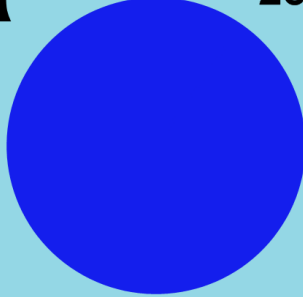





4.11 sodium

sodium	
Na	23
11	
22.989 769 28(2)	

Stable isotope	Relative atomic mass	Mole fraction
^{23}Na	22.989 769 28	1

Half-life of radioactive isotope

Less than 1 hour 
 Between 1 hour and 1 year 
 Greater than 1 year 

^{17}Na	^{18}Na	^{19}Na	^{20}Na	^{21}Na	^{22}Na	^{23}Na	^{24}Na	^{25}Na	^{26}Na
^{27}Na	^{28}Na	^{29}Na	^{30}Na	^{31}Na	^{32}Na	^{33}Na	^{34}Na	^{35}Na	^{36}Na
^{37}Na									

4.11.1 Sodium isotopes in biology

Both ^{22}Na and ^{24}Na have been used as radioactive **tracers** to study electrolytes in the human body [105-107].

4.11.2 Sodium isotopes in geochronology

^{22}Na is a **cosmogenic isotope** with a **half-life** of 2.6 years that has been used to study the **residence time** of water in freshwater basins. It has been used for dating of young (up to a few decades old) surface water and groundwater (Fig. 4.11.1) [108].

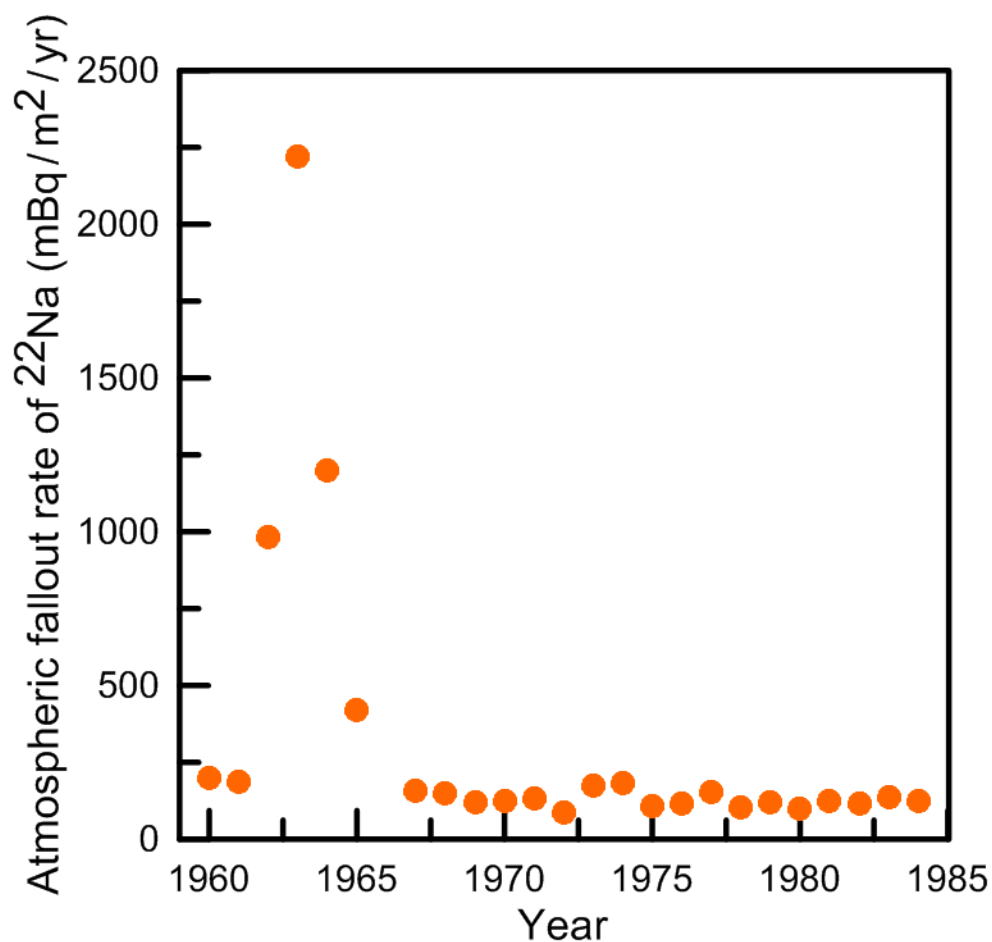


Fig. 4.11.1: Variation of ^{22}Na atmospheric fallout rate at St. Petersburg, Russia (modified from [108]). This variation makes ^{22}Na useful for determining **residence time** of lakes and other surface water bodies.

4.11.3 Sodium isotopes in medicine

^{22}Na is used as a source to calibrate **positron emission tomography (PET)** imaging scanners to check that the instruments are functioning properly [109].