

## Introducing G.O.Joe: A new online tool for LA-ICP-MS data reduction

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The coupling of laser ablation systems with inductively coupled plasma-mass spectrometers (LA-ICP-MS) was introduced in the 1980s. Since then, this technique has become indispensable for rapid in-situ trace element and isotopic analysis of both natural and synthetic solid samples. Its applications extend across various fields, including chemistry, materials science, geosciences, biological and environmental analysis, bio-imaging and forensic investigations. However, analytical advances are still needed to address challenges in trace element analysis using LA-ICP-MS, such as those caused by interferences.

The novel, non-commercial software tool G.O.Joe is designed to facilitate the calculation of trace element mass fractions in solid samples obtained by LA-ICP-MS analysis. It is written in the Dart programming language using the Flutter framework and operates entirely as a web-based application (i.e., no installation required). Since the data processing is performed on the user's computer, there is no need to upload data to the G.O.Joe-server, maximizing data security. In addition to enabling the quick and efficient processing of large datasets, G.O.Joe includes various optional interference corrections methods.

G.O.Joe's intuitive user interface simplifies the workflow during data evaluation, allowing for straightforward selections of peak- and background signals, importation of instrument settings, reference material compositions, and mass fractions of the internal standard to convert the measured raw signals into element mass fractions. Ensuring transparency in data processing, the results file (.xlsx) includes the calculated element mass fractions, associated statistical parameters as well as input data alongside instrument settings. Additionally, users can download a more comprehensive file containing the intermediate results of each calculation step. The software's key advantages include implemented corrections for isobaric interferences and abundance sensitivity.

The capabilities of G.O.Joe are demonstrated through the processing of two case studies, including trace element analyses of tungstates (e.g., scheelite) and silicates (e.g., garnet). In conclusion, G.O.Joe is a time-efficient, transparent and easy-to-use software tool that appeals to both experienced LA-ICP-MS users as well as newcomers to LA-ICP-MS data analysis. More