# How to study the carbon dioxide cycle in secondary schools

Marc Jamous
marc.jamous@ipsl.jussieu.fr

# Study the carbon dioxide cycle in secondary schools

Carbon is one of the most common element in the living-world.

$CO_2$ is the second major greenhouse gas, after water.

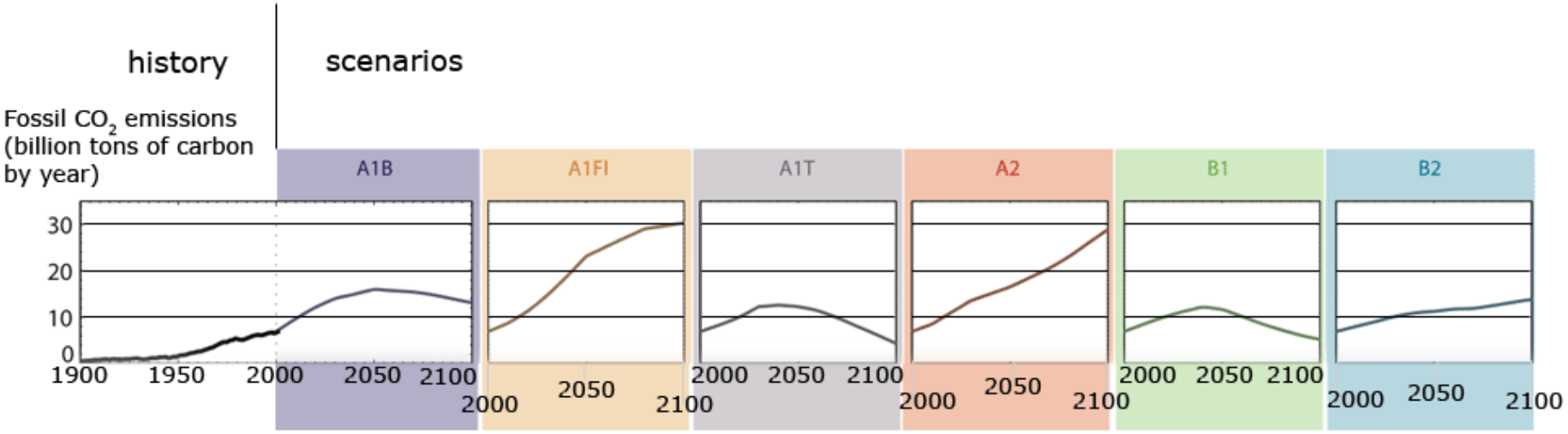
Photosynthesis is at the beginning of every food chain.

**Study of carbon cycle interests all disciplines in secondary schools.**

# Let’s begin with few calculations!

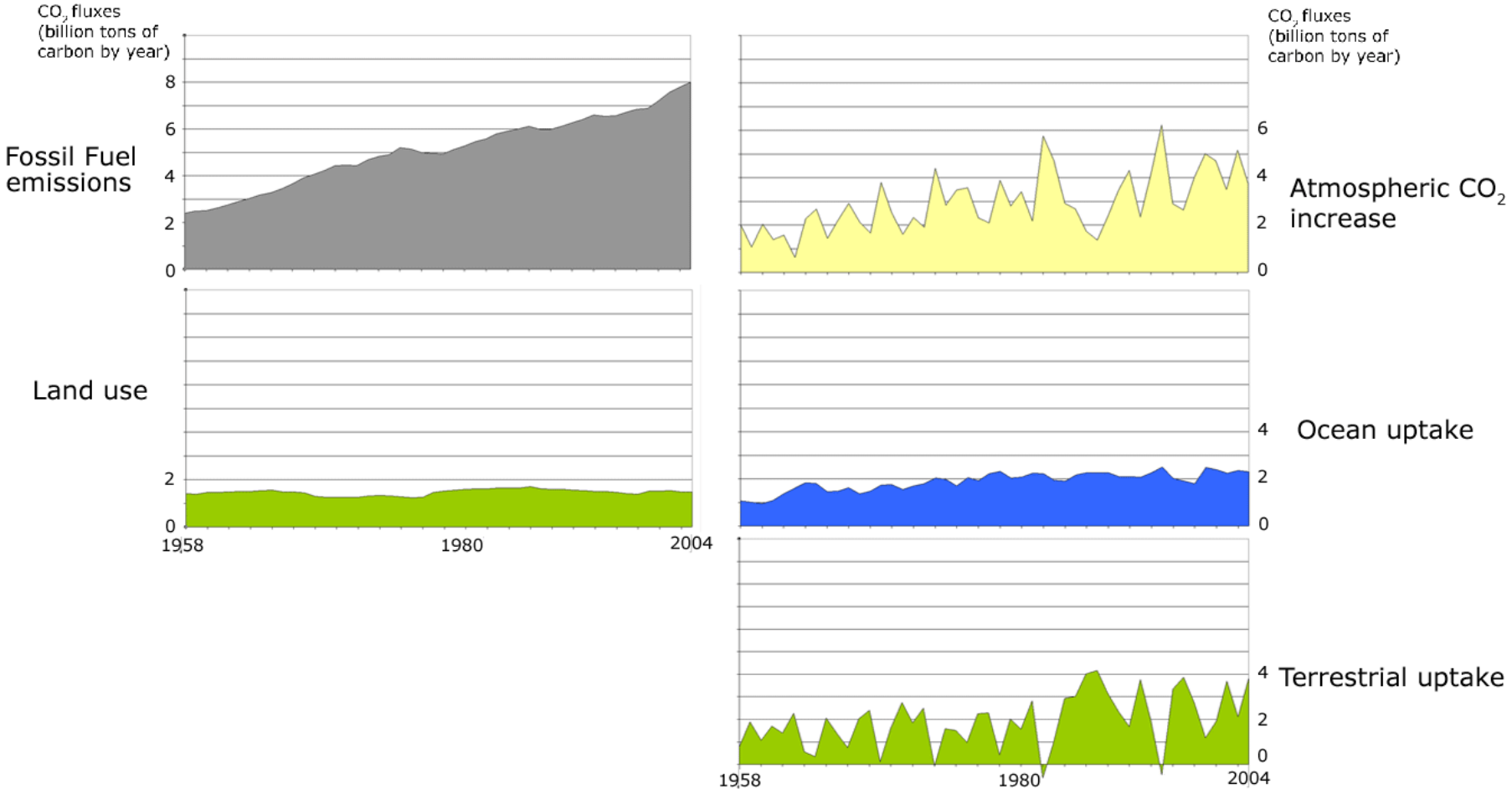
# Study the carbon dioxide cycle in secondary schools

## Fossil $CO_2$ emissions for six emission scenarios

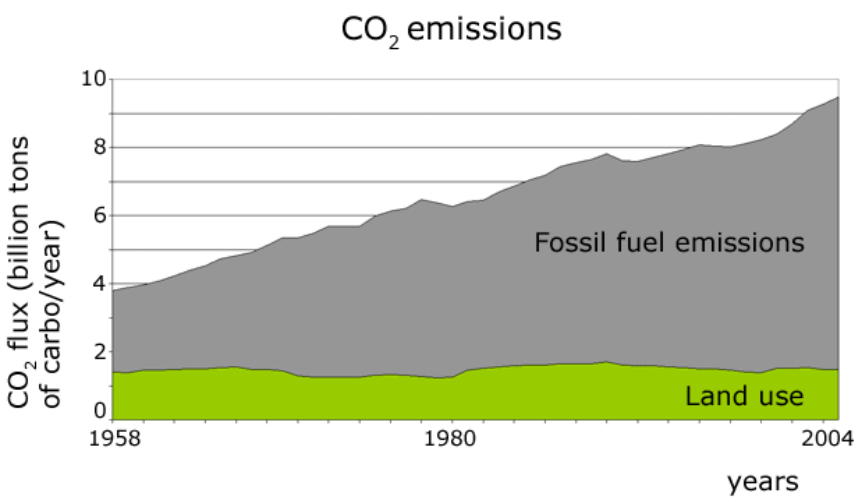


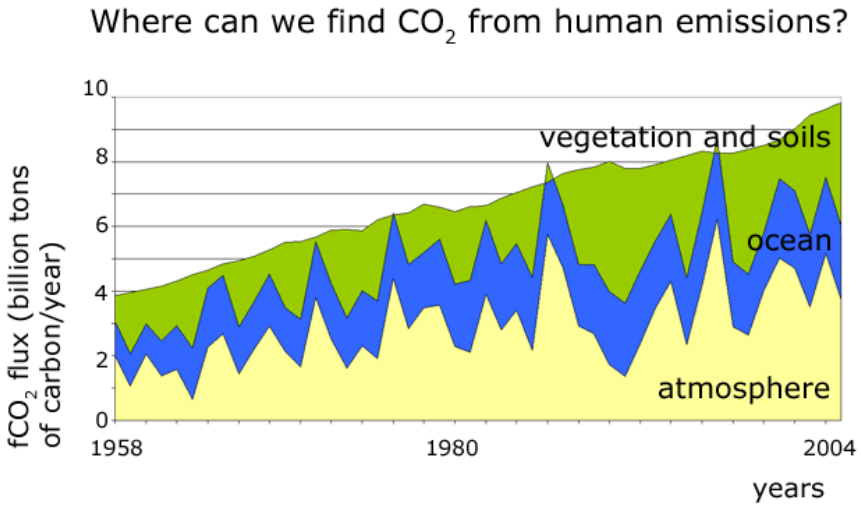

Sources: IPCC working group I, chapter 10, Figure 10.26

# Global carbon budget

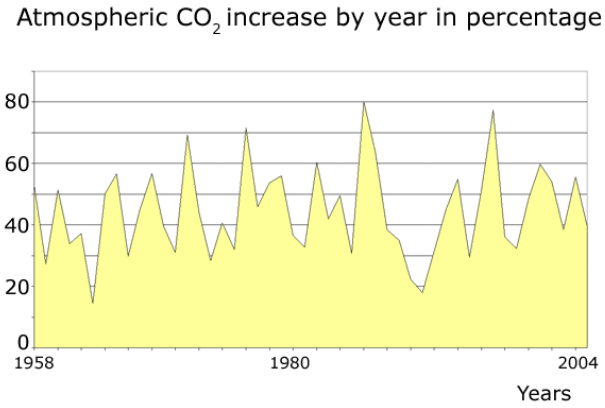


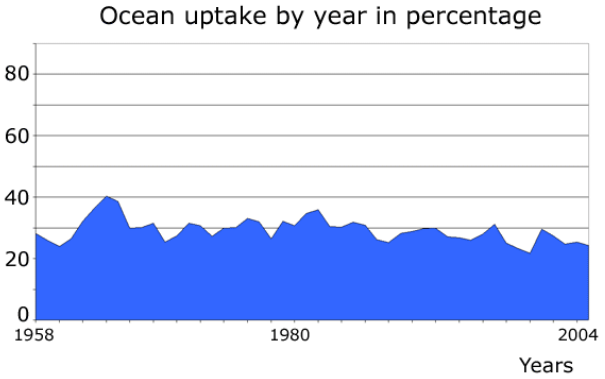
# Global carbon budget

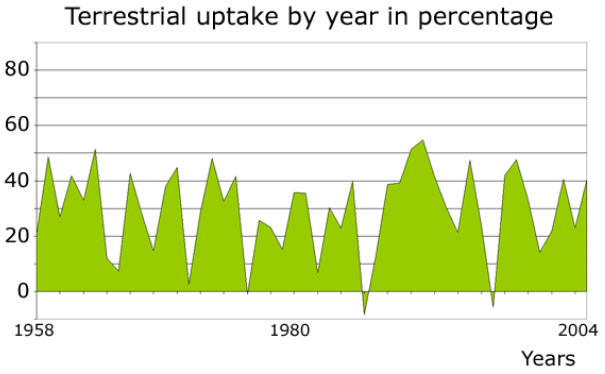


# Global carbon budget: relative part of sinks



# What will you do these three days?

- Working in groups
- With a $CO_2$ sensor and plants
- This afternoon:
  - Tests of your materials
  - Writing protocols
  - Beginning of experimentations
- Tomorrow afternoon:
  - Experimentations
- Wednesday morning:
  - Results, explanations, comments (plenary session)

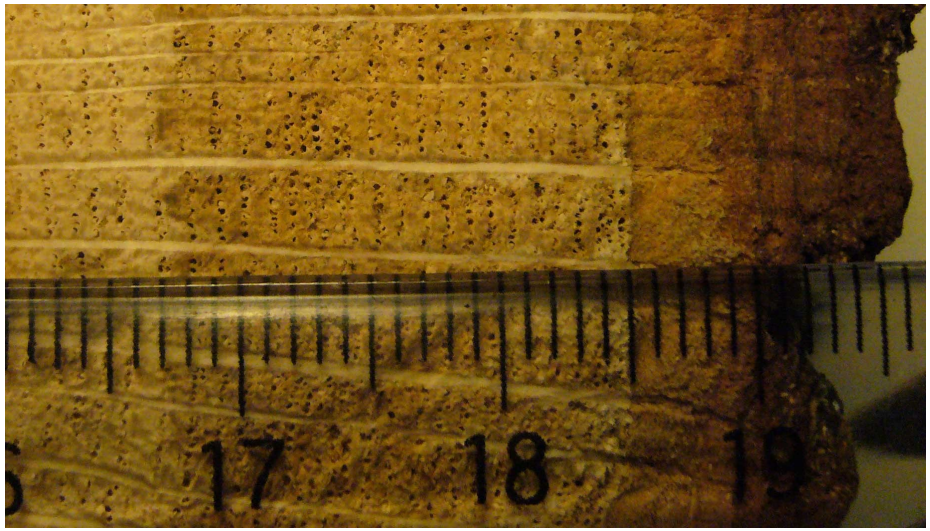
# Subjects of thinking:

- How will vegetation react to a raise of temperature or atmospheric $CO_2$?
- Where are $CO_2$ sources and sinks?
- How does atmospheric $CO_2$ vary during one year, one day?
- Is the carbon cycle similar in North hemisphere and South hemisphere?

# Other ways of work

(to discuss after the meeting or during breaks):

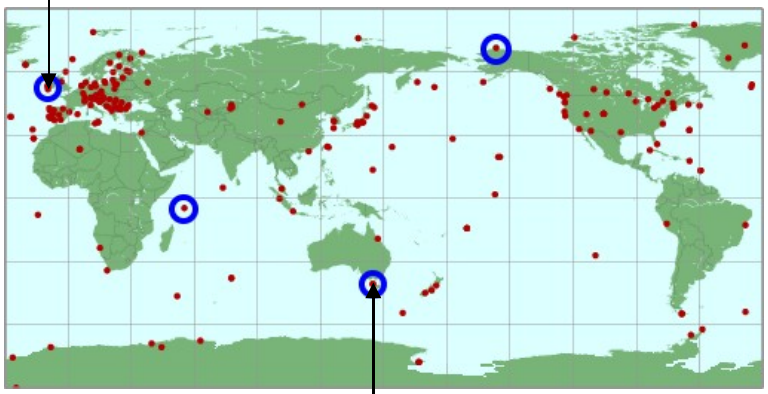
- Study of carbon exchanges between atmosphere and ocean
- Indirect indicators of carbon cycle: trees, ice core

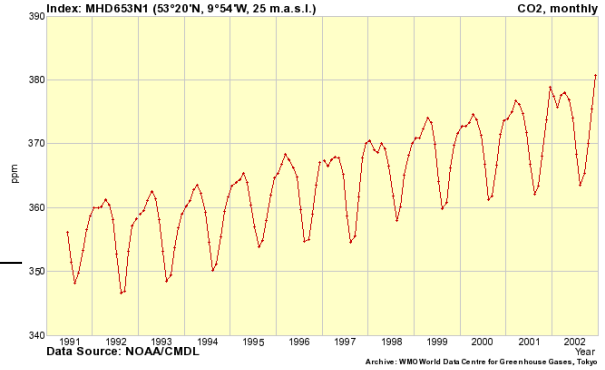


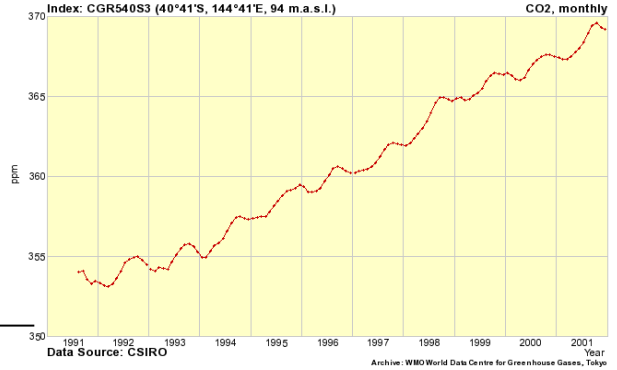
# Other ways of work (2)

(to discuss after the meeting or during breaks):

- Data online:
  - o Stations of measure






  - o Relationship between past atmospheric $CO_2$ and temperature
  - o Relationship between recent atmospheric $CO_2$ and temperature
- Scientific articles

And now:

it's up to you!

Good luck!