parties;

(c) Better information for various international scientific activities, such as the World Meteorological Organization Global Atmospheric Watch Programme;

(d) Ground-based cross-validation of satellite data-measuring trends in ozone layer properties.

C. Main elements of the long-term strategy

8. The ozone monitoring system rests on two main pillars: satellite measurements for global coverage and ground-based measurements for long-term stability, as well as for cross-validation of successive satellite missions. Based on the findings of the Ozone Research Managers at their tenth meeting and the goals of the Trust Fund, there is a need for long-term data on ozone levels, temperatures and composition (especially in terms of ozone-depleting and related substances) of the ozone layer. Unfortunately, ground-based ozone observations are decreasing and indeed some stations are closing, even in non-Article 5 countries. This shows that the ozone monitoring system is becoming fragile, and might even collapse if too many monitoring stations disappear.

9. Ground-based stations measuring ozone and related parameters are of great value, not only for monitoring the ozone layer during the crucial period of its recovery from the effects of ozone-depleting substances, but also for information on climate and air quality.

10. Furthermore, ultraviolet-related monitoring and research has not been as well represented as ozone measurements in the activities supported by the modest funds expended under the Trust Fund.

11. Monitoring the ozone layer and ultraviolet radiation are long time-scale activities. It is therefore important that any activity that provides a relevant data stream should also be a long time-scale, sustainable activity. To ensure the value of long-term high-quality data, it is essential that much attention should be paid to the calibration of instruments and the training of operators.

12. Based on the above observations, the Advisory Committee suggests the following plan towards the establishment of a long-term strategy for the Trust Fund covering three main areas of action:

First area: identification of gaps and needs in monitoring and research and development of a plan for resource mobilization

- Carrying out a critical review of the progress made under the Trust Fund to date to measure the cost-effectiveness of the programme: evaluate what was gained for the resources spent, and examine how much data and information have been submitted to the World Ozone and Ultraviolet Radiation Data Centre and related official/international data storage sites.
- Developing scenarios that envision different levels of functional ground-based observations of the stratosphere (ozone, temperature and composition): explore the full spectrum of possibilities without consideration of resources needed and establish priority activities.
- Identifying gaps in the global research efforts by comparing them with what is needed, based on the findings and recommendations of the Ozone Research Managers at their tenth meeting.
- Developing a plan for acquiring Trust Fund resources from non-Article 5 parties and exploring possibilities of acquiring resources from sources other than parties' voluntary contributions, including contributions from satellite/space agencies, scientific, research and philanthropic institutions, United Nations entities and international financial institutions and the private sector.

Second area: exploration of the use of new instrumentation and fostering of cooperation with and support by relevant programmes and institutions

- Exploring the use of new instrumentation for total ozone monitoring¹ with side-by-side operation of instruments for a period of at least two years to progressively replace the ageing Dobson instruments: transitioning to new instruments could be cost-effective and lead to remote diagnosis and rectification of measurement systems, use for air pollution monitoring and deployment of more instruments.

¹ For example, modern charge-coupled device (CCD) based instruments, mini-SAOZ (Système D'Analyse par Observations Zénithales) or Multi Axis Differential Optical Absorption Spectroscopy (MAX-DOAS) for total content and profile.

- Fostering relations with the scientific community, especially the International Ozone Commission, Stratospheric Processes and their Role in Climate, and the International Global Atmospheric Chemistry Project, to build capacity and the infusion of knowledge.
- Exploring the possibility of obtaining support for enhancing the synergy between the various networks, such as Global Atmosphere Watch, the Network for the Detection of Atmospheric Composition Change and the Global Climate Observing System Reference Upper-Air Network.
- Working with the climate and ozone layer community to declare that stratospheric ozone should be identified as a primary “essential climate variable”.² This could be done in cooperation with the International Ozone Commission.

Third area: establishment of ground rules for applications for Trust Fund resources

- Ground rules to govern applications for support by the Trust Fund could include the following:
 - (a) Requesting proposers to submit only activities that address gaps identified by the Advisory Committee, based on the recommendations of the Ozone Research Managers;
 - (b) Requesting proposers to make in-kind contributions (for example, to invest 30-40 per cent of the cost of the project) as a cost-share on the project;
 - (c) Requiring that proposers show how their activities would be maintained beyond the time of utilization of Trust Fund resources (that is, to view the Trust Fund as a startup package only, not as long-term support);
 - (d) Requiring proposers to leverage the proposed activity on existing activities within their country and region;
 - (e) Requesting proposers to show how the activity builds on previous activities, if any.

² The concept of essential climate variables was developed by the Global Climate Observing System, set up under the auspices of United Nations entities and the International Council for Science, to help ensure the availability of systematic observations of climate and quantify the success of environmental and climate policies. For more information on essential climate variables, see: http://unfccc.int/files/science/workstreams/systematic_observation/application/pdf/gcos_ip_10oct2016.pdf.