

The Application of Inductively Coupled Plasma Atomic Emission Spectrometer (ICP-AES) to the Analysis of Minor and Trace Elements in Volcanic Glass Shards

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ABSTRACT

Tephrochronology is a valuable dating technique in the geological community. It can be used not only to date strata, but can also be used to compliment and check other dating techniques such as biostratigraphy, magnetostratigraphy, and isotopic ages. Basic tephrochronology correlates major, minor, and trace element concentrations in the glass shards to other tephra deposits most commonly by electron microprobe analysis (EMA) X-ray fluorescence (XRF), instrumental neutron activation analysis (INAA), inductively coupled plasma mass spectrometer (ICP-MS). The inductively coupled plasma atomic emission spectrometer (ICP-AES) is another analytical instrument that has not been applied to tephrochronology. In this study, I intend to use an ICP-AES to collect minor and trace element data from volcanic glass shards to determine if the precision and accuracy of the ICP-AES is sufficient for application to tephrochronology by analyzing several well known tephra layers: Bishop ash, Lava Creek B, and Mesquite Springs. If the ICP-AES is suitable for tephrochronology, I will characterize the minor and trace element compositions of the tephra layers of the Furnace Creek basin in Death Valley, California.