



## **Maintaining consistency of hydrogen and oxygen delta-scales: Replacement for the exhausted international measurement standards VSMOW and SLAP**

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Relative differences of hydrogen and oxygen stable isotope-amount ratios are commonly expressed in the delta-scale notation using the two international measurement standards Vienna Standard Mean Ocean Water (VSMOW) and Standard Light Antarctic Precipitation (SLAP) as primary references. These materials were produced in 1967 in quantities of about 70 L each and were distributed for the last 40 years by the International Atomic Energy Agency and the National Institute for Standards and Technology. In December 2006, the distribution of both materials was finally discontinued due to exhaustion of stocks.

In order to maintain the consistency in calibration of the delta-scales worldwide, efforts were started several years ago to produce new batches of water with delta-values as close as feasible to those of VSMOW and SLAP.

After collection of several raw water samples, development of novel techniques for slight isotopic adjustments, and careful calibration of the samples in an international effort involving several experienced isotope hydrology laboratories, the two successor materials, VSMOW2 and SLAP2, were produced in quantities of about 300 L each at the IAEA. The two materials are stored in 300 L containers and 5000 sealed glass ampoules with 20 mL water each have been prepared for both of the new standards.

The isotopic homogeneity of the standards in the produced ampoules was examined. Preliminary results of the calibration of the two new standards in reference to the remaining fractions of VSMOW and SLAP will be reported. The distribution of the two new standards, VSMOW2 and SLAP2, will commence after finalization of the

calibration exercise involving careful measurements in three laboratories.