Combining NAA and best relative fit factors for provenancing

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Neutron Activation Analysis (NAA) employs a nuclear process to determine the concentrations of chemical elements at the percent, parts-per-million and even parts-per-billion level. Combining multi-element analytical capacity with sensitivity, precision and ease of sample preparation, NAA has become a privileged tool in provenance studies of archaeological ceramics. The application of NAA produces data on the elemental concentrations of up to 30 chemical elements. This so-called chemical fingerprint can then be used to find samples of chemically similar composition, in the case of ceramics, resulting in groups that share a common clay paste, i.e. the recipe that was used to produce the ceramic under investigation. During this process of comparison, several multivariate statistical methods need to be employed, most prominently a best-relative fit factor that enables the removal of additional statistical spread that is produced by slightly different amounts of temper used. Using real-world data as well as simulated datasets, the applications, limits and potential extensions of this combined approach will be presented.