

## JD Shutler *et al.* – Supporting Information

**WebTable 1. Overview of in-situ carbon dioxide (CO<sub>2</sub>) instrumentation currently in use for observing the oceans**

<i>Instrument and deployment type</i>	<i>Features</i>	<i>Accuracy*</i>	<i>Countries operating instruments (estimated number of instruments)</i>
Infrared analyzer <sup>ψ</sup>	Equilibrator system, gas standards	< 2 μatm	Argentina, Australia, Belgium, China, France, Ireland, Germany, Japan, New Zealand, Norway, South Africa, Spain, The Netherlands, UK, US (60)
Cavity ring-down spectrophotometer <sup>ψ</sup>	Equilibrator system, gas standards	< 2 μatm	Germany, Japan (3)
Gas chromatograph <sup>ψ</sup>	Equilibrator system, gas standards	< 2 μatm	Australia, Belgium, Canada, France, Germany, Japan, The Netherlands, UK, US (0, as mainly used before 2000)
Infrared <sup>ζπ</sup>	Small equilibrator, gas standards	< 4 μatm	Australia, Iceland, South Africa, US (23)
Infrared <sup>ψ</sup>	No gas standards	4 ppm	Germany (2)
Sealed infrared <sup>ψζπ</sup>	No gas standards, permeable membrane	0.7–5 μatm	Germany, Canada (5)
Spectrometer <sup>ζ</sup>	Dye based, without gas standards, permeable membrane	0–15 μatm (or ppm)	France, Sweden, US (10, but 20 between the years 1996–2008)

**Notes:** information is for datasets from the years 2014–2017 available in version 6 of the Surface Ocean CO<sub>2</sub> Atlas ([www.socat.info](http://www.socat.info); Bakker *et al.* 2016) and selected other sources. Platform types are research vessels and ships of opportunity (<sup>ψ</sup>), drifting buoys or fixed moorings (<sup>ζ</sup>), and wave gliders (<sup>π</sup>). Accuracy (\*) is for the pCO<sub>2</sub> systems and is defined as the agreement of the CO<sub>2</sub> measurement with the accepted baseline infrared analyzer system, as described in Wanninkhof *et al.* (2013), using the common deployment modes as indicated by the symbols in superscript. Summaries of the instruments can be found at [www.ioccp.org/index.php/instruments-and-sensors#pco2](http://www.ioccp.org/index.php/instruments-and-sensors#pco2).

### WebReferences

- Bakker DCE, Pfeil B, Landa CS, *et al.* 2016. A multi-decade record of high-quality fCO<sub>2</sub> data in version 3 of the Surface Ocean CO<sub>2</sub> Atlas (SOCAT). *Earth Syst Sci Data* **8**: 383–413.
- Wanninkhof R, Bakker D, Bates N, *et al.* 2013. Incorporation of alternative sensors into the SOCAT database and adjustments to dataset quality control flags. Oak Ridge, TN: US Department of Energy, Oak Ridge National Laboratory.