

The Atmosphere in the Earth System: Research in the Anthropocene

By Paul J Crutzen,
Max-Planck-Institute for Chemistry, Mainz, Germany and Scripps Institution of
Oceanography, La Jolla, California

Abstract:

Despite their relatively small mass, 10^{-5} of the earth biosphere as a whole, generations of ambitious 'homo sapiens' have already played a major and increasing role in changing basic properties of the atmosphere and the earth's surface. Human activities accelerated in particular over the past few hundred years, creating a new geological era, the 'Anthropocene', as already foreseen by Vernadsky in 1928: "...the direction in which the processes of evolution must proceed, namely towards increasing consciousness and thought, and forms having greater and greater influence on their surroundings."

Vernadsky's predictions were more than fulfilled. Human activities are affecting, and in many cases out-competing, natural processes, for instance causing the "ozone hole", the rise of the greenhouse gases with their impact on climate, urban and regional air pollution, 'acid rain', with all their consequences for human and ecosystem health. These problems also increasingly are affecting the poor nations of the world. Despite the tremendous progress that has been made since the start of the IGBP and other global change programs, much remains to be done. Some of the most urgent research needs, which must be taken up are outlined in this presentation.