8. Global warming and air pollution

In the past = equilibrium (balance) in the relation man-nature. But since the beginning of industrial revolution = *global violation of that balance* => e.g. declining biodiversity, global climate change <=> increasing

- industrial production (air, water, soil, forests)
- transport (air, soil, seas)
- agriculture (water, soil, flora)
- other activities (exploitation of raw materials, tourism, scrap heaps, …)
    - ⇨ ambitions to find solutions: 1992 – conference in Rio de Janeiro (sustainable development)

Acid rain

= *acid deposition* = increased acidity of rainfall. SO_2 (sulphur dioxide) and NO_x (oxides of nitrogen/nitric oxides) react with sunlight and ozone to produce acid deposition.

- **What are major causes of acid rain?**
    - Sulphur dioxide and oxides of nitrogen produced by burning of fossil fuels (coal, oil, gas).

Major producers of **SO_2** = coal-fired power station/plant **$SO_2 + H_2O \longrightarrow H_2SO_4$** (sulphuric acid)
Major producers of **NO_x** = vehicles (cars)
Consequences:

- buildings are weathered
- aluminium damages fish gill
- forest growth is severely affected
- soil acidity increases
- potential links with the rise of senile dementia

Transmission of SO_2 to a large distances (e.g. Upper-Silesian basin vs. NW Slovakia or UK vs. N+S => international problem)
Most endangered areas in the world = NE USA, W EU (Netherlands, Denmark, Germany, Sweden), Japan <=> **dense populated urban areas**

- **Do You think that all the oxygen could be used by burning all the fossil fuels?**
    - No, for oxidation of all fossil fuels would be needed only 2% of total quantity of O_2.

BUT *concentration of* ***CO_2*** *would increase* ***10x*** *more than normal level…*

Global warming

CO_2 is formed by oxidation of *hydrocarbons*. In last 100 yrs. growth in *10%*.
Greenhouse effect description: UV radiation from the space is passing directly through greenhouse gases (CO_2, methane, CFC) to the Earth´s surface and part of it is reflected back towards the space. But UV radiation is avoided to go back (to the space) by greenhouse gases => greenhouse effect is the process by which certain gases absorb outgoing long-wave radiation from the Earth and return some of it back to Earth.
Consequences: e.g. ascending sea level, glaciers melting => 2 possible tendencies of global climate change:

1. *warming*
2. *more snowfall* (more snowy precipitation)
    - ⇨ *incertitude*

Keywords:
equilibrium, global climate change, acid deposition, sulphur dioxide, nitric oxides, sulphuric acid, soil acidity, hydrocarbons, greenhouse effect, UV radiation, greenhouse gases, glacier melting, global climate change