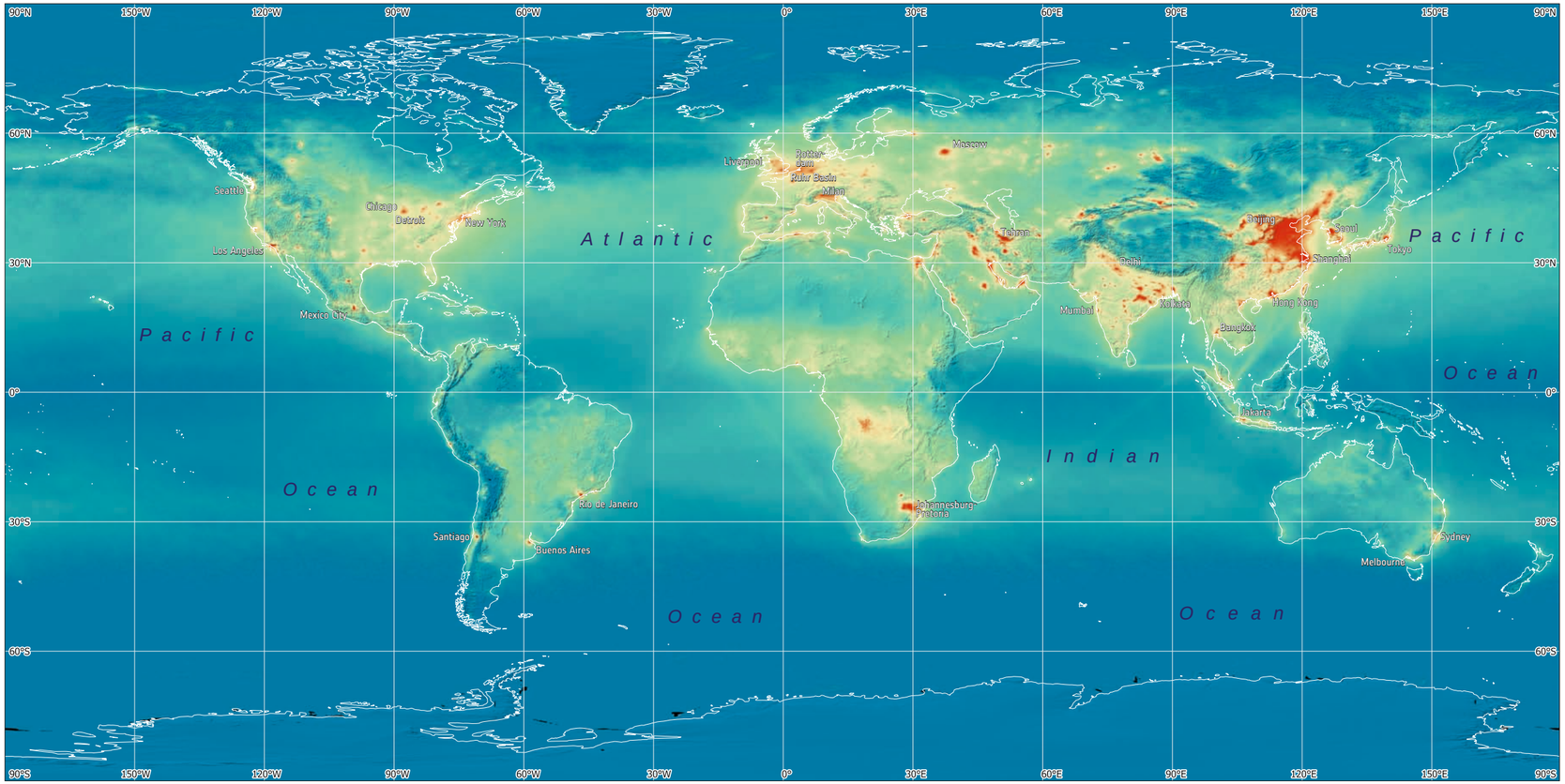
ATMOSPHERE



Nitrogen dioxide (NO_2) in µmol / m^2

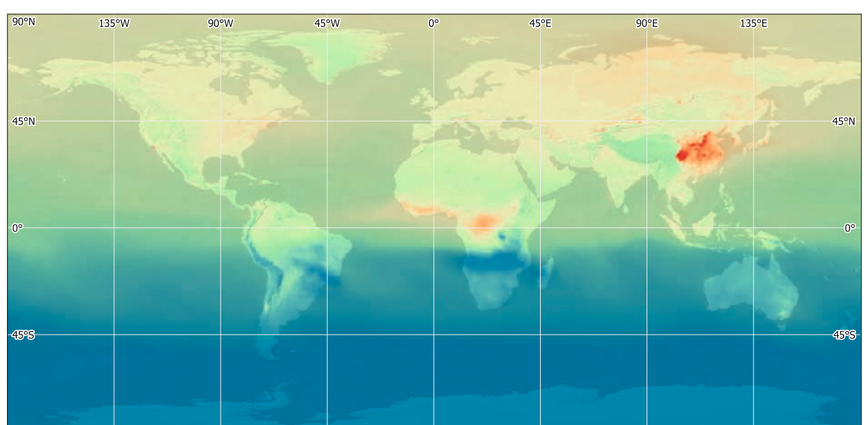
200 100 50 20 10 0

1. Global map of nitrogen dioxide (NO_2). distribution. NO_2 is produced by high-temperature combustion processes in industry and traffic and reflects the industrial activity of a region. Data: Sentinel-5P.

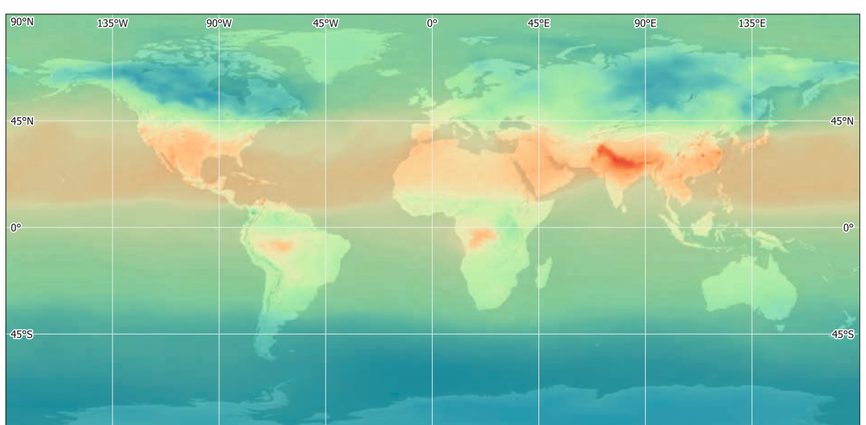
Components of the Atmosphere

The atmosphere consists mainly of nitrogen (N_2, 78.08%), oxygen (O_2, 20.95%), and argon (Ar, 0.93%). The remaining 0.04% are made of the so-called trace gases, which despite their small concentrations play important roles in the atmosphere. Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are important greenhouse gases contributing to global warming. During the last decades especially CO_2 has gained awareness, as its concentration has increased from 320 ppm (parts per million) in the 1960s to 420 ppm in 2023.

Ozone (O_3) plays an important role in the stratosphere. It acts as a filter for the solar ultraviolet (UV) radiation, which can destroy biomolecules. The antarctic ozone hole, an O_3-deficit occurring every year around October, was intensified by the man-made trace gas CFC (chlorofluorocarbon).



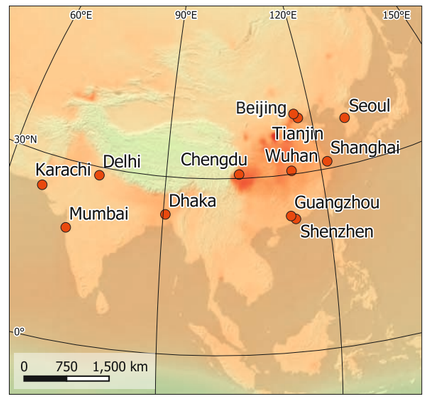
2. Global map of carbon dioxide (CO_2) distribution in January 2020.



3. Global map of carbon dioxide (CO_2) distribution in July 2020.

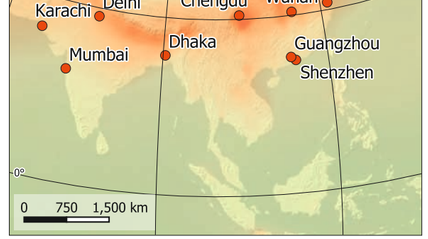
Carbon Dioxide (CO_2) Concentration [ppm]

<408 410 412 414 416 418 420<



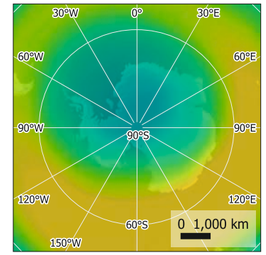
Methane (CH_4) Concentration [ppb]

<1,700 1,750 1,800 1,850 1,900 1,950 2,000<

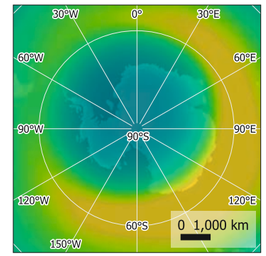


4. Seasonal variation of the methane (CH_4) concentration in south-east Asia, January 2020 (top) and July 2020 (bottom). Rice cultivation is one of the most important sources of CH_4.

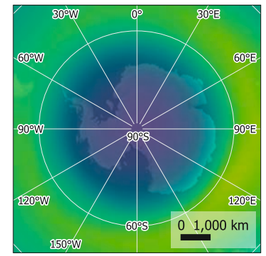
5. Development of the Antarctic ozone hole since 1970.



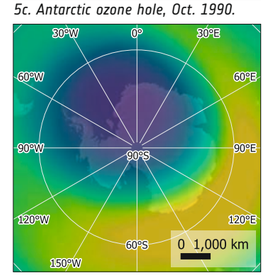
5a. Antarctic ozone hole, Oct. 1970.



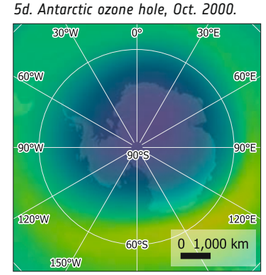
5b. Antarctic ozone hole, Oct. 1980.



5c. Antarctic ozone hole, Oct. 1990.



5d. Antarctic ozone hole, Oct. 2000.



5e. Antarctic ozone hole, Oct. 2010.

Ozone Concentration Total Column [Dobson units]

<100 200 300 400<