New discovery could pave the way for identification of rogue CFC release

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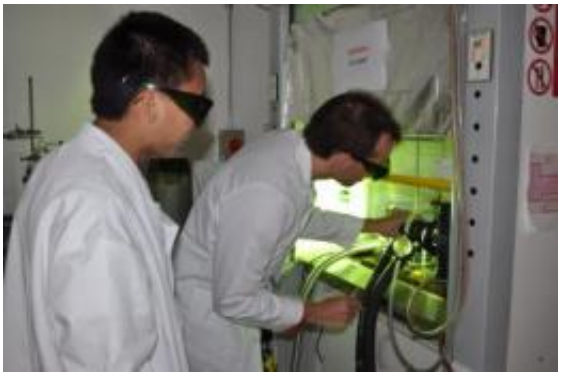

University of East Anglia researchers Dr Jan Kaiser (right) and BSc project student Martin Martin in their simulated stratosphere laboratory. Credit: University of East Anglia

A new discovery by scientists at the Universities of East Anglia and Frankfurt could make it possible in future to identify the source of banned CFCs that are probably still being released into the atmosphere.

Using mass spectrometers, the researchers analysed air samples collected in the stratosphere by balloons belonging to the French space agency, the Centre National d'Etudes Spatiales (CNES). They discovered the largest chlorine isotope enrichment ever found in nature.

CFCs were banned in most countries because of their depletion of the ozone layer. Due to their long lifetimes, their atmospheric concentrations

are expected to decline only slowly. However, the observed decline is even slower than what scientists predicted. The likely reasons for this are the continued use of CFCs and emissions from old refrigerators, air conditioning units and waste disposal.

"We are particularly excited by this discovery because this is a totally new observation for atmospheric chlorine," said Johannes Laube, of the University of East Anglia's School of Environmental Sciences.

Scientists at the University of East Anglia have used mass spectrometers to analyze air samples collected in the stratosphere by these balloons. Their discovery could make it possible in future to identify the source of banned CFCs that are probably still being released into the atmosphere. They also discovered the largest chlorine isotope enrichment ever found in nature. Credit: Andreas Engel

"Potentially, the technique we developed could enable us to identify remaining sources of CFCs in the atmosphere and to measure human contributions to naturally occurring ozone-depleting gases."

The measurements were obtained from samples brought back by the stratospheric balloons, but the research group has now started experiments in a laboratory where they replicate the reactions in the stratosphere.

"We try to measure the isotope effect in our laboratory in simulated stratospheric conditions," says Dr Jan Kaiser, also of the School of Environmental Sciences. "We do need to do more method development work and gather additional information before we can identify the fingerprint of the isotope in this way, but this discovery opens the door to that possibility."

More information: Their findings are published in this week's *Science*. 'Chlorine isotope fractionation in the stratosphere' was authored by J. C. Laube, J. Kaiser, W. T. Sturges, H. Bönisch and A. Engel

Provided by University of East Anglia