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## The need for clearer climate target definitions - illustrating ambiguities of net zero CO<sub>2</sub>-eq targets

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Article 4 of the Paris Agreement calls for a “balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century”. It is not made explicit if this balance should be achieved for each of the greenhouse gases (GHGs) individually or if some sum of all GHGs is supposed to become net-zero. This confusion translated into several declared climate targets, that range from carbon-neutral, over GHG-neutral to climate-neutral, and sometimes use these terms interchangeably. However, these targets imply different trajectories in terms of single GHG emissions and result in vastly different temperature trajectories.

Here, we show the implications of this confusion concerning declared climate target metrics, using the most commonly used metric of CO<sub>2</sub>-equivalent emissions. The same trajectory of net-zero-2050 CO<sub>2</sub>-equivalent emissions, shows vast differences in short term and long-term temperature and carbon cycle responses, depending on the distribution of CO<sub>2</sub>-equivalent emissions across the different GHGs.

We emphasize that achieving net zero CO<sub>2</sub> emissions remains a necessary precondition for long-term temperature stabilization. We also show that methane emissions reduction can have large short term benefits, as it would strongly reduce the short term temperature and thereby increase the natural carbon uptake. Going forward we recommend to aim for more transparency in declared climate goals and suggest aiming to achieve net zero anthropogenic emissions for all GHGs individually.