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Traceability in isotope ratio measurements: the role of data analysis

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Isotope ratios offer countless applications but almost as a rule precision measurements are required. Making use of such measurements involves comparison of the results between the laboratories which, in turn, requires international primary standards. Much less appreciated is the role of data analysis and measurement models. This presentation will feature a variety of examples of stable isotope ratio measurements, including light and heavy elements with examples from the redefinition of the kilogram, lead-lead dating, and carbon isotope delta reference scales, showing that choices on how we interpret and model our measurements can affect the traceability and comparability of isotope ratio measurements. The challenge is therefore for the analysts to recognize data analysis practices as a natural part of the measurement.