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Supplemental Material

1. Two different examples of $^{40}\text{Ar}/^{39}\text{Ar}$ data sets archived via FAIR data principles.
2. Checklist of minimum and recommended data to report for $^{40}\text{Ar}/^{39}\text{Ar}$ dates.

Table 4. Checklist of minimum and recommended data to report for $^{40}\text{Ar}/^{39}\text{Ar}$ dates.

Minimum Required Data

Report uncertainties for all parameters (e.g., 95% confidence interval, 1σ , 2σ)

Explicitly stated whether uncertainties on ages include decay constant uncertainties

Report sample identifier (ideally unique, e.g., International Geo Sample Number [IGSN])

Report sample location (e.g., latitude, longitude, elevation)

Report sample lithology

Specify material analyzed specified (e.g., single vs. multi-crystal aliquot, weight, phase type)

Report relative isotope abundances[†] for ^{40}Ar , ^{39}Ar , ^{38}Ar , ^{37}Ar , and ^{36}Ar

Describe step heating schedule and/or laser power/wattage per analysis

Identify reactor and port used for irradiation (and if Cd shielding or rotation was used)

Describe fluence monitor details (e.g., name, age assumed, reference, J value)

Report decay constants used (e.g., ^{40}K , ^{39}Ar , ^{37}Ar , ^{36}Cl), references cited

Identify interfering isotope production ratios (e.g., Ar produced from K, Ca, Cl), references cited

Report ratios used for trapped[§] argon correction ($^{40}\text{Ar}/^{36}\text{Ar}$, $^{40}\text{Ar}/^{38}\text{Ar}$), reference cited

Indicate time interval used in decay corrections (e.g., days from end of irradiation to start of analysis)

Report proportion radiogenic ^{40}Ar ($\%^{40}\text{Ar}^*$)

Provide model age and unit of each analysis (e.g., yr, ka, Ma, Ga)

List F value ($^{40}\text{Ar}^*/^{39}\text{Ar}_K$)

Distinguish which steps are included in the age spectrum/isochron

Report statistics to evaluate robustness of data (e.g., MSWD, p-value)

Publish data tables in tabular (e.g., CSV, XLS) or machine-readable (e.g., JSON/XML) file format

Recommended Data

Describe sample treatment (e.g., mineral separation techniques, acid treatment used)

Identify data reduction software used (e.g., Mass Spec, ArArCALC, PyChron, in-house)

List grain size of material analyzed

Report representative blank measurements

Report frequency of blank/air/cocktail measurements

[†] Corrected for baseline, background, mass discrimination and/or detector intercalibration, reactor interferences, and radioactive decay

[§] For terrestrial samples, this is commonly the composition of atmospheric argon