HYDROISOTOP gmbh
Laboratorium zur Bestimmung von Isotopen in Umwelt und Hydrologie

Schweitenkirchen, March 2013

Isotope of the month: Oxygen-18

^{18}O is a natural stable isotope of oxygen. Compared to total oxygen, ^{18}O has a proportion of about 0,2 %. Being part of the water molecule, ^{18}O takes part in the water cycle.
The distribution of ^{18}O isotopes in the water cycle is temperature-dependent. Water molecules without ^{18}O are about 12 % "lighter" than water molecules with ^{18}O and, therefore, evaporate more easily. The water vapour and hence the rain in cooler times, for example in winter, is therefore "lighter" than in summer, when more energy for evaporation is available. This led to a characteristic seasonal pattern of the ^{18}O signature in the rain.
This seasonal pattern can be found in the ice cores of the Antarctica and allows the dating of the cores. Also groundwater that was recharged during the last glacial maximum can be distinguished from modern, recently recharged groundwater. Furthermore, the seasonal recharge period from these modern groundwater bodies can be determined due to the analysis of the ^{18}O proportion.
Due to the temperature dependency, the rain fallen in warmer regions of the world can be distinguished from rain fallen in colder regions. This difference continues to the flora and allows a proof of origin for example of fruits and vegetables.

Hydroisotop analyses the ^{18}O signature of water and aqueous phases of food by the accredit methods "Isotope-Ratio-Masspectromety" (IRMS) und "Cavity-Ringdown-Spectrometry" (CRDS).