

Comparison of interferometric and mass spectrometric measurements of O₂/N₂ by the Scripps O₂ program

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Since 2001, measurements of O₂/N₂ ratio by the Scripps O₂ program have been routinely made using both the interferometric and mass spectrometric methods. At that time, the interferometric analyser system, which had been used since 1990, was augmented by incorporating an ISOPRIME mass spectrometer equipped with eight collectors ($m/z = 28, 29, 30, 32, 34, 36, 40, 44$). This mass spectrometer was plumbed in parallel with the interferometer, sharing calibration gases and allowing the standard 5L flasks used throughout the Scripps O₂ station network to be analysed for O₂/N₂ ratio on both analysers (Keeling et al., 2004). Since then, the system has been used to analyse more than 10,000 flask samples collected around the world on both analysers. The system has also been used for more than 10,000 simultaneous reference gas analyses, thus providing the most exhaustive comparison to date of two physically independent O₂/N₂ measurement methods. This presentation will discuss the details of this comparison, which provides insights into systematic errors on both systems, such as trace-gas interference, as well as insights into the intrinsic long-term stability of both analysers in relation to the calibration gas suite and the instrument span sensitivities.

Keeling, R. F., T. Blaine, B. Paplawsky, L. Katz, C. Atwood and T. Brockwell (2004). "Measurement of changes in atmospheric Ar/N₂ ratio using a rapid-switching, single-capillary mass spectrometer system." *Tellus* **56B**: 322-338.