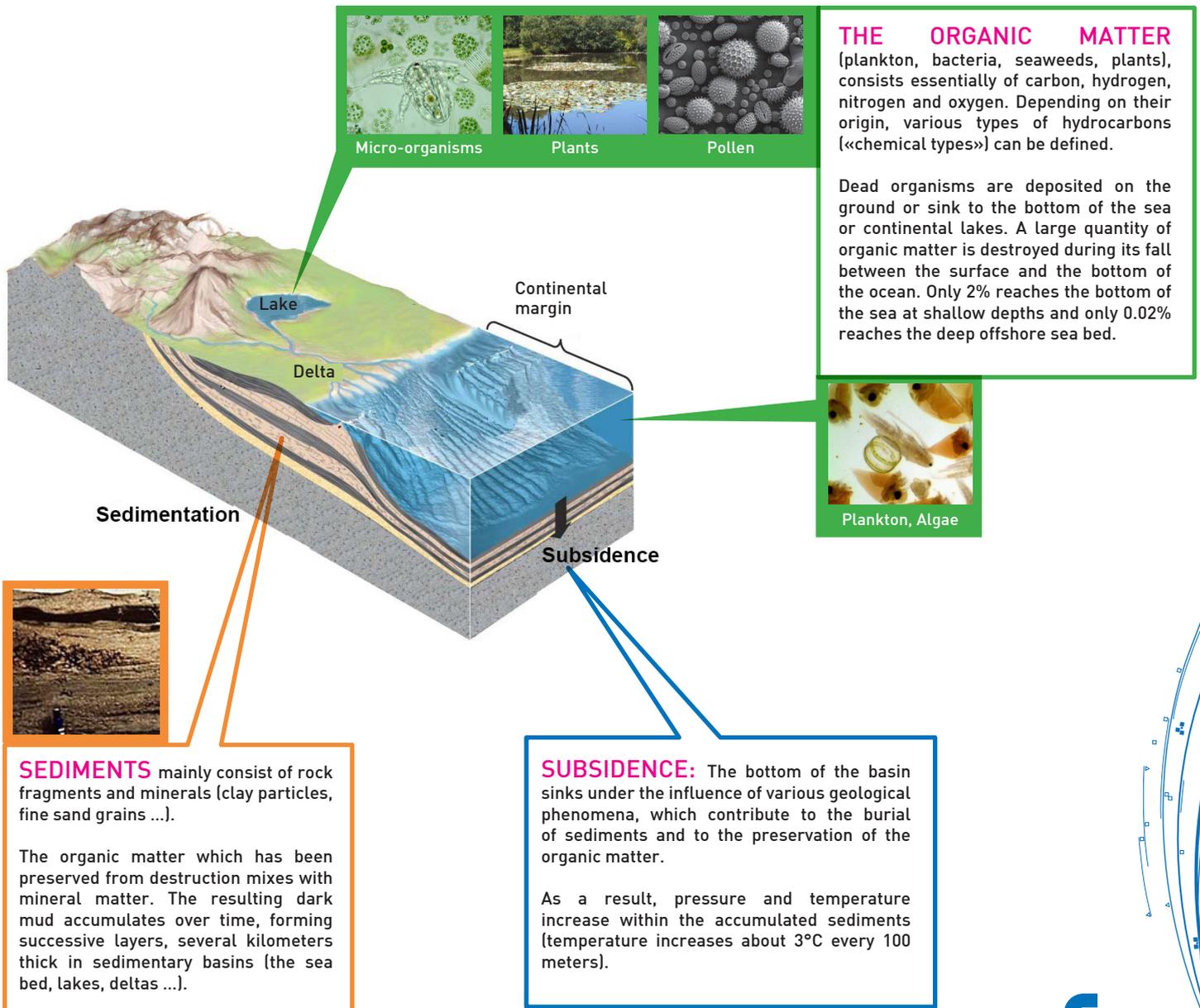




## Where does petroleum come from?

**O**il (liquid hydrocarbon) and natural gas are fossil fuels, which come from the decomposition of **organic matter** present in various concentrations in **sediments**. The progressive burial of sediments (**subsidence** of several kilometers) means the organic matter is slowly transformed over millions of years.



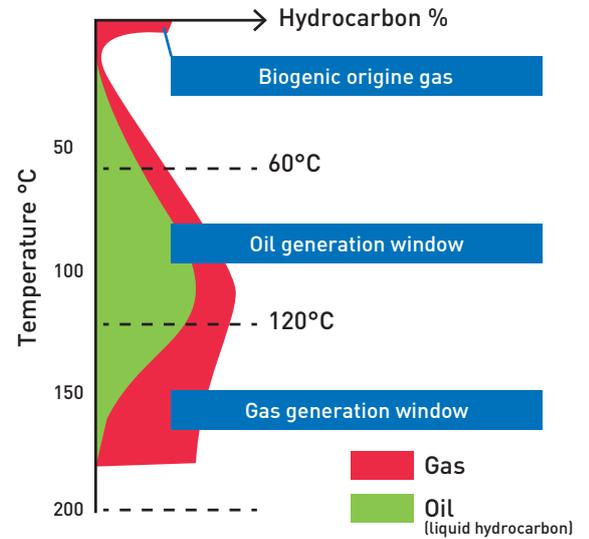
# The petroleum system

- a source rock, which generates the hydrocarbons,
- a porous and permeable reservoir rock, which hosts hydrocarbons after migration,
- a non-permeable cap rock, the seal, which will prevent the hydrocarbons from leaking out of the trap.

## SOURCE ROCK AND HYDROCARBON GENERATION

A fine-grained sedimentary rock containing at least 1 to 2% of organic matter can play the role of a **source rock**.

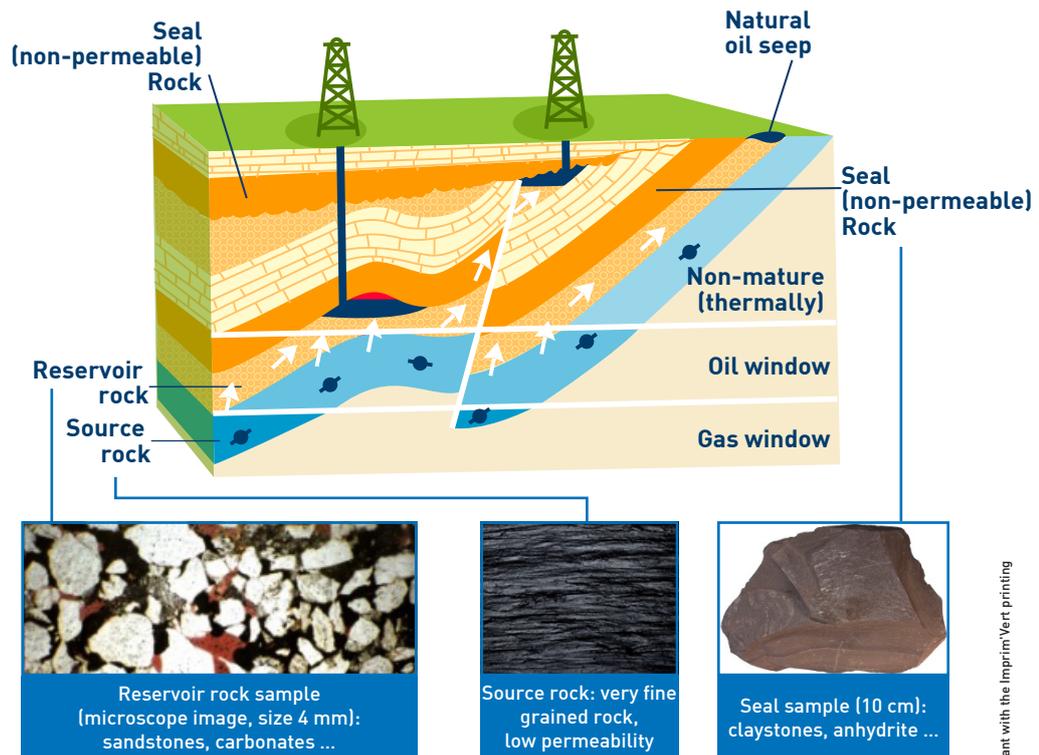
Under the influence of temperature and pressure, the organic matter contained in the source rock is gradually converted into kerogen, which is distributed throughout the rock as small particles. The kerogen starts to mature at temperatures of 60 to 100°C (at depths below 2000m). The increasing temperature and pressure, as burial depth increases, breaks and reorganizes molecules. The kerogen starts to generate hydrocarbons: oil first (oil window) and gas at higher temperatures and pressures (gas window).



## EXPULSION, MIGRATION AND TRAPS

The maturation process causes pressure build-up in the source rock. When this pressure exceeds the pressure of adjacent layers, oil or gas is **expelled** to a porous and permeable rock which allows fluids to flow through it. This is called the reservoir rock (usually 5 to 30% porosity). Hydrocarbons are lighter than the water contained in the rock. They **migrate** upward through the porous and permeable rocks, or along faults.

Hydrocarbons can migrate in the reservoir over distances ranging from a few meters to several hundred kilometers, until they accumulate in a trap covered with a non-permeable layer (the seal). In the trap, hydrocarbons are separated according to their density.



## HYDROCARBON GENERATION: A SUMMARY



### For more information:

IFP School  
228-232, avenue Napoléon Bonaparte  
92852 Rueil-Malmaison Cedex  
Tél. : 01 47 52 59 22  
Fax : 01 47 52 67 65  
[www.ifp-school.com](http://www.ifp-school.com)

### + Useful link:

[www.ifpenergiesnouvelles.fr/espace-decouverte/les-cles-pour-comprendre/les-sources-d-energie/le-petrole](http://www.ifpenergiesnouvelles.fr/espace-decouverte/les-cles-pour-comprendre/les-sources-d-energie/le-petrole)

