UN environment
United Nations Environment Programme

OZONE SECRETARIAT

Relevance of Nitrous Oxide for the Ozone Treaties

Nitrogen Working Group of the United Nations Environment Programme

First e-briefing, 8 – 9 June 2020

Sophia Mylona / Ozone Secretariat

Ozone treaties

- **The Vienna Convention for the Protection of the Ozone Layer**

- **The Montreal Protocol on Substances that Deplete the Ozone Layer**

Ultimate goal: To protect human health and the environment against adverse effects resulting from modifications of the ozone layer

Vienna Convention for the Protection of the Ozone Layer (1985)

To promote cooperation by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer

Vienna Convention

Reference to nitrogen substances *(1)*

Article 3: Research and systematic observations

"**The Parties undertake to promote or establish,** as appropriate, directly or through competent international bodies and taking fully into account national legislation and relevant ongoing activities at both the national and international levels, **joint or complementary programmes for systematic observation of the state of the ozone layer and other relevant parameters, as elaborated in annex I**."

Para. 2

Vienna Convention

Reference to nitrogen substances *(2)*

Annex I: Research and systematic observations

- **Nitrogen substances** are included in the list of chemical substances of natural and anthropogenic origin, thought to have the potential to modify the chemical and physical properties of the ozone layer

Para. 4(b)

Vienna Convention

Reference to nitrogen substances *(3)*

Annex I, para. 4 (b)

(i) Nitrous oxide (N_2O)

The dominant sources of N_2O are natural, but anthropogenic contributions are becoming increasingly important. Nitrous oxide is the primary source of stratospheric NO_x, which play a vital role in controlling the abundance of stratospheric ozone

(ii) Nitrogen oxides (NO_x)

Ground-level sources of NO_x play a major direct role only in tropospheric photochemical processes and an indirect role in stratosphere photochemistry, whereas injection of NO_x close to the tropopause may lead directly to a change in upper tropospheric and stratospheric ozone

Substances controlled by the Montreal Protocol

Ozone Depleting Substances (ODSs)

(subject to phase-out)

- Chlorofluorocarbons (CFCs)
- Halons
- Carbon tetrachloride
- Methyl chloroform
- Methyl bromide
- Hydrobromofluorocarbons (HBFCs)
- Hydrochlorofluorocarbons (HCFCs)

Greenhouse gases *(subject to phase-down)*

- Hydrofluorocarbons (HFCs)

Through production and consumption control measures for all controlled substances and emission controls of HFC-23, following a common but differentiated approach

Montreal Protocol

Adjustments

quick response to new scientific information to accelerate reductions required on chemicals already covered by the Protocol

Adjustments to date:

1991, 1993, 1996, 1998, 2000, 2008, 2018

Amendments

enable control of new chemicals

Amendments to date:

- **London Amendment (1990)**
- **Copenhagen Amendment (1992)**
- **Montreal Amendment (1997)**
- **Beijing Amendment (1999) and**
- **Kigali Amendment (2016) - *entered into force on 1 Jan 2019***

Montreal Protocol Quadrennial Assessments

- Under the Protocol, comprehensive assessments are produced every four years by its three Assessment Panels:
  - The Scientific Assessment Panel (SAP)
  - The Environmental Effects Assessment Panel (EEAP)
  - The Technology and Economic Assessment Panel (TEAP)
- Assessment Panel reports are also prepared in response to other requests by parties set out in relevant decisions
- All Assessment Panel reports are available at the Ozone Secretariat's website: https://ozone.unep.org/science/overview

SAP Quadrennial Assessments of Ozone Depletion

Findings related to greenhouse gases (GHGs)

- **All SAP quadrennial assessments to date *(2002, 2006, 2010, 2014, 2018)* have addressed the role of the GHGs Carbon dioxide (CO_2), Methane (CH_4) and Nitrous oxide (N_2O)**

- **Increasing concentrations of CO_2 and CH_4 during this century are estimated to cause global ozone levels to increase beyond the natural level of ozone observed in the 1960s**

- **Increasing concentrations of N_2O are estimated to cause depletion of stratospheric ozone**

2018 Quadrennial Assessment of Ozone Depletion

Findings related to N_2O

- N_2O continues to grow relatively steadily in the atmosphere (at a rate of 0.8 ppb per year)
- Future emissions of CO_2, CH_4, and N_2O will be extremely important to the future of the ozone layer through their effects on climate and on atmospheric chemistry, assuming full compliance with the Montreal Protocol
- Mitigation of N_2O emissions would have a small-to-modest ozone benefit in the coming decades
- The wide range of possible future levels of CO_2, CH_4 and N_2O represents an important limitation to making accurate projections about the ozone layer

Terms of Reference for the 2022 Quadrennial Assessment of Ozone Depletion

Decision XXXI/2: Potential areas of focus for the 2022 quadrennial reports of the SAP, EEAP and TEAP

31st Meeting of the Parties, Rome, 4 - 8 November 2019

- **Requested the Panels to bring to the notice of the parties any significant developments which, in their opinion, deserve such notice, and set out the focus areas of each Panel assessment**
- **As usual, the Panels will re-assess the role of N_2O, along with other substances of relevance to stratospheric ozone, based on the best available scientific information**

The Panels' 2022 Quadrennial Assessment Reports will be finalized by 31 December 2022 for the parties' consideration in 2023

UN environment
United Nations Environment Programme

OZONE SECRETARIAT

Thank you

sophia.mylona@un.org
ozone.unep.org