# Evolution and observations of ozone depleting substances

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## 45 years of atmospheric CFC measurements





Lovelock in his laboratory.

## 45 years of atmospheric CFC measurements



















## **ODSs: Column Abundance by FTIR**



Update from WMO/UNEP 2014, M Mahieu

## **The End**

## **ODSs: The Big Five**

A Closer Look into CCI



## **On-going Emissions or Inadequate Lifetime?**

## Ozone Assessment 2014



Assessment for Decision-Makers



Core Project of the WMO/ICSU/IOC World Climate Research Programme

#### SPARC Report on the Mystery of Carbon Tetrachloride

Q. Liang, P. A. Newman, S. Reimann SPARC Report No. 7, WCRP-13/2016



## **On-going Emissions or Inadequate Lifetime?**





<sup>30</sup>th Anniversary of the Montreal Protocol



## **CFC-11 Banks**



Year 2003 ff.: ~60 Gg Chapter 1, Ozone Assessment 2014 Year 2008: 1420 Gg Chapter 5, Ozone Assessment 2010

Constant emissions: ~60 Gg/yr



2008-2016: 1420 Gg bank should be depleted by ~40%



Concentrations should begin to drop more rapidly in recent years





<sup>30</sup>th Anniversary of the Montreal Protocol



## Conclusions

- The Montreal Protocol led to a continuous decline in all major ozone depleting substances.
- Long-term measurements combined with modelling can be used for checking compliance with the Montreal Protocol.
- Measurements are essential to be continued for detecting future deviations and knowledge gaps.

## Definitely the End

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