

Supplementary Material: Improving measurements of SF₆ for the study of atmospheric transport and emissions

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1. Tests using an Agilent μ -ECD

Limited tests using the three-column method with an Agilent μ -ECD (G2397A) suggests that this technique is fully compatible with the μ -ECD. An Agilent μ -ECD was installed in the calibration GC (Version 3) and the column outlet was simply moved from one detector to the other while all operating conditions remained the same. Although the tests were not performed at optimal CO₂ levels for N₂O (estimated at 500-700 ppm, Andrew Croxwell, personal communication, 2010), precision and peak shape (Figure S1) are similar to those observed with the older style Agilent ECD (G1533A). Several samples (3-12 ppt SF₆, 260-360 ppb N₂O) were analyzed over four days. The average precision observed for SF₆ was comparable for both the μ -ECD (0.35%) and older style ECD (0.32%). Average N₂O precision for the μ -ECD (0.060%) was not as good as that of the older style ECD (0.033%). The difference in precision for N₂O could be related to the amount of CO₂ dopant applied.

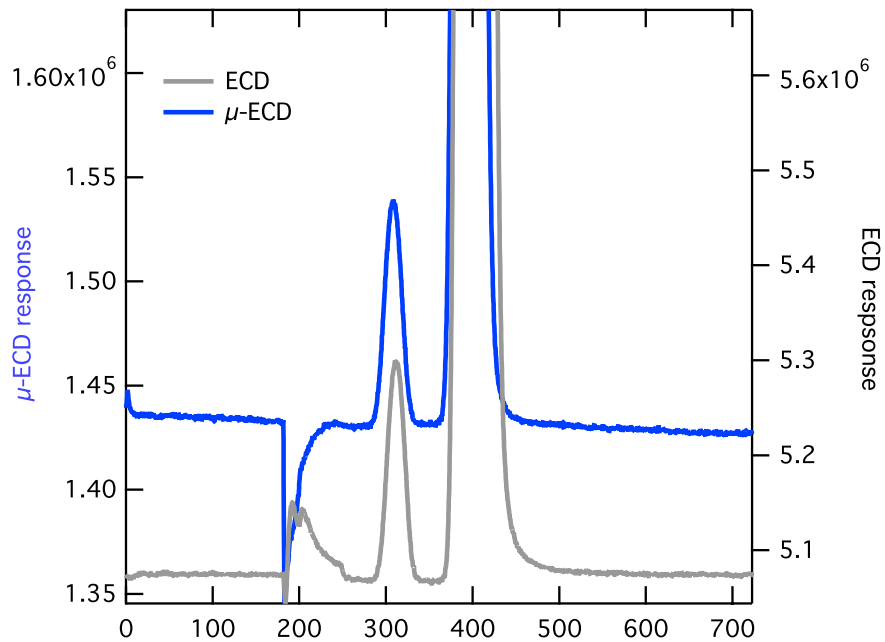


Figure S1: Comparison of Agilent ECD (G1533A) and Agilent μ -ECD (G2397A) response (arbitrary units) using similar columns and operating conditions.

2. SF₆ trends

NOAA/ESRL data are available at:

<http://www.esrl.noaa.gov/gmd/hats/combined/SF6.html>

Figure S2: SF₆ mole fraction measured at ten sites since 1995. Dashed lines correspond to sites with flask measurements only. Solid lines correspond to sites with both flask and in situ measurements (in situ measurement started in 1999, except Summit (2007)).

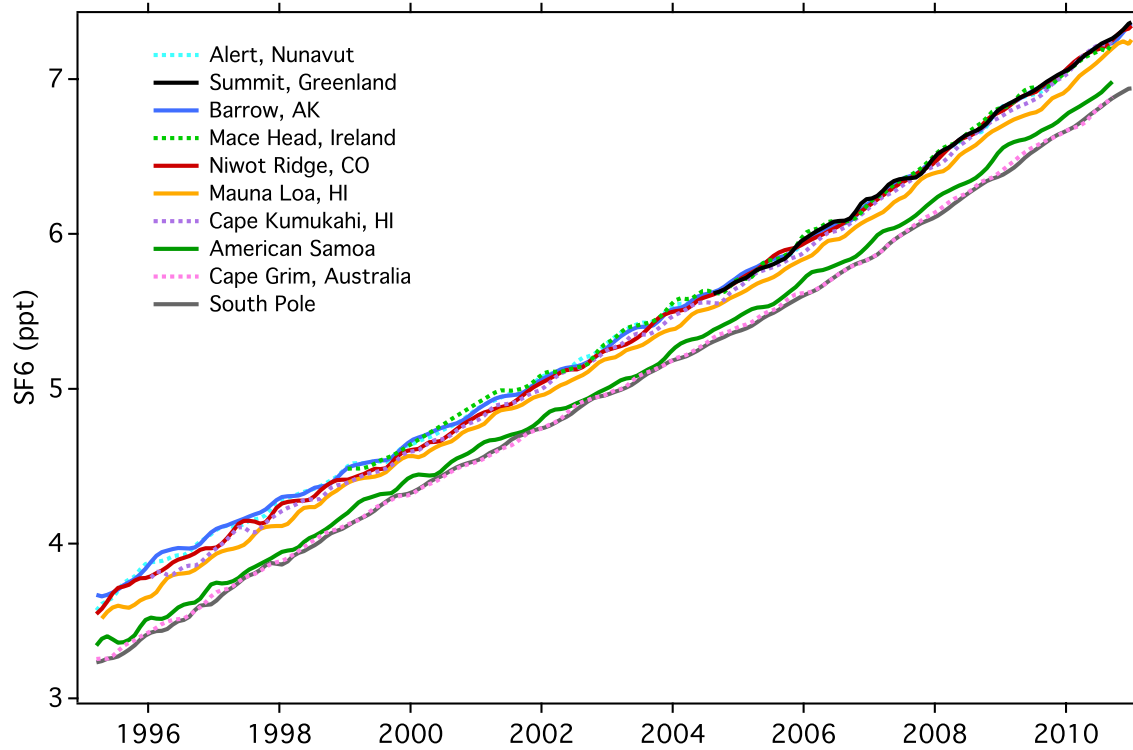


Figure S3: Frequency plot showing differences between global mean SF₆ computed from in situ and flask measurements (mean difference is -0.004 ppt, $\sigma=0.045$ ppt).

