

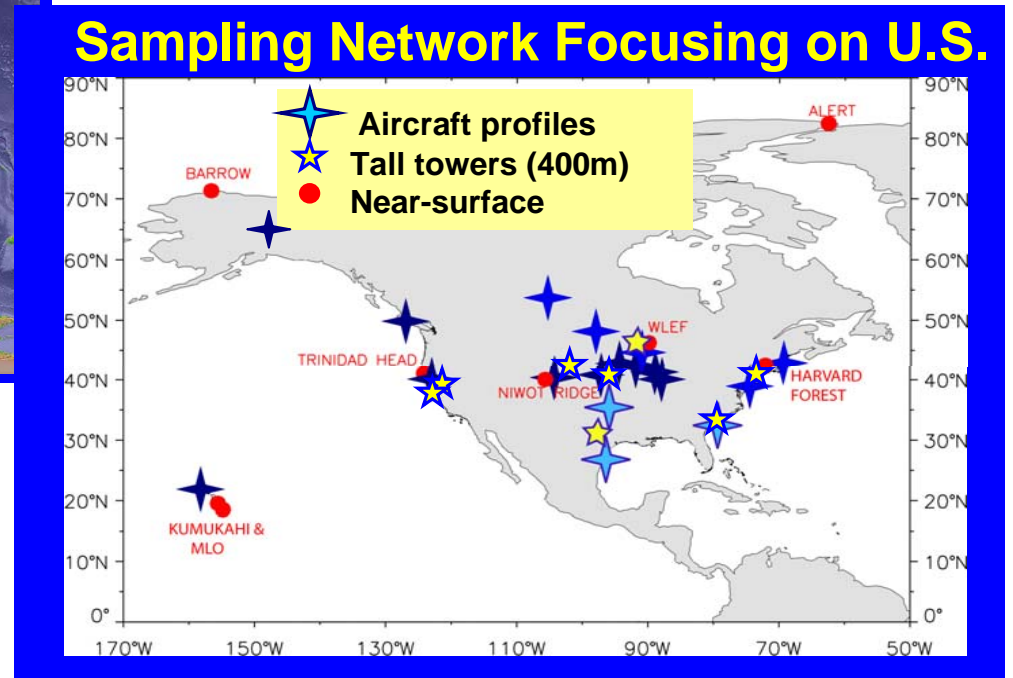
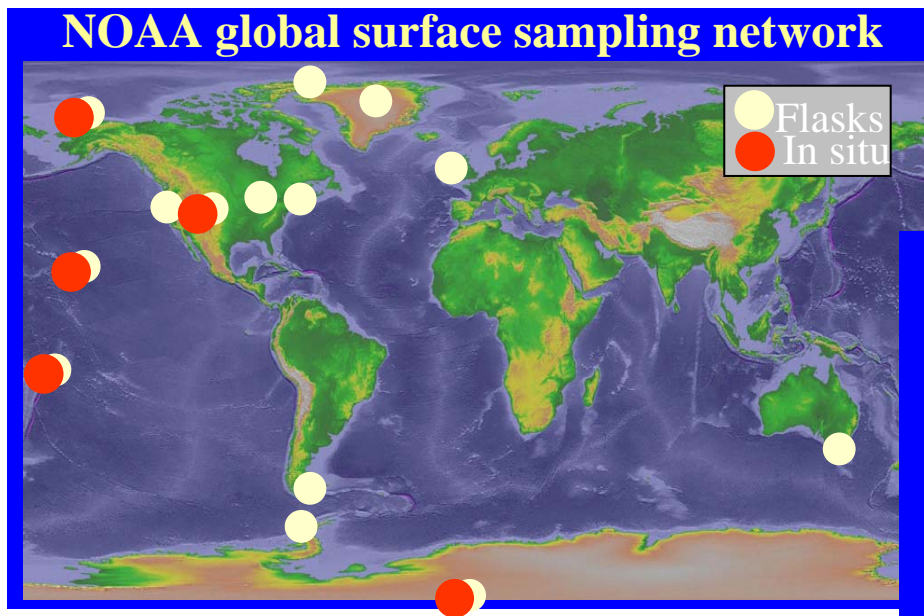
# **Atmospheric measurements of Ozone Depleting Substances (ODSs) at ESRL...**

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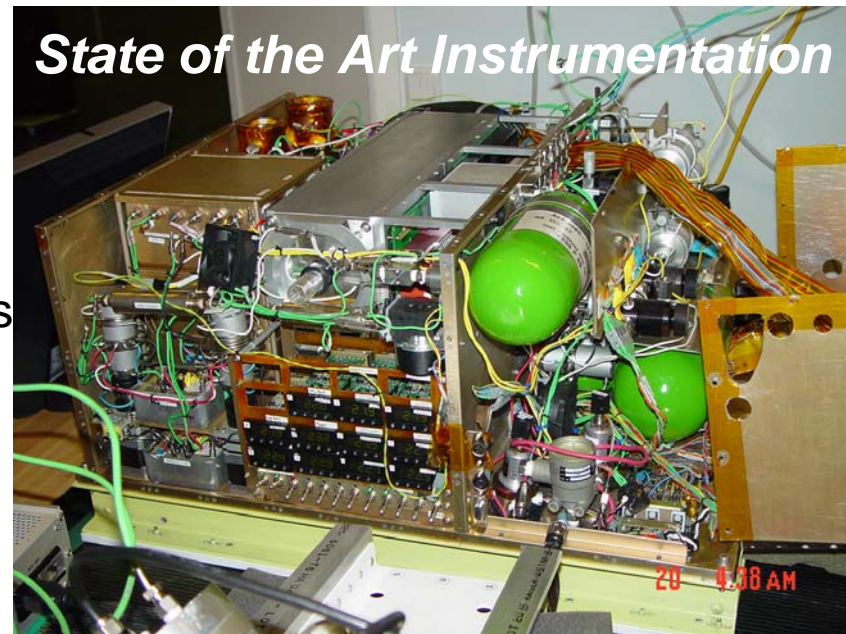
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**With custom instrumentation  
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*e.g., surface sites, aircraft,  
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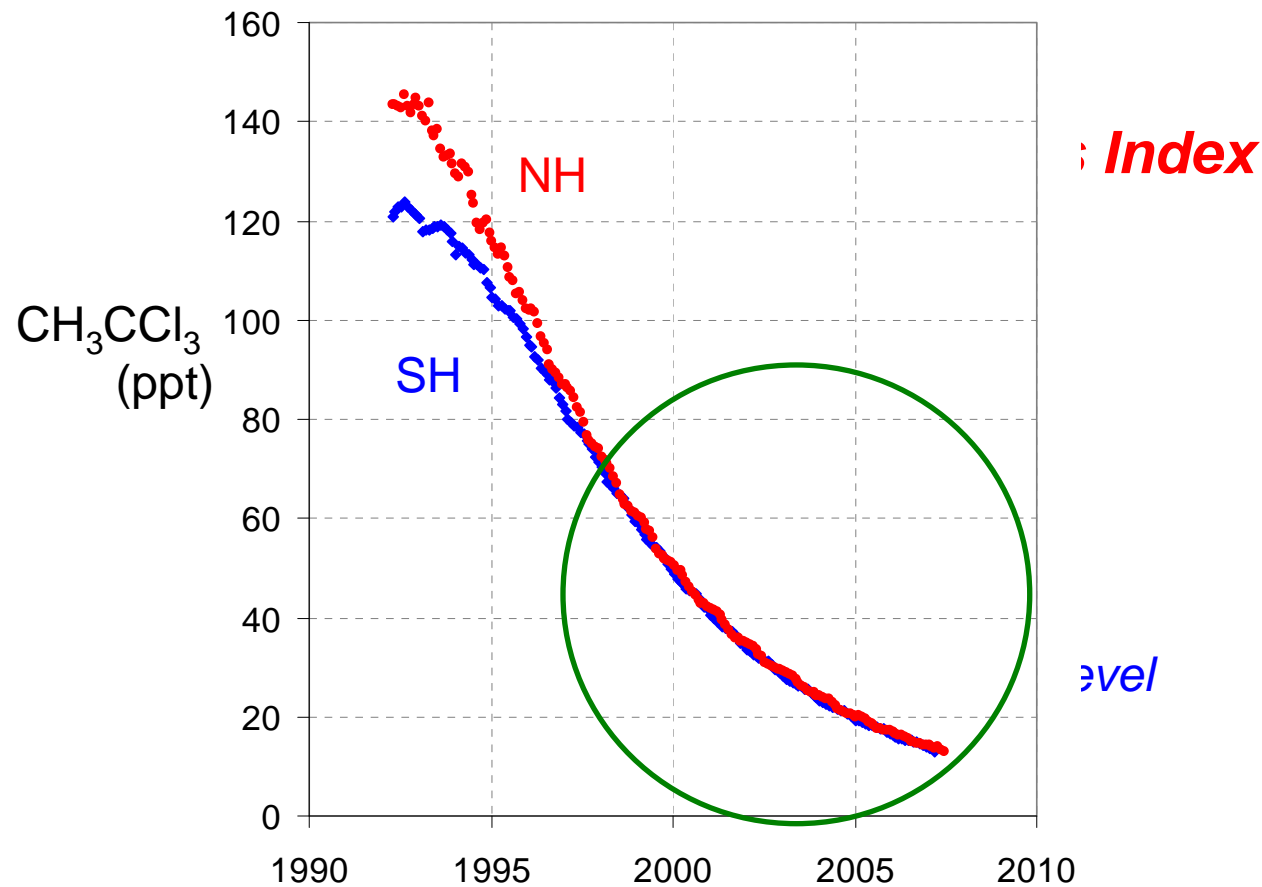
*e.g., surface sites, aircraft,  
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**In combination with others** (NASA, Universities, international partners, others)

# Why measure ozone-depleting substances at ESRL?

To understand fundamental atmospheric processes and properties:

\*Hydroxyl radical abundance and variability (ODS lifetimes)



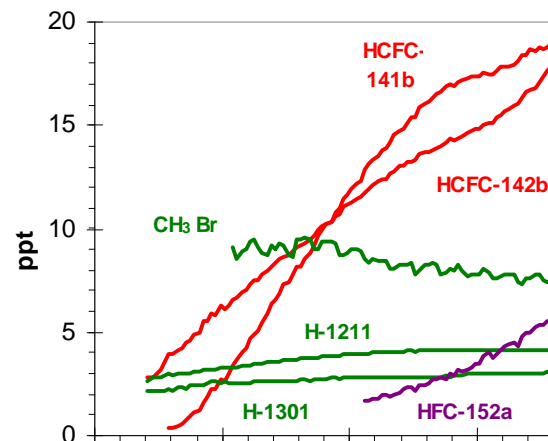
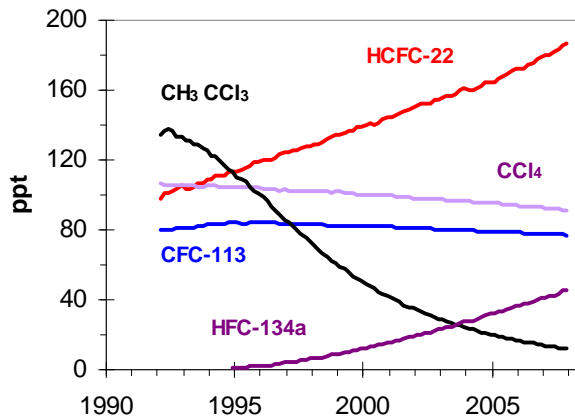
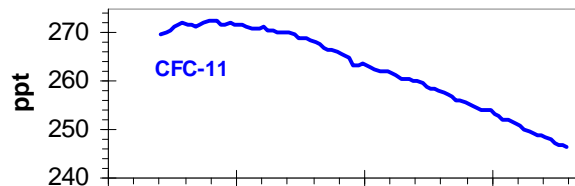
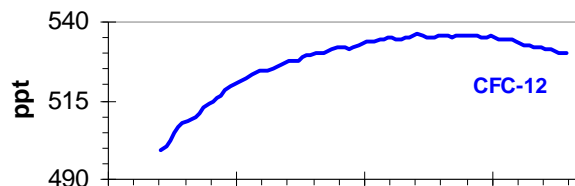
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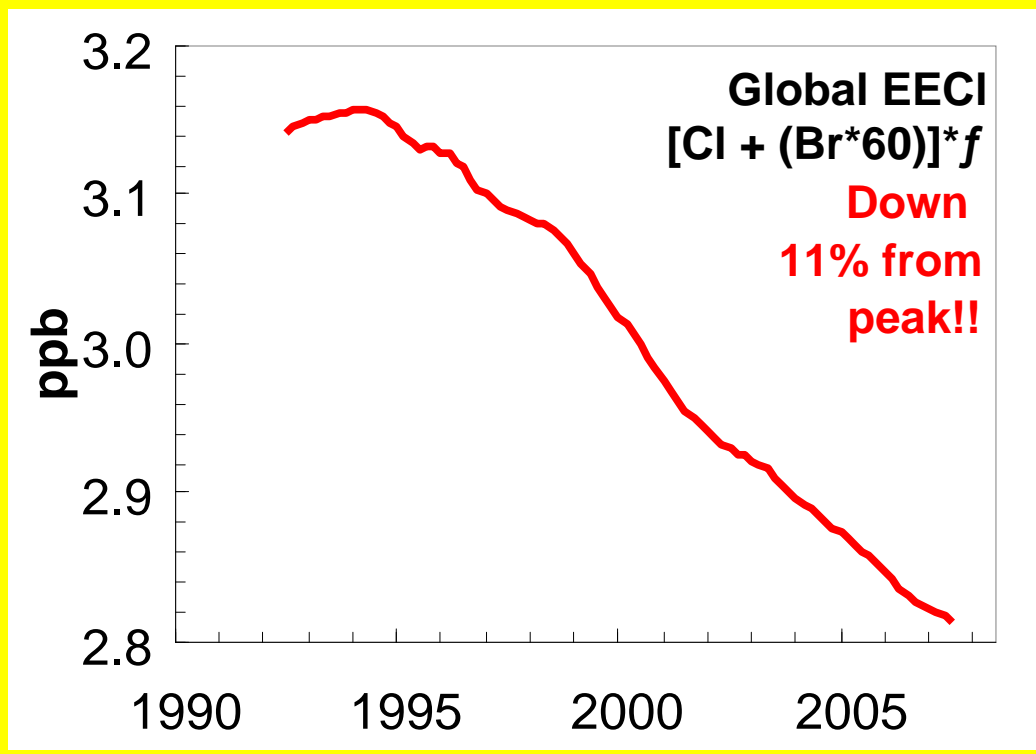
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Summarizing trends for all ODSs:  
Effective Equivalent Chlorine (EECI)





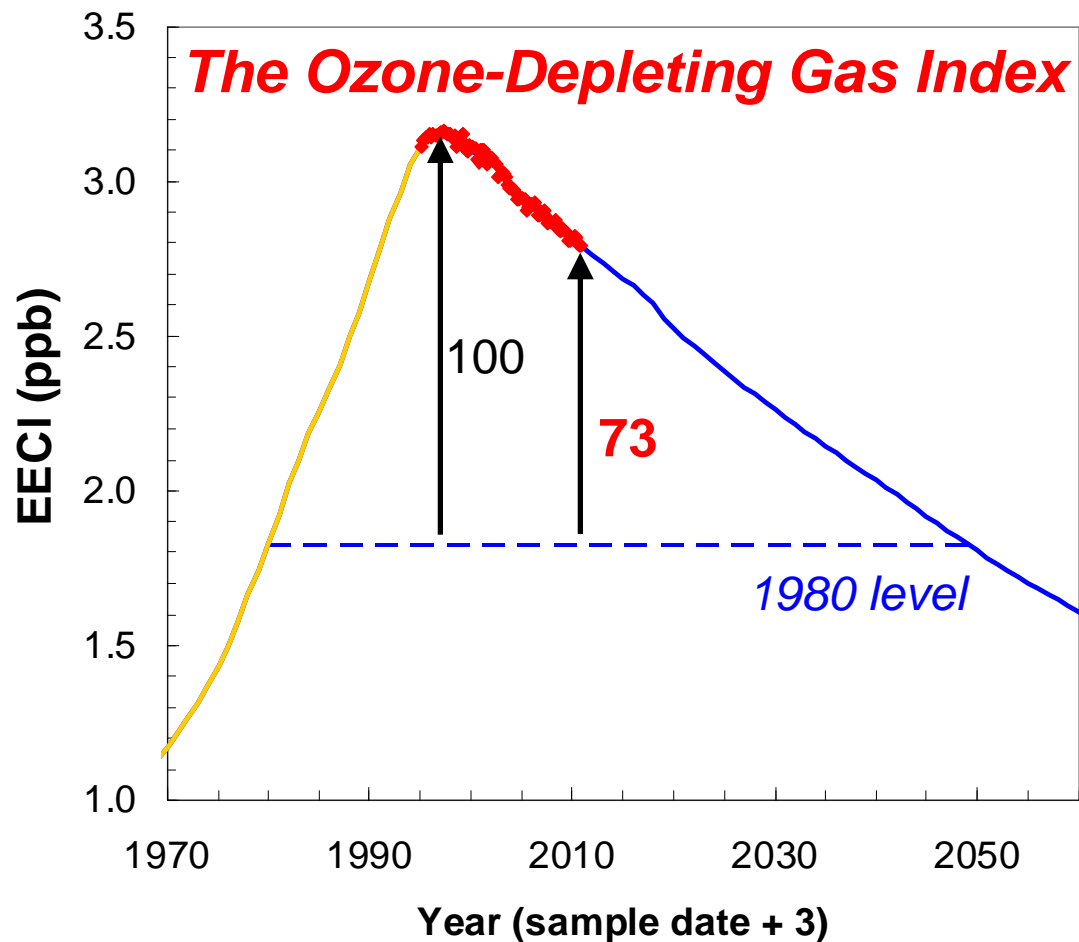
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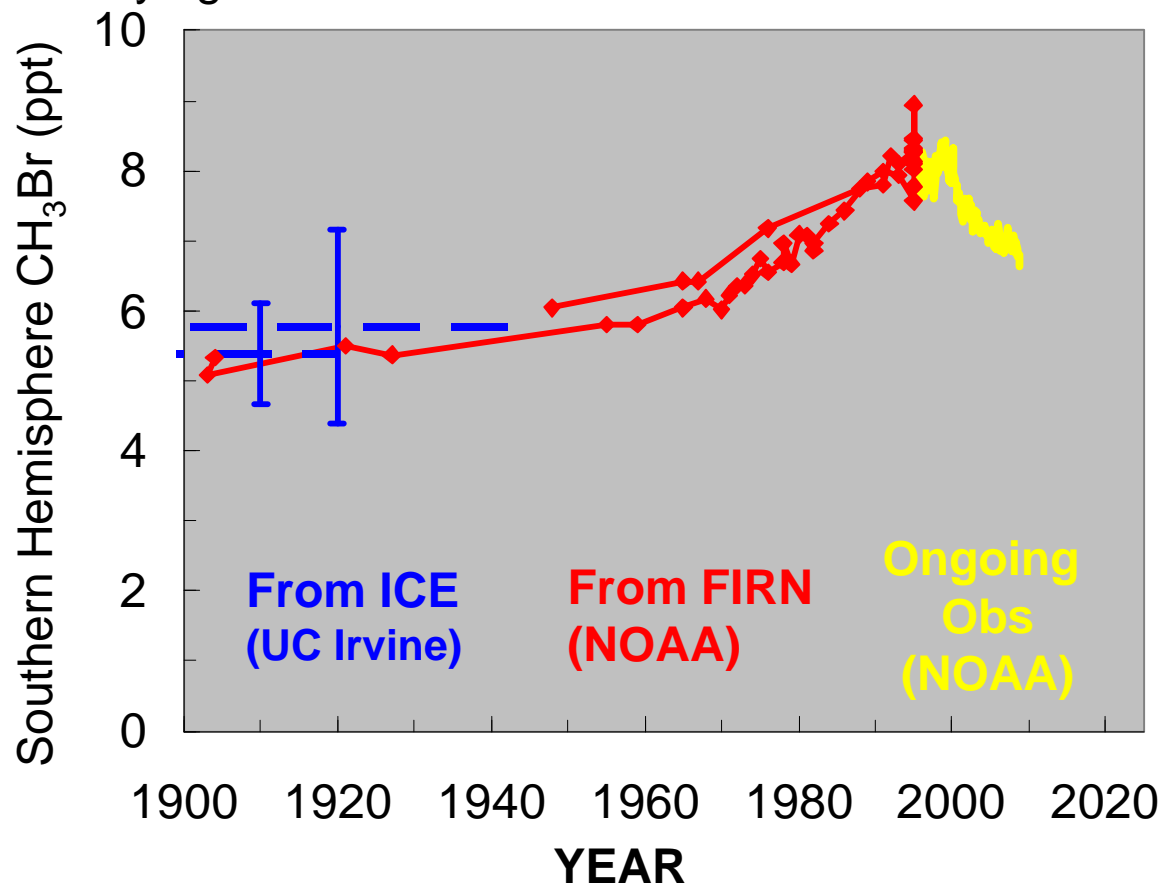
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Quantifying natural influences



**CH<sub>3</sub>Br in the Southern Hemisphere**

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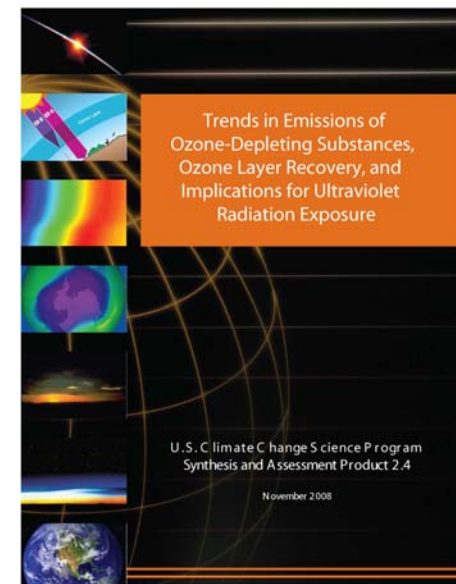
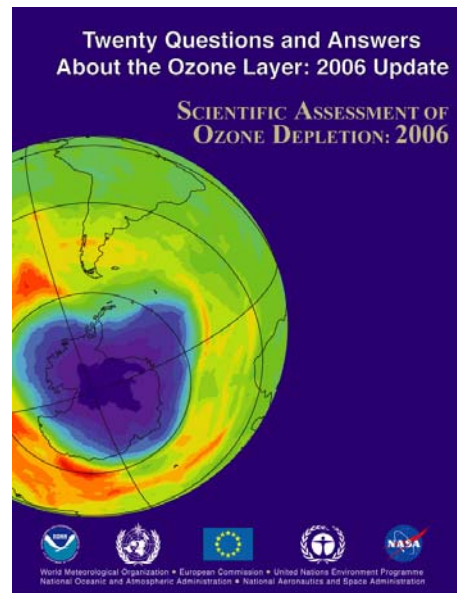
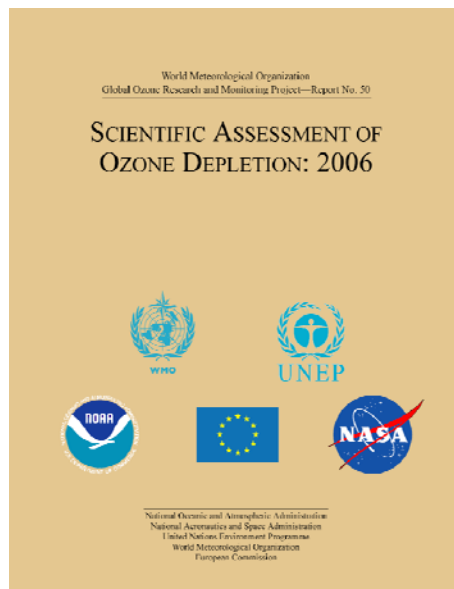
## To provide policy-relevant information:

→ Guiding ozone layer recovery (Montreal Protocol)

The Ozone Depleting Gas Index

→ Quantifying the contributions of ODSs to Radiative Forcing (AGGI)

→ Through participation in national and international assessment reports



# Concerns for the future:

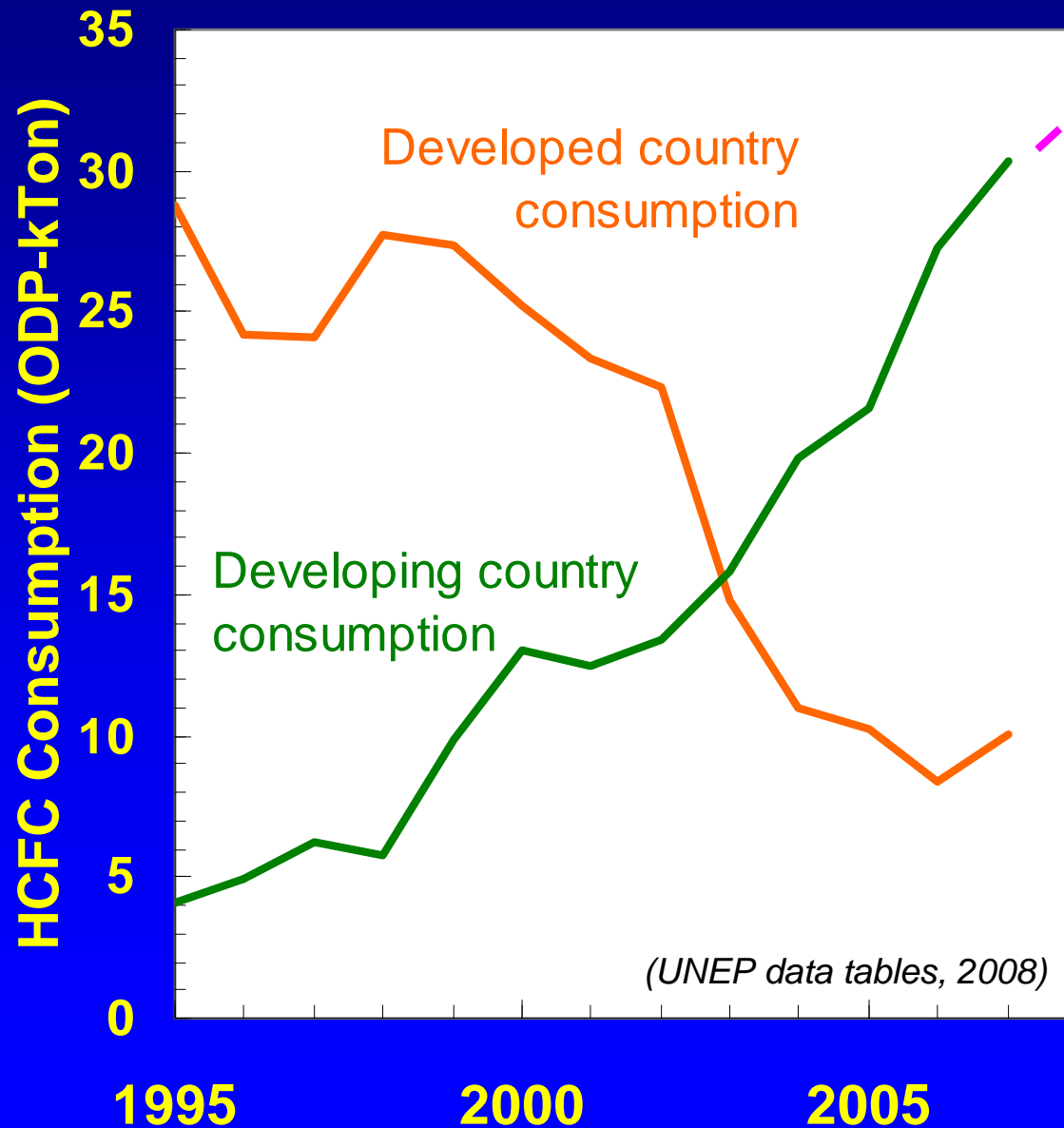
## Guiding the recovery of the Ozone Layer...

### **\*Will ODSs decrease/change as expected?**

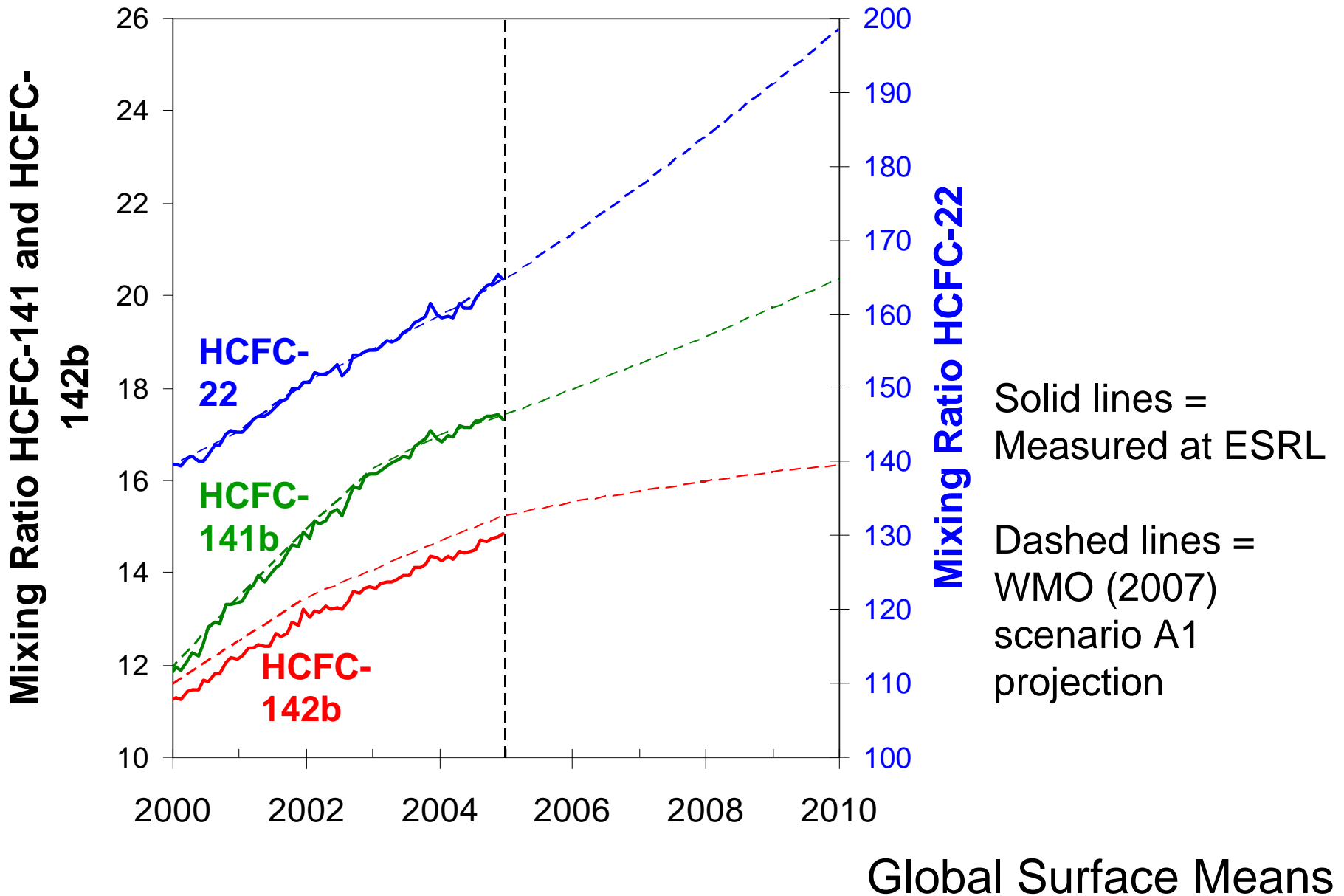
What influence will *un*regulated production and emission have?  
HCFC use in developing countries (until 2013)...

Production and use of HCFCs is NOT limited in developing countries until 2013...

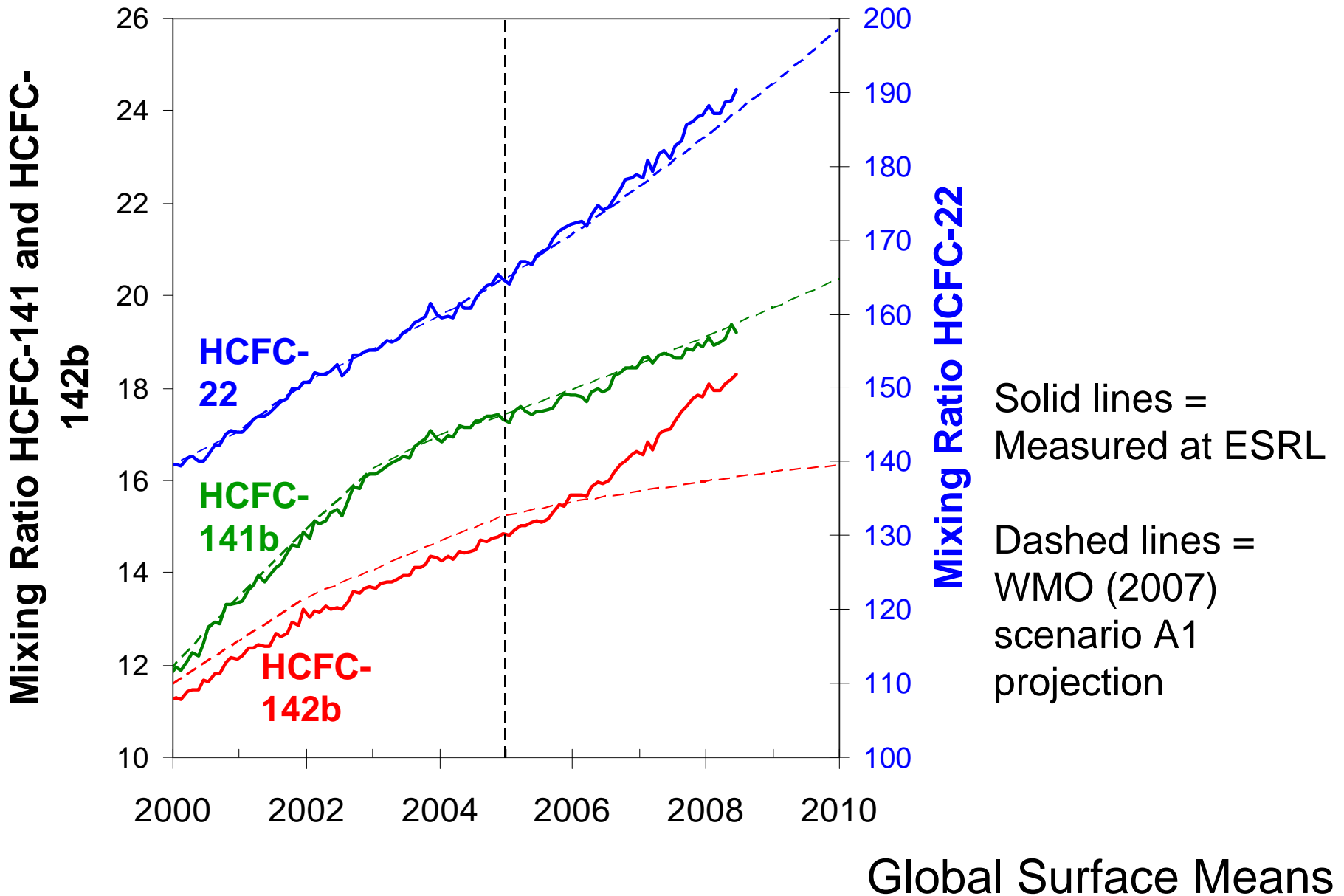
**How high  
by 2013?**



Continued measurements allow us to monitor progress and identify any unexpected developments...



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# Concerns for the future:

## Guiding the recovery of the Ozone Layer...

### \*Will ODSs decrease/change as expected?

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HCFC use in developing countries (until 2013)...

CH<sub>3</sub>Br for non-regulated quarantine & pre-shipment uses...

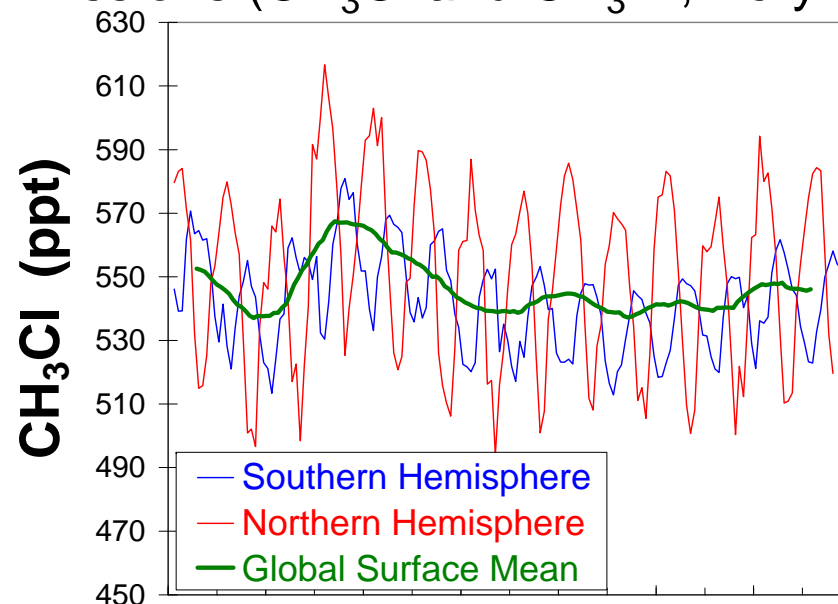
Emissions from foams, refrigerators, AC units (banks)...

### \*How will natural fluxes change?

What will be the influence of climate change?

Lifetimes (OH, strat-trop exchange)

Emissions (CH<sub>3</sub>Cl and CH<sub>3</sub>Br, Very Short-Lived Substances)



# Summary of ESRL Activities Related to Ozone-Depleting Substances

- The study of ODSs at ESRL
  - Monitoring long-term atmospheric changes
  - Investigating regional/specific issues
  - Understanding observed changes
  - Enhancing predictive capability
  - Communicating results
    - *Guiding the recovery of the ozone layer*
    - *Improving our understanding of the atmosphere*