



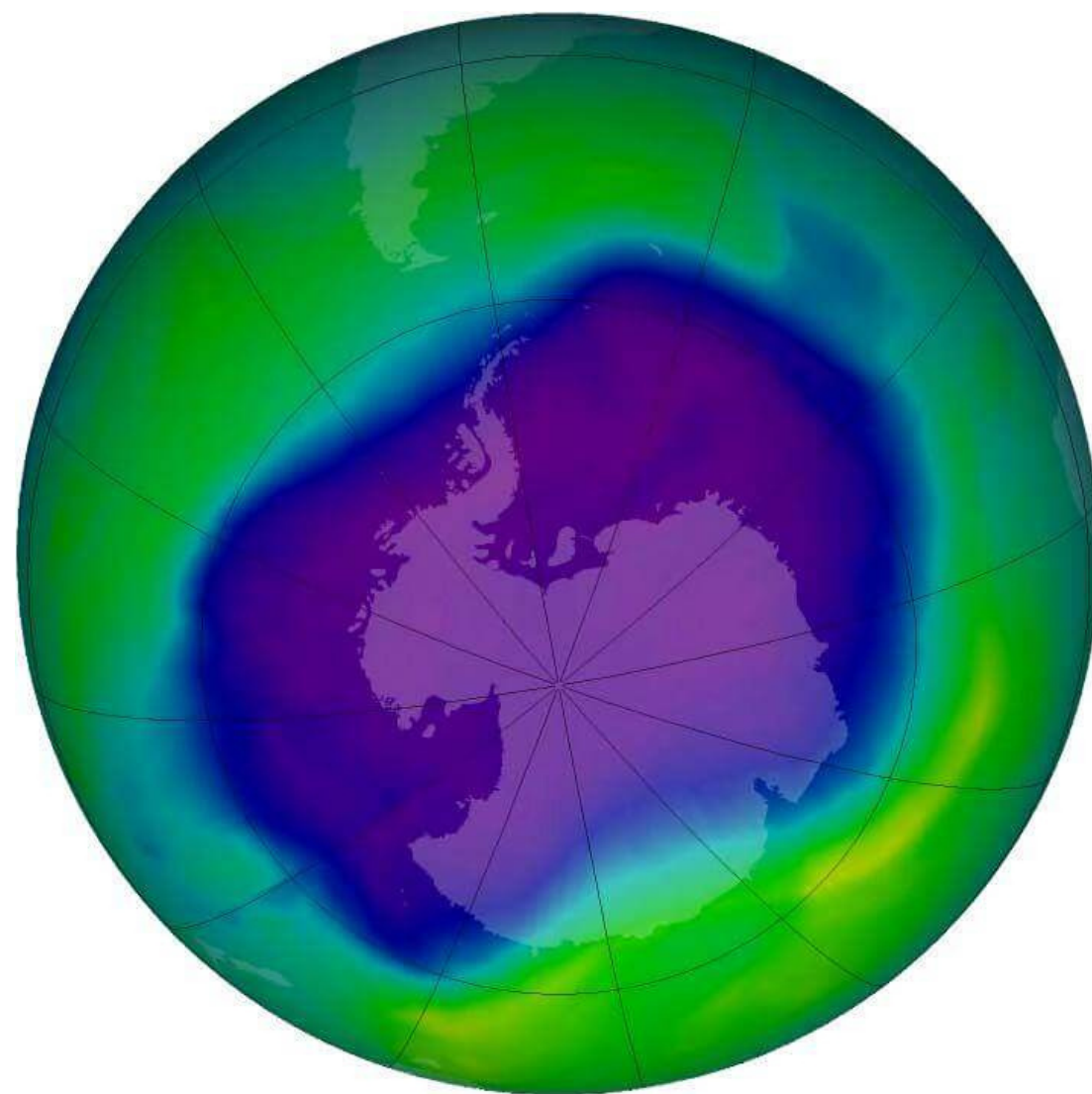
# MONTREAL PROTOCOL REVISITED

BY TOM SEVERIN & HELDER MANUEL

## INTRODUCTION

Car dashboards, refrigerators, insulation foams in our houses and office buildings, water boilers, and even shoe soles were made using chlorofluorocarbon (CFCs) or hydrofluorocarbon (HCFCs). These ozone-depleting substances (ODS) have been used in thousands of products across 240 sectors. Consequently, the Montreal Protocol was established in 1987 to protect the ozone layer and our climate from ozone-depleting substances. In 2009, governments agreed to phase out 98% of the chemicals in the protocol. The Kigali Amendment of 2016 made the Protocol an effective tool against climate change. But research shows that the emission of CFCs and HCFCs is still creating a big Antarctic ozone hole. The Montreal Protocol must act according to these new threats to protect the ozone layer and our climate.

The Montreal Protocol was a success. Now we need to adapt the protocol to the 21st century!



The ozone hole over the Antarctic in blue

## MUCH DONE

### Management ODS.

The protocol has supervised the use of many ODS and industries have introduced effective alternatives.

### Financial Assistance.

OECD nations encouraged countries to participate. Parties have been flexible to adapt to Protocol's technical panels.

### CFC Reduction.

Elevation of CFC reduction to one of total global phase-out of production and consumption of these chemicals.

## MUCH UNFINISHED

### Re-appearing CFCs and HFCs.

CFC decreases too slowly and HFC increase more than expected. Remaining gases in the atmosphere.

### Leaking banks ODS.

Old air conditioning, refrigerator, and insulating foams are still damaging the ozone layer and contributing to climate change.

### The question of N2O.

The most significant ODS is N2O which continues undermining the Montreal Protocol.

## RESULTS & DISCUSSION

### Toughen Compliance

We need to use more stringent compliance measures contained in the protocol.

### Eliminate feedstock and co-products

Use new technologies available to eliminate unwanted coproducts. Parties must negotiate stricter control.

### Stop the leakages

Halt CFC leakages by including policies in the protocol.

### Drawdown nitrous oxide

Tackle N2O difficulties by boosting nitrogen-use efficiency.

### Environment Monitoring Implementation

Make official ODS and HFC studies and introduce HCFC, HFCs, CCl<sub>4</sub>, and N<sub>2</sub>O.

### Protecting Ozone Layer and Climate

We are off course to be below 2.0 C. Urgency to reduce all ODS and climate damaging substitutes.

## Kigali-Plus Amendment?

### Literature

Solomon, S., Alcamo, J. & Ravishankara, A.R. Unfinished business after five decades of ozone-layer science and policy. *Nat Commun* 11, 4272 (2020). [www.nature.com/articles/s41467-020-18052-0#citeas](http://www.nature.com/articles/s41467-020-18052-0#citeas)  
Tina Birmipili, Montreal Protocol at 30: The governance structure, the evolution, and the Kigali Amendment, *Comptes Rendus Geoscience*, Volume 350, Issue 7, 2018, Pages 425-431, ISSN 1631-0713, [www.sciencedirect.com/science/article/pii/S163107131830124X](http://www.sciencedirect.com/science/article/pii/S163107131830124X)