Contribution of anthropogenic and natural sources to atmospheric methane variability

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The methane (CH4) is one of the main greenhouse gas in the Earth atmosphere. An international team of researchers (with a participation of Paris Observatory) publishes a study on the variability of the methane abundance over the last 20 years. The growth rate of CH4 has slowed down during this period. This reduction of the growth rate is explained by a reduction of anthropogenic emissions, and since 1999 by a reduction of wetlands.

The atmospheric methane (CH4), an important greenhouse gas that has contributed to about 20% of the total warming over the last century. The atmospheric CH4 shows strong annual variations and a slowing down of its average growth rate has been observed over the last 15 years.

The concentration of methane has been measured in situ in 68 sites by different instruments (the NOAA, National Oceanic and Atmospheric Administration's, providing 75% of the measurements). The research team has carried out an inversion on 20 yrs of atmospheric in situ measurements of CH4 and its isotope 13CH4 to deduce variations of CH4 emissions over the 1984-2003 period. Variations in CH4 emissions are dominated by wetlands, whereas biomass-burning fluctuations play a smaller rôle, except during the 1997-1998 El Niño event.

The inverted anomalies in both wetland and biomass burning emissions are in good agreement with independent estimates based on remote sensing information and surface models. The stalled atmospheric CH4 growth rate observed after 1992 is explained by a decline of anthropogenic emissions throughout the 1990s. In the most recent years, anthropogenic emissions have risen up, especially in North Asia, but their impact was hidden by a coincident decrease in wetland emissions. These results suggest that atmospheric CH4 may increase again in the near future.

Reference


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