

## Optimal dry cylinder sequencing on Picarro G2301 and G2401 CRDS instruments

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This presentation describes experiments undertaken to determine an optimal sequence to analyse dry calibration and sample cylinders on Picarro G2301 & G2401 instruments, and to determine whether extended measurements of very dry air eventually degrades the measurement precision for CO<sub>2</sub> and/or CH<sub>4</sub> in an instrument and software designed to also fit a water vapour transition line.

All our standard and calibration cylinders are dried at the point of filling. A Rix SA3 oil-free compressor is used to fill cylinders, with magnesium perchlorate used to strip water out of the gas before it enters the cylinder. This method typically results in water vapour concentrations of less than 30 ppb within our tanks. The cylinders are filled under baseline conditions at Cape Schanck on the southern coast of Australia. Any spikes required are prepared using high purity dry gases in the laboratory and inserted during the filling process.

Numerous sequences were run over a 6 month period on a single Picarro instrument. Some sequences sampled ambient undried air within the sequence, other sequences sampled only dry cylinder gas for extended periods. The sequences varied in length between 5 and 18 hours and the number of times the cylinder was accessed ranged between 3 and 16 occasions. Sample cylinders were accessed between 10 and 30 minutes each time, while the ambient air was run for 10 minute to 2 hour periods within the sequences.

Subsequent experiments ran select sequences on additional Picarro instruments, both in the laboratory and in the field.

The experiments indicate that Picarro instruments are robust regarding extended dried air sequences.