



## **Estimating pre-industrial global temperature**

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The United Nations Framework Convention on Climate Change (UNFCCC) process has recently agreed to try and limit global temperature rise to ‘well below 2°C above pre-industrial levels’. But what period is ‘pre-industrial’? Remarkably, perhaps, this is not defined within the UNFCCC or its many agreements and protocols. Neither was the term used in the IPCC’s fifth assessment report (AR5) when discussing when particular temperature levels might be reached, due to the lack of a robust definition. Here, we discuss the important factors to consider when defining a period to call pre-industrial, based on estimates of historical radiative forcings and the availability of climate observations. There is no perfect period to choose, but we suggest that 1720-1800 is the optimal choice. We also attempt to estimate the change in global temperatures since this pre-industrial period using a range of approaches based on observations, radiative forcings, global climate model simulations and proxy evidence. We discuss how such an assessment might be improved in future and conclude that 2015 was likely the first year in which global temperatures were more than 1°C above pre-industrial levels.