How Accurate is Radiometric Dating?

Have you ever wondered how archeologists and scientists know how old the things they dig up are? The main way is by radiometric dating. This method has been accepted as an accurate way to determine the age of an artifact, and until recently few have questioned the accuracy of this method. The problem is, if radiometric dating is accepted as an accurate way to date artifacts, when in fact it is not, then it is misleading people to believe artifacts are older than they really are.

In this paper we'll see that radiometric dating is not an accurate way to determine how old fossils are, because it is based on non-provable assumptions.

Radiometric dating is the most common type of dating. There are a wide variety of materials that can be used for radiometric dating. The most well known method is carbon dating. To understand how carbon dating is improperly used to support the old earth theory we need to take a brief look at how carbon dating works.

Carbon dating is based on a ratio of two types or isotopes of carbon. The first is an abundant stable form of carbon called carbon-12 (^{12}C). The second is a more rare form called carbon-14 (^{14}C), or radiocarbon. Carbon-14 is made in the upper atmosphere when cosmic rays hit ordinary nitrogen (^{14}N) changing it into ^{14}C. Carbon-14 is unstable, unlike ^{12}C, and it slowly decays over time.

While an organism is living it absorbs both types of carbon in the same ratio that ^{14}C and ^{12}C exist in the air. Even though ^{14}C atoms are unstable and constantly decaying, a living organism exchanges both types of carbon with its environment keeping the mixture in the organism about the same as the atmosphere. When an organism dies the ^{14}C decays and is not replaced. The amount of ^{14}C decreases over time decreasing the $^{14}C/^{12}C$ ratio. Scientists can use this ratio, and the half–life of ^{14}C, to estimate how long ago something died.

This appears to be an accurate way to determine how long ago a living organism died. But, those who are pushing the theory that the earth is millions to billions of years old want you to accept carbon dating without thinking. The problem is that there are major assumptions that are made in order for carbon dating to work. Revealing these assumptions pokes holes in the credibility of carbon dating.

A significant assumption is that all living things absorb ^{14}C at the same rate as everything else. But that's not true. Plants discriminate when it comes to absorbing carbon dioxide containing ^{14}C. Some plants take up less then would be expected. When you carbon date these types of plants, you get an inaccurate result. The tests will give results showing an age much older then it actually is. Different types of plants absorb ^{14}C at different rates. This means those different rates need to be calculated into the equation when determining the age. In the case of a “prehistoric” plant that is no longer in existence, there is no way to get an accurate age through carbon dating of the plant.

Another problem is that there is no way to know the original ratio of ^{14}C to ^{12}C in the atmosphere when the organism was living. This ratio has not been constant. For example, the ratio of ^{14}C to ^{12}C was higher before the industrial revolution. When we started burning massive amounts of fossil fuels it released huge amounts of carbon dioxide into the earth atmosphere. The higher levels of carbon dioxide diluted the amount of ^{14}C in the atmosphere. This makes things that died during the industrial revolution seem older, when carbon dated, than they truly are.

A third problem is that there is no way to know how much ^{14}C was being produced in the upper atmosphere when the organism was living and died. The amount of cosmic rays that penetrate the earth's atmosphere directly affects the amount of ^{14}C that is produced. Therefore, it affects the carbon dating system. An example of how the cosmic ray level varies is the fact that the number of cosmic rays reaching the earth's upper atmosphere varies based on the strength of the earth's magnetic field. The stronger the magnetic field, the fewer cosmic rays can get to the atmosphere. There is evidence that the earth's magnetic field has fluctuated and is now decreasing. As a result more ^{14}C is being created today. Since the ^{14}C level is higher now, and in carbon dating it is assumed the ^{14}C level is constant throughout history, it makes old things appear to be older than they actually are.

Finally, even if these assumptions were correct, there still is a big problem with carbon dating. The time span for which ^{14}C can be used is limited by the rate at which ^{14}C decays. Its half life is about 5,730 years. A half life is how long it takes for half of the ^{14}C to convert back into ^{14}N. That is why it is called a 'half-life.' After two half-lives, over a period of about 11,460 years, only a quarter of the ^{14}C will be left. But, there is a lower limit at which there is not enough ^{14}C left such that it can be detected. That limit is reached when something is about 50,000 years old. For that reason carbon dating can not give ages for things that were living millions of years in the past. As the authors Ken Ham, Jonathan Sarfati, and Carl Wieland put it in their book titled The Answers Book, "In fact, if a sample contains ^{14}C, it is good evidence that it is *not* millions of years old."

What about the other radiometric dating methods? There are many other radiometric dating methods used today to determine the age of rocks. These other methods, unlike carbon dating, are used on things that were never living. For example, potassium-40, uranium-238, rubidium-87, etc. The technique for determining the age of rocks is also different from carbon dating. All candidates for radiometric dating have to be a substance that is unstable and which over time decays into a different stable substance. The original unstable substance is called the parent product and the substance that the parent product decays into is called the daughter product. For example, these are what the substances above decay into; potassium-40 decays to argon-40, uranium-238 decays to lead-206, rubidium-87 decays to strontium-87. When these elements appear in igneous rocks the ratio of the parent to daughter substance is assumed to give the time since the rock solidified. The concentration can be accurately measured giving the amount decay of the original substance.

These second types of radiometric dating, like carbon dating, have their own non-provable assumptions that are used when calculating the age of rocks. The first assumption is that when a rock first solidifies all the radioactive elements in the rock are set to zero, no decay is present. That means the assumption is that there is no daughter isotope present at solidification. However, it is impossible to confirm this is true for ancient rock, and new lava flows do show a presence of daughter isotopes. Without an accurate starting point, the results can be drastically off.

Second, some scientists assume that over time neither parent nor daughter materials have been added or removed. This is not an accurate assumption to make. The world is not a closed system and there is no way to tell if parent or daughter products were lost or added since the time of solidification.

A good example of how inaccurate this type of radiometric dating can be comes from the famous Mt. St. Helens eruption in 1980. Scientists know when that rock solidified because they saw it happen. When they radiometric dated the new rock, the results came back as if the rock was millions of years old even though it was actually less then a year old. So if the dating method does not work when we know how old the rock really is, why do we think it works any better when we don't know the actual age of the rocks?

Even today there are new discoveries of so-called ancient human remains or ancient plants and animals. The latest was recently published in just about every U.S. newspaper. An article written by Anthony Mitchell in the Washington Post gives one example of this type of discovery, "A team of U.S. and Ethiopian scientists has discovered the fossilized remains of what they believe is humankind's first walking ancestor, … they are estimated to be 3.8-4 million years old." We know they did not get the age of those bones from carbon dating. If they say they did, you know that is not possible because carbon dating can not go back that far. Then how can they make this claim. They take the rock layer that the fossil was found in and then try to find other things in the same layer that help date when the layer could have been put down. The most common way they do this is by finding igneous rock in the layer that they can radiometric date. However, this method does not give an accurate answer that can be considered scientific. But, none the less, it is used to "prove" the age of fossils and is accepted by scientists and common people alike to be accurate. So the next time you read a story in your paper about a million year old man, take it with a grain of salt, because all it really means is that they found some bones that happen to be next to some rock that were tested to be that old using a extremely fallible method.

Works Cited

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