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Effects of Evaporation on Rain Water Isotope Composition
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Background

There are two stable isotopes of hydrogen (\textsuperscript{1}H and \textsuperscript{2}H) and three stable isotopes of oxygen (\textsuperscript{16}O, \textsuperscript{17}O, and \textsuperscript{18}O). Of these stable isotopes, \textsuperscript{1}H, \textsuperscript{2}H, \textsuperscript{16}O, and \textsuperscript{18}O are most abundant in nature and most easily measured. A general rule stands for most hydrological processes; heavier isotopes are more readily available in liquid (or solid) phases and lighter isotopes in the gaseous phase.\textsuperscript{1}

Purpose

When collecting water samples in an open environment, we want to make sure that what we are collecting is what fell. The purpose of this study was to observe the isotope composition of water before and after evaporation, and how the weights of the isotopes effect the water composition after evaporation.

Methods

• Nine collectors filled with various volumes of deionized water and left in an open area.
• Three left to open air
• Three were covered with a ping pong ball
• Three had a thin layer of mineral oil
• Initial samples and masses were recorded, then analyzed
• Collectors left to evaporate
• Final samples and masses recorded, then analyzed

The open collectors (control) had the greatest evaporation rates, followed by the ping pong balls, then the mineral oil. The data showed that after evaporation, the heavier isotope of \textsuperscript{18}O were more abundant than the lighter isotope of \textsuperscript{17}O.

Conclusions

These collectors can be used to collect fog on or near coastlines and will be deployed in Arequipa Peru for an upcoming project. The mineral oil layer had the best results in hindering evaporation and halting the change in the isotope composition of the water.

References