

Trace species observations at Cape Point: Challenges and results

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At the South African station Cape Point, several efforts have been made to comply with the GAW objectives regarding instrumentation, data quality and quality assurance. We report here on two instrumental upgrades, the expansion of our flask sampling intercomparison programme with international partners as well as on analytical challenges, which took place during the period from 2009 till mid-2011. In February 2011, ANSTO (Australian Nuclear Science and Technology Organisation) installed a new ²²²Rn analyser at Cape Point, which will eventually replace the former unit, now already 12 years in operation. A preliminary comparison between the two instruments showed good overall agreement, thereby ensuring continuity between the new and the historical data series.

In June 2011 a Picarro model G2302 CRD analyser for CO₂, CO and H₂O was commissioned at Cape Point. Comparisons have been conducted between the G2302 instrument and our URAS4 NDIR CO₂ analyser as well as with the Trace Analytical RGA CO system, and the results are being discussed. The importance of H₂O correction tests is highlighted.

N₂O measurements made with an Agilent GC with micro-ECD have continuously posed many analytical challenges since its inception in mid-2007, especially relating to instrumental sensitivity and overall data uncertainty. Shortly before a WCC-N₂O audit in February 2011, only the very elementary components of the GC system were used in order to ensure easier and more elementary control of instrumental parameters. Under these very basic conditions of no backflush, no O₂ removal or makeup gas supply and bypassing the instrument's flow controllers the audit comparison results were quite acceptable as are the ambient measurements since August this year.

A flask sampling programme with NOAA GMD was initiated at the beginning of 2010. Currently the ICP data for CO₂ show agreement within a range of about 0.5 ppm. For CO an assumed scale difference of about 5 ppb has been confirmed by the comparison. For unknown reasons the CH₄ data show greater variability than anticipated.

The time series of CO₂ and CH₄ background and non-background levels will be presented with updated trend estimates (see Fig. 1 for CH₄ background). Renewed interest in non-background data has been voiced by local and regional authorities – also in view of the COP17 conference to be held in Durban in November/December 2011.

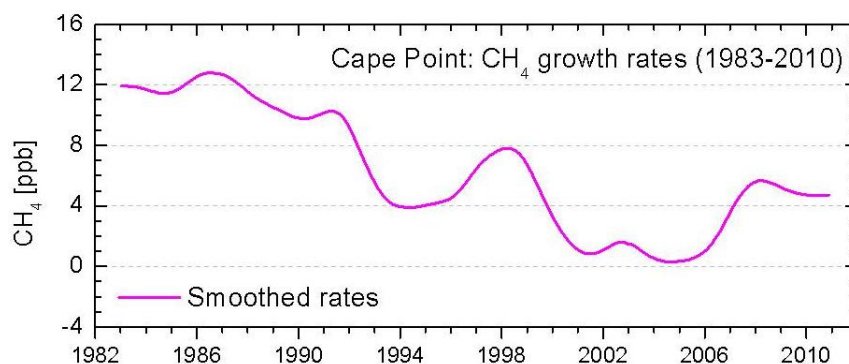


Figure 1. Cape Point CH₄ growth rates (1983-2010) for background data.