

Abstract Submitted
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Some geophysical considerations in radioisotope dating applications.¹ ROBERT HAYES, North Carolina State Univ — Radioisotope dating only assumes radioactive decay laws are taking place allowing closed form solutions to be obtained in generating a sample date estimate. To be discussed in this work is the isotopic distribution expected in geological samples due to mass diffusion superimposed on that from simple radioactive decay. By taking into consideration the isotope effect (differential mass diffusion rates) when measuring isotopic ratios from very old samples, the distribution dependency will cause a bias if isotopic diffusion rates are not identical throughout a material (or at least across the boundaries of all samples measured). The isotope effect being that isotopes having a smaller atomic mass will diffuse faster in a medium than will their heavier counterparts causing concentration gradients of their ratios even when there are no contributions from radioactive decay which will tend to bias all sample ages (slopes of the isochron) to have a more linear distribution. The application to Sr/Rb dating is evaluated and shown to result in expected age overestimates. Suggested methods to test for this effect along with sample preparation techniques to minimize it are discussed.

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