Information provision of quantitative assessment of cumulative air impacts in the framework of environmental impact assessment in Antarctica

English version provided by the author

Information provision of quantitative assessment of cumulative air impacts in the framework of environmental impact assessment in Antarctica

**Information paper submitted by the Republic of Belarus**

***Summary***

The importance of collecting and archiving information on the sources of pollutant emissions at Antarctic stations and in the areas of operation of national Antarctic programs for use in assessing the cumulative impact on the atmospheric air during impact assessment is highlighted.

In accordance with the environmental principles of the Protocol on Environmental Protection to the Antarctic Treaty (Article 3), activities in the Antarctic Treaty area shall be planned and conducted on the basis of information sufficient to allow prior assessments of, and informed judgments about, their possible impacts on the Antarctic environment. Such judgments shall take account of the cumulative impacts of the activity, both by itself and in combination with other activities in the Antarctic Treaty area. However, no consensus has yet been reached on how to assess cumulative impacts, despite multiple consideration of this issue since 1996 (ATCM XX/IP085, 1996; ATCM XXI/IP061, 1997; ATCM XXII/IP030, 1999; ATCM XXIV/IP052, 2001; ATCM XXVI/WP006, 2003; ATCM XXV/IP072, 2003; ATCM XXXI/WP034, 2008 etc.). A summary of the history of consideration of various issues related to cumulative impact assessment is provided in IP111 presented at ATCM XXXVIII (2015). A brief summary of the discussion on methods for assessing cumulative impacts is given in IP80 (ATCM XXIX, 2006): “there are numerous methods available for analyzing cumulative impacts. And no single approach can be regarded as definitive." The greatest attention is paid, perhaps, to the discussion of the assessment of the cumulative impact of Antarctic tourism (ATCM XXIV/IP052, 2001; ATCM XXXI/WP034, 2008; ATCM XXXII/IP015, 2009). Significant progress has been made on the need to take into account the sites of past and current activities in Antarctica, including geo-referenced and mapped scientific research (ATCM XXXIII/WP023, 2010). At the same time, the methodology for assessing the cumulative effect of activities leading to the release of pollutants into the Antarctic environment with emissions and wastewater has not been sufficiently developed. This also applies to impact of diesel generator power plants emission. For several decades, diesel generators have served and still serve as the main sources of energy for scientific stations in Antarctica, and are the main stationary sources of emissions of anthropogenic pollutants into the air in Antarctica. It seems that the reconstruction of rows of impacts of emission sources for the period of their operation, taking into account the effects of overlapping dispersion / fallout halos, can be considered as an effective method for assessing cumulative air impacts in a certain area. However, to date, assessments of the impact on atmospheric air of activities in Antarctica are very limited (ATCM XXXIX/IP3, 2016), and assessments of impact over a more or less long period are sporadic.

In the 2019/2021 Intersessional Period, Information Paper 22 was presented, which describes approaches to assessing trends in the impact of emission sources on the atmospheric air in Antarctica. The example of Vecherny Oasis, Enderby Land, which is characterized by a long history of study and exploration, has been used. An assessment of the environmental impact associated with emissions of various pollutants from diesel generator sets into the atmosphere over a 30-year period was carried out. For this purpose, available information from different sources was collected and a database has been compiled on diesel generators operating in the Vecherny Oasis, including their type, power, location, years of operation, time of operation, fuel consumption and other characteristics. Modelling allowed, in particular, to describe dynamics of areas of increased concentrations of air pollutants and PM10 dry depositions. More detailed results are shown in (*Kakareka, Salivonchyk, 2020*).

It seems that the proposed approach can be used to assess the cumulative impacts of stationary emission sources (total for the period of exposure and for all sources of exposure) and in other Antarctic oases, including over a longer period. However, to obtain sufficiently accurate estimates, detailed and complete information is required characterizing both current and past sources of emissions, which can only be achieved through the creation of databases and archives of such information by national Antarctic programs with the assistance of CEP / COMNAP / SCAR. Such databases and archives may include information on fuel consumption, emissions, waste generation, wastewater discharges, as an example (Australian Antarctic Program, 2016); as well as parameters and modes of operation such as currently used and used in the past, stationary and mobile installations, which are sources of pollutants into the environment. It is important to georeference the location of stationary sources of emissions, including diesel generators, waste incineration facilities, and account their changes over time.

These proposals are a development of previously made proposals (e.g. ATCM XXVI/WP006, 2003; ATCM XXXIII/WP023, 2010) on the need to collect information on visits to areas in order to have comprehensive information on activities in areas of interest and to help develop and maintaining a database or databases containing information about visits to areas, as well as other important information. This is a challenging task because, as noted in (ATCM XXIX/IP80, 2006), collecting data to analyze cumulative impacts is often the most difficult aspect; in Antarctica, limited data availability is a particular problem, as is the ability to establish monitoring or research programs to fill the gaps.

***References***

Antarctic Treaty Intersessional Period 2019/2021. IP 22. Towards assessment of trends of air quality impact of diesel generator power plants emission in Antarctica.

ATCM XXXIX/IP3, 2016. Application of air dispersion modeling for impact assessment of construction/operation activities in Antarctica. Information paper submitted by the Republic of Belarus.

Kakareka S. and Salivonchyk S. An assessment of the impacts of diesel power plants on air quality in Antarctica // Advances in Polar Science. March 2020 Vol. 31 No. 1: 74-87. doi: 10.13679/j.advps.2019.0029.

Australian Antarctic Program’s Station Environment: Operation indicators. Antarctic environment (2016). https://soe.environment.gov.au/theme/antarctic-environment/topic/2016/australian-antarctic-programs-station-environment-operation.

ATCM XXXVIII/IP111, 2015. Cumulative Impact Assessment. Information paper submitted by ASOC.

ATCM XXXIII/WP023, 2010. Assessing cumulative environmental impacts: identifying the distribution and concentration of national operator activities in Antarctica. Information Paper submitted by UK.

ATCM XXXII/IP015, 2009. Cumulative impacts from walking in the Dry Valleys. Information Paper submitted by the United States.

ATCM XXXI/WP034, 2008. A Mechanism for Centralizing Tourism and Non-governmental Activity Declarations and Authorization Requests Suitable for Taking Cumulative Impacts into Account. Information Paper submitted by France.

ATCM XXIX/IP80, 2006. Methodologies for Assessing Cumulative Impacts: A Progress Report. Information Paper submitted by New Zealand.

ATCM XXVI/WP006, 2003. Final Report from the Intersessional Contact Group on Cumulative Environmental Impacts. Working document submitted by the United States of America.

ATCM XXV/IP072, 2003. IAATO Site Specific Guidelines 2003 in the Antarctic Peninsula Further Addressing Potential Cumulative Impacts. Information Paper submitted by IAATO.

ATCM XXIV/IP052, 2001. Issues Relating to Cumulative Environmental Impacts Of Tourist Activities. Information Paper submitted by IAATO.

ATCM XXII/IP030, 1999. Cumulative Environmental Impacts in Antarctica: Minimisation and Management. Information Paper submitted by IUCN.

ATCM XXI/IP061, 1997. Cumulative environmental impacts in Antarctica: minimisation and management. Information Paper submitted by IUCN.

ATCM XX/IP085, 1996. IUCN International workshop on cumulative environmental impacts in Antarctica: minimisation and management. Information Paper submitted by IUCN.