



An Arduino based CO₂ sensor or, “I’m not paying for that, I’ll just build it myself”

Sarah L. Brown, Claire Goulsbra, Martin G. Evans, and Theodor Heath

University of Manchester, Manchester, United Kingdom (sarah.brown-7@postgrad.manchester.ac.uk)

Here we present the design for an Arduino based gaseous CO₂ sensor that uses ready-made components to create a bespoke device as a low cost, DIY alternative to “off-the-shelf” products. The open-source nature of the Arduino platform, as well as its relatively clear programming environment, means there is a wealth of free online resources accessible to beginners and advanced users alike. We encourage other research teams, including those unfamiliar with programming and electronics, to use and develop this straightforward design for their own research purposes.

Initial tests using the SenseAir K30 CO₂ sensor module demonstrate, after an offset regression, an error of 0.6% when compared to scientific standard equipment. This is combined with a comparably low cost per unit and independent user control over data collection and system alteration or add-ons. Geochallenges that could benefit from the use of this device and other Arduino based systems are limited only by the creativity of the user. We seek to use it to monitor gaseous carbon efflux from peatland streams, fluvial systems which are being increasingly recognised as areas of carbon transformation.