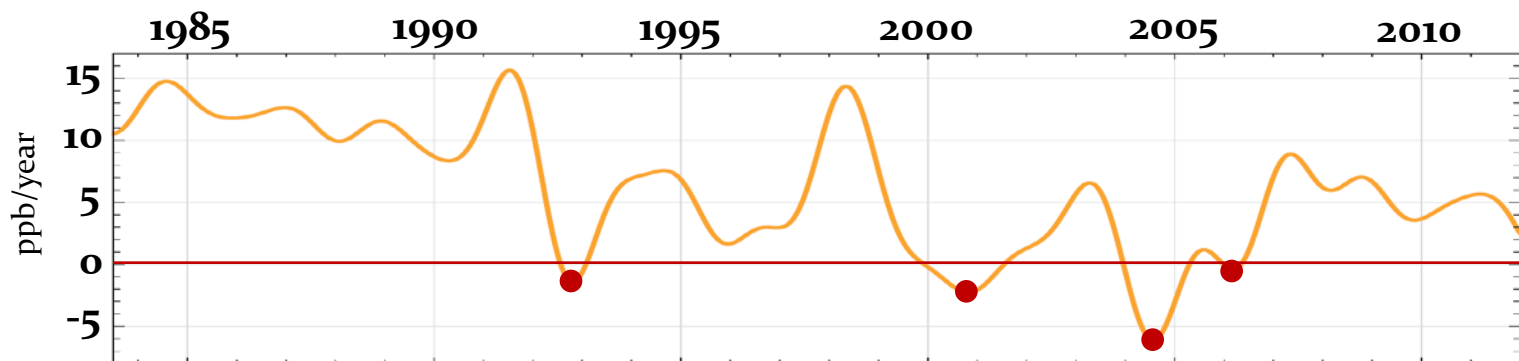


DYNAMICS OF METHANE CONCENTRATION INCREASE/DECREASE IN THE ATMOSPHERE



Rates of methane concentration changes in the atmosphere

~ 678 (542-852)
Mt

total methane emissions into the atmosphere (average 2000-2009)

Including:

natural



~ 347 (238-484) Mt

anthropogenic



~ 331 (304-368) Mt

~ 5,000
Mt

total methane in the Earth's atmosphere

~ 632 (592-785)
Mt

methane removal from the atmosphere (average 2000-2009)

Removal mechanisms:

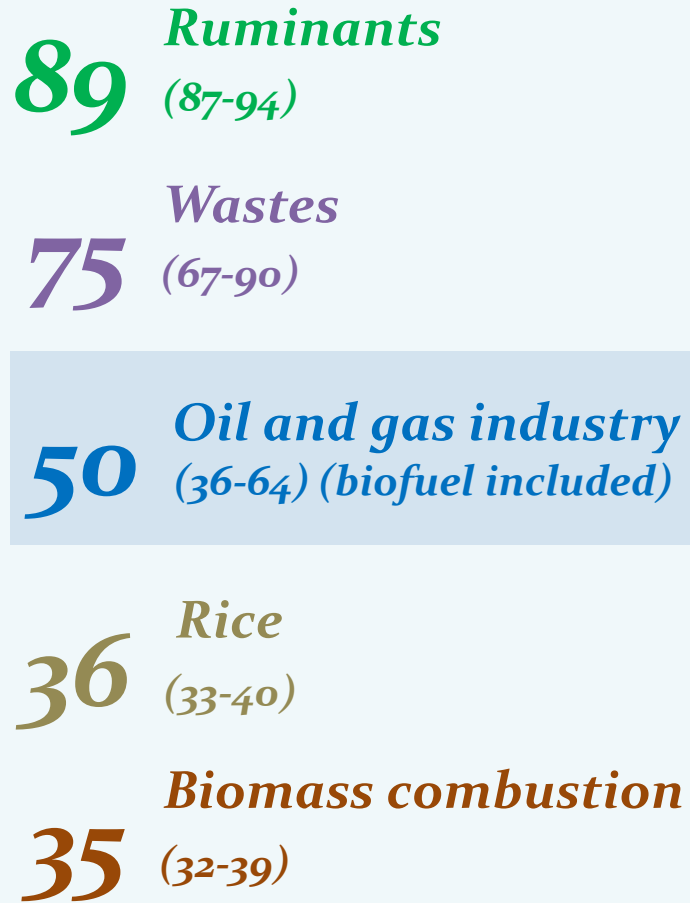
- OH hydroxyl radical (tropospheric, stratospheric),
- tropospheric Cl,
- oxidation in soils.

Source:
5th Assessment Report of the Intergovernmental Panel on Climate Change, 2013

NATURAL METHANE EMISSIONS

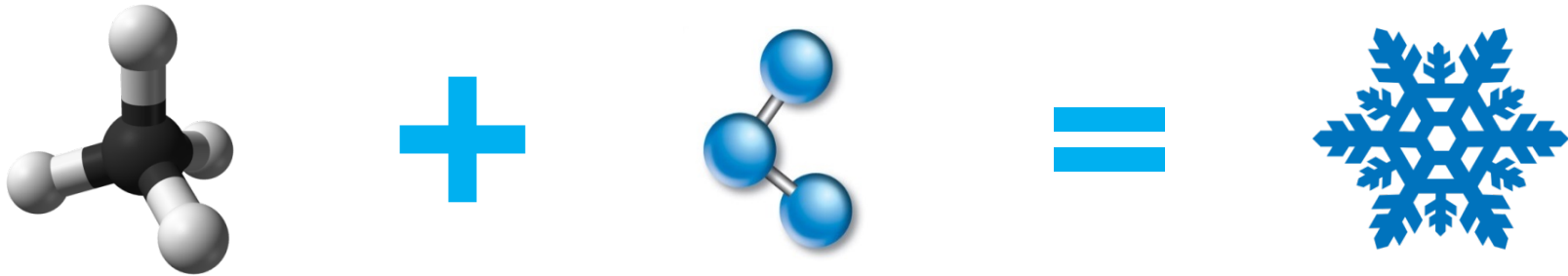


ANTHROPOGENIC METHANE EMISSIONS



Source: 4th and 5th Assessment Reports of the Intergovernmental Panel on Climate Change, 2007, 2013

* Range of estimations



“Controls on anthropogenic emissions of methane to lower surface ozone have been identified as ‘win–win’ situations, referring to both global **cooling and **warming**”**

Source: 5th Assessment Report of the Intergovernmental Panel on Climate Change, 2013

Various metrics can be used to compare the contributions to climate change of emissions of different substances. No single metric can accurately compare all consequences of different emissions, and all have limitations and uncertainties.

Global Warming Potential GWP

on the cumulative radiative forcing over a particular time horizon

Up to 4th IPCC report, the most common metric has been the Global Warming Potential (GWP)

The uncertainty in the GWP increases with time horizon, and for the 100-year GWP of well-mixed greenhouse gases

the uncertainty can be as large as $\pm 40\%$

based on

Global Temperature change Potential GTP

the change in global mean surface temperature at a chosen point in time

There is now increasing focus on the Global Temperature change Potential, which is based on the change in global mean surface temperature at a chosen point in time, again relative to that caused by the reference gas CO₂, and thus accounts for climate response along with radiative efficiencies and atmospheric lifetimes

Source: 5th Assessment Report of the Intergovernmental Panel on Climate Change, 2013

Global Warming Potential VS Global Temperature change Potential of methane

