

Radioisotopes of significance to environmental radioactivity

¹⁴C

Carbon

Element classification: not classified
No. of isotopes: 15 (¹²C and ¹³C stables)
Typical elemental concentrations:
 Soil: 2 to > 30 kg OC/m²
 Seawater: ca 30 mg DIC/L
 Freshwater: 1-3 mg DOC/L



Behaviour in the Environment

- ◆ Two main chemical forms: mineral (¹⁴CO₂), organic (¹⁴CH₄)
- ◆ Follows the carbon cycle
- ◆ Isotopic equilibrium (¹²C/¹⁴C) achieved in terrestrial environment
- ◆ Involved in pH control *via* the carbonate system in freshwater
- ◆ Exchanges governed by photosynthesis and animal feeding

Carbon-14

radioecology

Key sources

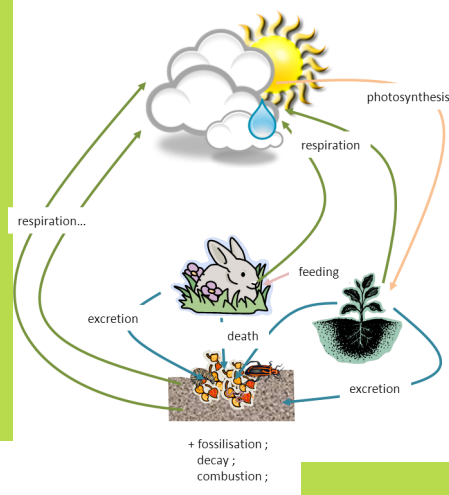
- ◆ **Nuclear cycle:** Nuclear power plants, reprocessing, waste
- ◆ **Fallout:** Nuclear weapons testing
- ◆ **Others :** medical and research applications
- ◆ **Natural sources:** reactions of cosmic rays with atmospheric nitrogen

For more information ...

[IRSN ¹⁴C factsheet](#)

[ANL ¹⁴C factsheet](#)

[Remediation](#)



Why is it of interest?

- ◆ Element essential to life
- ◆ Naturally transferred to any biological tissues
- ◆ Potential for incorporation in cellular components (DNA)
- ◆ Major component of gaseous and liquid releases with ³H