

HYMN

AT A GLANCE

Title: Hydrogen, Methane and Nitrous oxide: Trend variability, budgets and interactions with the biosphere

Instrument: Specific Targeted Research Project, FP6

Total Cost: 2.325.711 €

EC Contribution: 1.772.993 €

Duration: 40 months

Start Date: 01/09/2006

Consortium: 13 partners from 7 countries

Project Coordinator: Royal Netherlands Meteorological Institute (NL)

Project Web Site: www.knmi.nl/samenw/hymn

Key Words: Greenhouse gases, Emissions, Trends, Biosphere, Atmosphere

THE CHALLENGE

Global human activities cause increases of the atmospheric concentrations of several long-lived greenhouse gases, including methane (CH₄) and nitrous oxide (N₂O). The possible future transition to a 'hydrogen economy' is expected to lead to increases in atmospheric molecular hydrogen (H₂) and reductions of fossil fuel burning emissions with consequent changes in ozone (O₃) and CH₄. In order to find optimal abatement strategies for CH₄ and N₂O, more knowledge is needed about their sources and sinks, the causes of trends and variability, and the feedbacks involving land-biosphere processes. For instance the current inter-annual variations in CH₄ are badly understood.

PROJECT OBJECTIVES

- 1) Improve the process modelling of the land-biosphere-atmosphere exchange of the HYMN gases (H₂, CH₄, N₂O) and to provide estimates of sources and sinks
- 2) Contribute to global monitoring by providing multi-year global satellite data sets of CH₄ and CO distributions and long-term time series of CH₄ and N₂O at multiple stations
- 3) Provide advice on optimization of monitoring networks
- 4) Quantify atmospheric loss of CH₄ and H₂ and the impact of changing anthropogenic and natural emissions on OH trends and on current and future CH₄ and H₂ levels
- 5) Quantify how the possible future change to a hydrogen economy will affect H₂, CH₄ and O₃
- 6) Evaluate simulations with a coupled atmospheric chemistry-biosphere model for CH₄, N₂O and H₂ by comparison to ground based and satellite observations
- 7) Make new estimates of the sources and sinks of CH₄ and H₂, including their temporal and spatial variability.



