European atmospheric $^{14}CO_2$ activities within the ICOS-RI network

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Radiocarbon in atmospheric CO_2 has successfully proven to be a very powerful tracer for carbon cycle studies and for quantifying CO_2 originating from the combustion of fossil fuels. The European research infrastructure ICOS (ICOS-RI.eu) has thus selected $^{14}CO_2$ as one of the key-species to be sampled at all atmospheric ICOS class 1 stations and to be analysed at the ICOS Central Radiocarbon Laboratory. ICOS follows a two-pronged sampling strategy for $^{14}CO_2$. On the one hand, flask samples will be collected during predefined meteorological conditions; on the other hand continuous, two-weekly integrated samples will be collected to estimate long-term trends of fossil fuel CO_2 at the sites.

We present the first results of ICOS integrated $^{14}CO_2$ samples from 10 European stations, starting in 2015. These measurements provide an overview of the current $^{14}CO_2$ levels at predominantly background stations and illustrate the influence from regional fossil fuel sources at individual stations.