

Radioisotopes of
significance to
environmental
radioactivity

^3H

Hydrogen

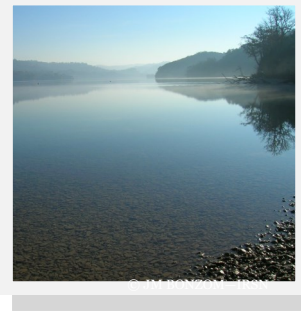
Element classification: not classified

No. of isotopes: 7 (^1H and ^2H stable)

Typical elemental concentrations:

Soil (dry): not relevant

Seawater: about 100 g/L



Behavior in the Environment

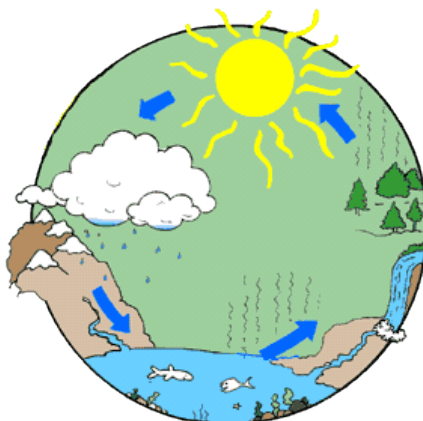
- ◆ Three chemical forms: tritiated water (HTO), gaseous tritium (HT), organically bound tritium (OBT)
- ◆ HTO follows the water fluxes and biogeochemically cycle
- ◆ Easy atmosphere-water exchanges (evaporation, fog, etc.)
- ◆ HTO very easily absorbed by plants and animals
- ◆ Equilibrium quickly achieved in aquatic environment (HTO)
- ◆ HTO does not bioconcentration
- ◆ Much less known about OBT

Tritium

radioecology

Key sources

- ◆ **Nuclear cycle:** Nuclear power plants, reprocessing, waste
- ◆ **Fallout:** Nuclear weapons testing
- ◆ **Nuclear accidents:** e.g. Windscale, [Chernobyl](#), [Fukushima Daiichi](#)
- ◆ **Others:** military, medical and research applications
- ◆ **Natural sources:** reactions of high-energy cosmic rays with atmospheric nitrogen and oxygen



Why is it of interest?

- ◆ Extremely mobile isotope
- ◆ Easily transferred to any biological tissues, as tritiated water
- ◆ Potential for incorporation in DNA
- ◆ Major component of gaseous and liquid releases from nuclear power plants (with ^{14}C)

For more information ...

[IRSN \$^3\text{H}\$ factsheet](#)

[ANL tritium factsheet](#)

Remediation