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Global modelling of the atmospheric hydrogen budget

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Hydrogen is a trace gas in the atmosphere that can directly influence concentrations of hydroxyl radicals and ozone in the troposphere and stratosphere. At $\sim$500 ppb, the current background hydrogen mixing ratio is more than double the estimated pre-industrial concentration, likely due to increased emissions from the fossil fuel industry and biomass burning. If there is a future switch to a global hydrogen economy, emissions from leaks during production, storage and transport of hydrogen may further increase atmospheric H_2 concentrations, with possible important implications for the atmosphere. Before future H_2 emissions can be accurately estimated in a hydrogen-based energy industry, we need to understand hydrogen in the air today. So far, only a few studies have modelled hydrogen in the atmosphere and the current H_2 budget is not well understood. Major uncertainties in the hydrogen budget include production from the atmospheric destruction of hydrocarbons and the magnitude of the soil sink. Model simulations of today's hydrogen budget have been performed using up-to-date estimates of surface fluxes with the aim of understanding and improving our knowledge of present-day hydrogen sources and sinks.