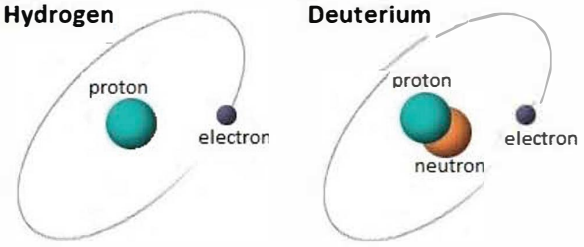
Deuterium-depleted water: What is it?

AUGUST 7, 2013 BY MJ PANGMAN ▪ 8 COMMENTS



Deuterium is an isotope of hydrogen that contains a proton *and a neutron* in the nucleus of the atom. The extra neutron doubles the mass of the hydrogen atom.

It is well-known that due to its mass difference, deuterium (D) behaves differently from hydrogen in chemical reactions (called the isotope effect). In other words, deuterium can, in some ways, be considered an independent element. When deuterium combines with oxygen, the resulting water is referred to as deuterium oxide or "heavy" water –D2O. Semi-heavy water results when one atom of hydrogen and one atom of deuterium combine with oxygen: (HDO). Water with a reduced deuterium content may have the capacity to transmit information more clearly. The extra neutron may create a "pucker" in the water matrix that is involved with information storage and transfer. Water made with deuterium tastes and looks the same but has numerous distinguishing characteristics. For example:

- Normal water boils at 100° C; heavy water boils at 101.4 °C
- Normal water freezes at 0° C; heavy water freezes at 3.8° C.
- Ice normally floats on the surface of water; ice made with heavy water sinks.

Left: Ice made with normal water; Right: Ice made with Heavy water

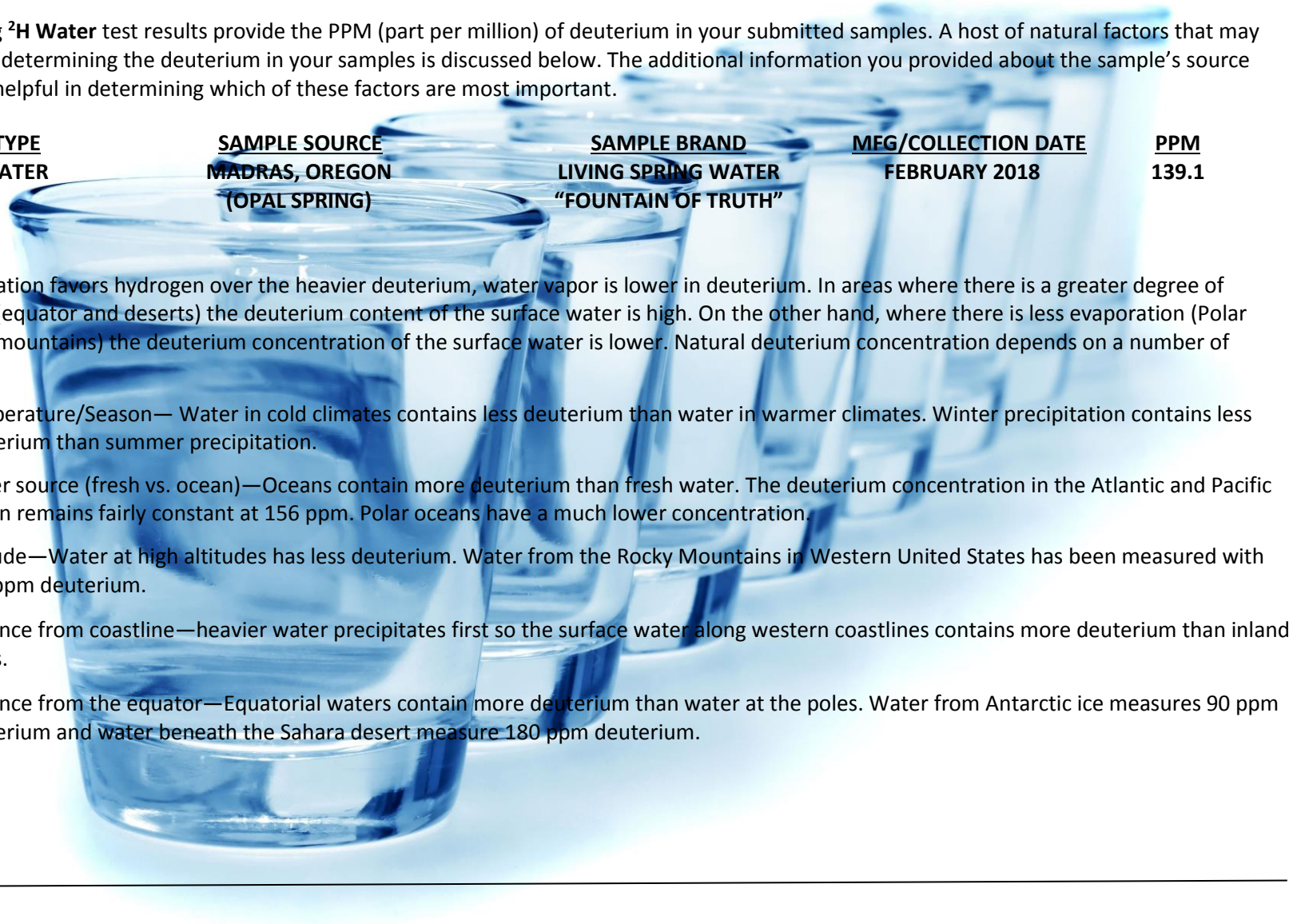
Gilbert Lewis was the first to produce a pure sample of heavy water in the 1930s. He accurately predicted its toxic effects on living organisms. His experiments showed that while tobacco seeds placed in typical water sprouted over the course of two weeks, those placed in D2O did not sprout at all. Tobacco seeds in 50/50 D2O sprouted—slowly. Subsequent experiments on cell cultures and living organisms determined that increasing the deuterium concentration of the water in an organism could disturb normal cell function. Higher concentrations were lethal. While all this was interesting, most scientists considered deuterium to be so scarce that the study of its biological effects were ignored until the 1990s.

DEUTERATED WATER REPORT

SUBMITTER'S NAME: JASON [redacted]

The following **^{2}H Water** test results provide the PPM (part per million) of deuterium in your submitted samples. A host of natural factors that may play a role in determining the deuterium in your samples is discussed below. The additional information you provided about the sample's source may also be helpful in determining which of these factors are most important.

SAMPLE TYPE	SAMPLE SOURCE	SAMPLE BRAND	MFG/COLLECTION DATE	PPM
SPRING WATER	MADRAS, OREGON (OPAL SPRING)	LIVING SPRING WATER "FOUNTAIN OF TRUTH"	FEBRUARY 2018	139.1



DISCUSSION

Since evaporation favors hydrogen over the heavier deuterium, water vapor is lower in deuterium. In areas where there is a greater degree of evaporation (equator and deserts) the deuterium content of the surface water is high. On the other hand, where there is less evaporation (Polar Regions and mountains) the deuterium concentration of the surface water is lower. Natural deuterium concentration depends on a number of factors:

- Temperature/Season— Water in cold climates contains less deuterium than water in warmer climates. Winter precipitation contains less deuterium than summer precipitation.
- Water source (fresh vs. ocean)—Oceans contain more deuterium than fresh water. The deuterium concentration in the Atlantic and Pacific Ocean remains fairly constant at 156 ppm. Polar oceans have a much lower concentration.
- Altitude—Water at high altitudes has less deuterium. Water from the Rocky Mountains in Western United States has been measured with 136 ppm deuterium.
- Distance from coastline—heavier water precipitates first so the surface water along western coastlines contains more deuterium than inland areas.
- Distance from the equator—Equatorial waters contain more deuterium than water at the poles. Water from Antarctic ice measures 90 ppm deuterium and water beneath the Sahara desert measure 180 ppm deuterium.