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## Improving quantification and understanding of the global H<sub>2</sub> soil sink through field and lab based flux measurements

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An improved quantification of the soil sink of Hydrogen (H<sub>2</sub>) gas is required to understand the environmental implications of a future Hydrogen economy and global atmospheric models. Typically, soil microbes utilise H<sub>2</sub> as an energy source, but we also have evidence that emission of H<sub>2</sub> from soils is also possible via microbial processes. We present new H<sub>2</sub> flux data from several field sites and lab studies in which a variety of soils from around the world have been measured from. These sites include agricultural and forest soils from the UK where we have preliminary data of a longer-term measurement campaign. We have developed flux chamber methodology to establish a best practice for measuring H<sub>2</sub> flux in soils, which is radically different from typical greenhouse gas protocols. We present our work so far on the development of H<sub>2</sub> measurement methodology and on the characterisation of the H<sub>2</sub> soil sink in relation to soil physical & chemical properties, vegetation and climate under controlled environment conditions. We also present observations of spatial and temporal soil H<sub>2</sub> uptake rates from sites across the UK. We highlight the importance of soil aeration and the physical barriers that strongly interfere with H<sub>2</sub> uptake in soils, particularly the influence of high water-filled pore space which should be accounted for in future modelling efforts.