



Institute of Environmental Physics

University of Heidelberg
Im Neuenheimer Feld 229
D-69120 Heidelberg
<http://www.iup.uni-heidelberg.de>

Prof. W. Aeschbach-Hertig

phone: +49 (0)6221 54 6331
fax: +49 (0)6221 54 6405
e-mail: aeschbach@iup.uni-heidelberg.de
www: (...)/institut/forschung/groups/aquasys/

Groundwater Sampling for Tritium and Stable Isotopes

General remarks

Sampling for tritium and stable isotopes is simple compared to sampling for dissolved gases. No special requirements for well selection or sampling containers exist.

Well selection

In principle any well or spring can be sampled. In the case of wells with technical equipment such as pressure or storage tanks, chemical treatment or filtering etc., the water should be taken before any treatment if possible.

Before sampling, the well should be sufficiently flushed (pump out at least once the volume of the borehole). During flushing, temperature and electrical conductivity should be checked to see if the values stabilise.

Sampling

The sample containers are usually small glass bottles (at least 30 ml for stable isotopes, 100 ml for tritium). However, tight plastic bottles can also be used.

Sampling is usually performed via flexible plastic tubing, ideally with a small diameter such that it can be inserted into the bottles. The bottles and caps should be rinsed thoroughly. Then the bottles are gently filled with water, avoiding excessive flow or entrainment of air bubbles. Fill the bottles almost to the top, but not completely, i.e., leave a small volume of air beneath the cap. Glass bottles should not be filled entirely, because they would break if the water expands due to warming. Close the caps of the bottles tightly.

The only contamination issue may be tritium from watches with fluorescent digits, which may contain (and release) large amounts of tritium. Such watches are rather rare nowadays, but if in doubt, take of your watch during sampling.

Sample identification and additional data

To identify the samples, you may put stickers or tape on the bottles or write directly on them with a water-proof marker. Additional information should be written down in a field book.

For each sample, note at least the sample identification, location, well name, and date of sampling in your field book. Additional data such as temperature and salinity (electrical conductivity) of the water, altitude of the well and altitude of the presumed recharge area might also be helpful in the interpretation of the data.

Packing and transport

Pack the bottles in boxes and protect them against impacts during transport. You may want to label the boxes as containing fragile material.

The most important points:

Pump long enough to flush the borehole completely.

Take samples before any treatment of the water.

Rinse the bottles well.

Fill the bottles almost (but not completely) to the top.

Close the cap tightly.

Identify the samples (name, location, date).

If possible note temperature, conductivity and altitude of the well.

Protect the bottles reasonably well for transport.