

Short course on: “Provenance analysis: how to integrate single grain and bulk techniques”

(16 hours – 2 credits) - Teachers: Sergio Andò and Alberto Resentini

This short course is conceived as a state-of-the-art simple practical guide for PhD students willing to tackle the challenges posed by a multi-technical approach to provenance studies. We will illustrate the problems posed by sampling in the field and the choice of the size window for analysis to the complex issues associated with data interpretation, illustrating the general criteria that should guide provenance studies based on heavy-mineral suites and bulk petrography. The aid of statistical techniques has become indispensable at a time when the flourishing of new technologies allows the collection of bigger and bigger datasets that make objective interpretation by visual inspection impossible. We will also introduce through real case histories innovative ideas for identification of detrital minerals by Raman Spectroscopy, a user-friendly tool that allows targeting detrital minerals as small as a few microns in diameter, thus opening up a new frontier for provenance studies. Last but far from least, we will describe an application of Raman spectroscopy combined with heavy-mineral and zircon U-Pb analyses to significantly improve the resolution of provenance analysis with implications also for the correlation of hydrocarbon reservoirs.

This short course is part of the teaching plan of the PhD programme in Chemical, Geological and Environmental Sciences at University of Milano-Bicocca (Italy). It will be held on Webex. It is free and open to advanced graduate students and post-docs from any university. To participate, send an email to sergio.ando@unimib.it and alberto.resentini@unimib.it by the 10th of January 2021. For the sake of a better organization, you are asked to specify your current position and ongoing research.

Schedule

Lecture 1– Monday 11st January 2021, 2 PM – 5 PM CET - (3h)

Classical methods: bulk petrography and heavy-mineral analyses

Lecturers: [Sergio Andò](#) and [Alberto Resentini](#) (University of Milano-Bicocca)



Lecture 2 – Wednesday 13rd January 2021, 2 PM – 4 PM CET - (2h)

Sampling and preparation in silt and sand

Lecturer: [Sergio Andò](#) (University of Milano-Bicocca)



Lecture 3 – Friday 15th January 2021, 2 PM – 5 PM CET - (3h)

Physical processes: Minsorting & Rounding

Lecturer: [Alberto Resentini](#) (University of Milano-Bicocca)

Lecture 4 – Tuesday 19th January 2021, 2 PM – 4 PM CET - (2h)

Chemical processes: Weathering: a catalogue for corrosion features

Lecturer: [Sergio Andò](#) (University of Milano-Bicocca)



Lecture 5 – Thursday 21st January 2021, 2 PM – 4 PM CET - (2h)

Statistic for provenance studies

Lecturer: [Alberto Resentini](#) (University of Milano-Bicocca)

Lecture 6 – Tuesday 26th January 2021, 2 PM – 4 PM CET - (2h)

Raman Spectroscopy: Miragem

Lecturer: [Sergio Andò](#)



Lecture 7 – Thursday 28th January 2021, 2 PM – 4 PM CET - (2h)

Metamictic Zircon: application to provenance studies

Lecturer: [Alberto Resentini](#) (University of Milano-Bicocca)