A Central Facility for Greenhouse Gas Analyses Within the Integrated Carbon Observation System (ICOS) Research Infrastructure

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The ICOS RI is a European research infrastructure that aims at providing long-term, high quality observational data for the study of the European greenhouse gases balance. The accuracy and compatibility of these measurements shall be supported by Central Analytical Laboratories (CALs). The CALs comprise the CRL at Heidelberg University and the FCL related to the MPI for Biogeochemistry (BGC) in Jena. The FCL will provide measurements of CO_2, CH_4, N_2O, CO, H_2, SF_6 and O_2/N_2 ratios as well as stable isotope analyses of flask air samples collected at the ICOS observatories (see Gas Chromatograph (GC)-System schematics, Fig 1). These samples will be taken using an automated air sampling system, which is currently being developed at the MPI-BGC. The second major task of the FCL is the provision of real air reference standards to the monitoring stations calibrated relative to the respective World Meteorological Organization calibration scales. These reference air mixtures can be adjusted in their tracer composition using a scrubbing and spiking system. At the CRL the majority of the ICOS radiocarbon samples will be analysed using accelerator mass spectrometry, however the CRL will in addition continue the conventional low level counting to assure a solid comparison and overlap period between these two analysis techniques. The ICOS radiocarbon sampling strategy includes network-wide two-weekly integrated samples to monitor the European long-term trends of fossil fuel CO_2. In addition, tracer and event-based flask sampling will be implemented at stations of special interest to monitor local/regional fossil fuel budgets and to ease model comparison. We will present an overview of the laboratory facilities and the first results from performance tests of the new instrumentation and comparisons with the MPI-BGC laboratories.

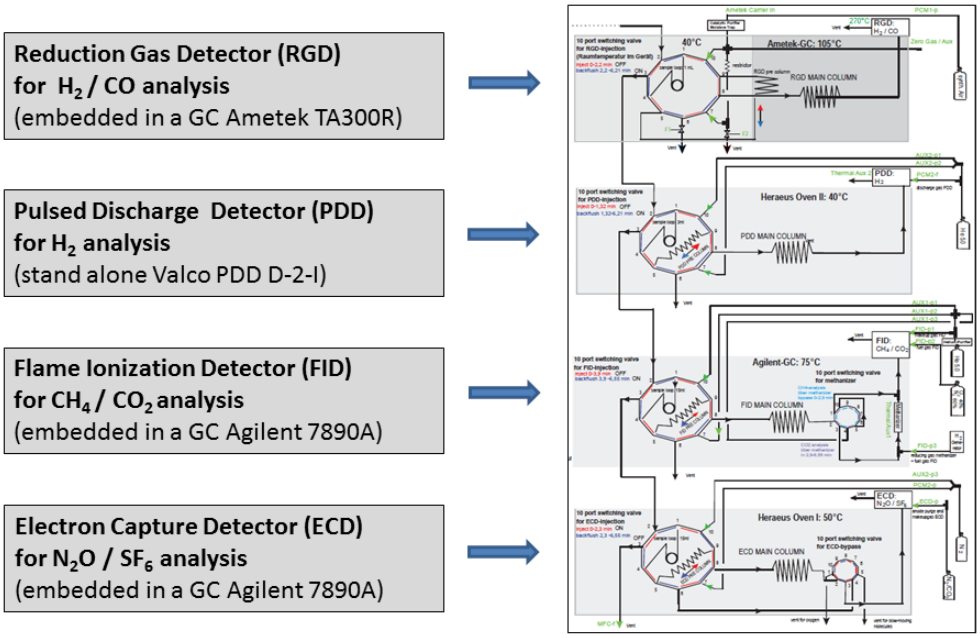

Figure 1. Setup and parallel operation of the GC trace gas analysis line.