



## **Equilibrium Global Warming Potential and temperature changes calculated by radiative convective model**

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The Global Warming Potentials (GWPs) is widely used for comparison the calculation of other greenhouse gases warming 'equivalent' related to carbon dioxide effect for different time horizons. The classical GWP for any greenhouse gas is the ratio of the cumulative, globally-averaged radiative forcing over a specified time horizon produced by a unit-mass emissions impulse of that gas to that due to a unit-mass impulse of carbon dioxide.

During last decade many investigations are shown, that classical GWPs for CH<sub>4</sub> and other minor GHGs are accurate only for short time horizons. The question of what component of climate change should be used for the comparison is still open. What it is: GHGs emission or concentration, radiative forcing or temperature changes?

One of the alternative ideas is to use equilibrium temperature changes instead radiative forcing. Very practical tool for the different greenhouse gases warming 'equivalent' estimation is radiative-convective climate model (RCM) with line-by-line solar and thermal radiation fluxes calculation.

The demonstration version of such RCM was developed and used for estimation of global surface temperature changes in the case of multiple times raising of CO<sub>2</sub> and CH<sub>4</sub> atmospheric amount. Equilibrium global warming potential for CH<sub>4</sub> defined as equilibrium global warming due to same amount of CO<sub>2</sub> and CH<sub>4</sub> addition to the atmosphere is calculated by RCM. The result is very similar to 20 years GWP for CH<sub>4</sub> and far from long-term methane GWP.

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