



Dr. Julia Ricci

Geochronologist

NM Geochronology research Laboratory
New Mexico Bureau of Geology

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RESEARCH EXPERIENCE

Geochronologist

New Mexico Tech
Since 2024

Co-managing of the New Mexico
Geochronology Research Laboratory

Associate Radiation Safety Officer

New Mexico Tech
Since 2023

General safety of radioactive activities,
Management of radioactive materials and
waste. Renewal of NM Tech radioactive licence.

Research Scientist Argon Lab Manager

2021 - 2024

High precision $^{40}\text{Ar}/^{39}\text{Ar}$ analyses applied to
various research projects. Day-to-day operations.
Management

CNRS Postdoctoral research

Geosciences Montpellier France
2019 - 2021

$^{40}\text{Ar}/^{39}\text{Ar}$ and in situ K-Ar dating of clay minerals
for application to tectonics, hydrothermalism,
and diagenesis studies.

Collaborators : P. Monié, P. Munch, P. Patrier,
D. Beaufort, P. Caffé

TOTAL Postdoctoral research

Institut Physique Globe Paris
2019

Geochemical characterization and research of
geochemical tracers in volcanism. Implication
for global model of plates motion.

Collaborators : J. Besse, C. Chauvel, M. Greff

European Research Council Postdoctoral

Institut Physique Globe Paris
2016 - 2019

ERC / EDIFICE - Changes in the Geomagnetic
Dipole over the Past 5 Ma.

Collaborators : J.-P. Valet / J. Carlut

Teaching and research Assistant

Geosciences Paris Saclay, France
2014 - 2016

Analytical developments of a new Argon extraction
line.

Collaborator : X. Quidelleur

PhD in Geochronology / volcanology

Geosciences Paris Saclay, France
2011 - 2014

Space and time evolution of volcanism within
Basse-Terre Island (Guadeloupe, F.W.I.)
reinterpreted from new geochronology,
geochemistry and geomorphology data.

Advisor : X. Quidelleur, P. Lahitte

Master II research project

Geosciences Paris Saclay, France
Institut Physique Globe Paris
2011

New $^{40}\text{Ar}/^{39}\text{Ar}$ and K-Ar ages of the Viluy traps
(Eastern Siberia): Further evidence for a
relationship with the Frasnian-Famennian
mass extinction.

Advisor : X. Quidelleur, V. Courtillot

*As an Argon geochronologist and
volcanologist, I explore various
geological questions to unravel the
complexities of Earth's history.*

*My research integrates multiple
disciplines, including paleomagnetism,
geomorphology, and geochemistry, to
provide a holistic understanding of
geological processes.*

*I am particularly passionate about
analytical development, continually
pushing the limits of $^{40}\text{Ar}/^{39}\text{Ar}$ dating
techniques.*

CERTIFICATE

Radiation Safety Officer

RESEARCH INTERESTS

$^{40}\text{Ar}/^{39}\text{Ar}$ - K-Ar geochronology

Clay minerals dating
Evolution of volcanic islands
Quaternary volcanism
Magnetic field reversals
[Mass extinctions](#)
Geological processes

Low temperature $^{40}\text{Ar}/^{39}\text{Ar}$ dating

Continental surfaces processes
Hydrothermalism
Fault paleo-activity

Analytical developments

High precision dating
Developments of Ar extraction line
Mass spectrometer calibration

Paleomagnetism

Paleosecular variations
Reversals magnetic field

Geomorphology

Numerical reconstruction of
paleo-surfaces
Erosion rates / volcanic production
GIS analyses (ArcGis, ShapeVolc)

Geochemistry

Geochemical evolution of magma

Published

- Attia S., **Ricci, J.** (2023). Latest Eocene $^{40}\text{Ar}/^{39}\text{Ar}$ Age from the Yeso Hills Dikes, Eddy County, New Mexico. In: Evaporite Karst of the Lower Pecos Region, Land, Lewis; Bou Jaoude, Issam; Hutchinson, Peter; Zeigler, Kate; Jakle, Anne; Van Der Werff, Brittny, New Mexico Geological Society 73 rd Annual Fall Field Conference Guidebook, 152 p. <https://doi.org/10.56577/FFC-73>
- Attia S., Heizler M. T., **Ricci, J.** (2023). Quaternary age of the Gatuna Formation at Livingston Ridge. In: Evaporite Karst of the Lower Pecos Region, Land, Lewis; Bou Jaoude, Issam; Hutchinson, Peter; Zeigler, Kate; Jakle, Anne; Van Der Werff, Brittny, New Mexico Geological Society 73 rd Annual Fall Field Conference Guidebook, 152 p. <https://doi.org/10.56577/FFC-73>
- Münch Ph., Caillaud J., Monié P., Grauby O., Corsini M., **Ricci J.**, Romagny A., Philippon M., Romagny A., Lanson B., Azdimoussa A., BenMoussa, A., Arnaud N., (2021). Direct dating of brittle extensional deformation in the internal zones of the Rif Chain. *Tectonophysics*, p228800
- Ricci, J.**, Carlut, J., Marques, F.O, Hildenbrand, A., Valet, J.P., (2020). New paleomagnetic record of the Matuyama-Brunhes reversal in a lava flow sequence from the Azores islands. *Frontiers in Earth Science*, 8, 165.
- Ricci, J.**, Carlut, J., Valet, J-P., (2018). Paleosecular variation recorded by Quaternary lava flows from Guadeloupe Island. *Scientific reports*, 8(1), 10147.
- Ricci, J.**, Quidelleur, X., Pallares C., Lahitte, P., (2017). High-resolution K-Ar dating of a complex magmatic system: The example of Basse-Terre Island (French West Indies). *Journal of Volcanology and Geothermal Research* 345,142-160.
- Ricci, J.**, Quidelleur, X., Lahitte, P., (2015b). Volcanic evolution of central Basse-Terre Island revisited on the basis of new geochronology, and geomorphology data. *Bulletin of volcanology* 77(10), 84.
- Ricci, J.**, Lahitte, P., Quidelleur, X., (2015). Construction and destruction rates of volcanoes within tropical environment: Examples from the Basse-Terre Island (Guadeloupe, Lesser Antilles). *Geomorphology* 228, 597-607.
- Zami, F., Quidelleur, X., **Ricci, J.**, Lebrun, J.F., Samper, A., (2014). Initial sub-aerial volcanic activity along the central Lesser Antilles inner arc: New K-Ar ages from Les Saintes volcanoes. *Journal of Volcanology and Geothermal Research* 287, 12-21.
- Ricci, J.**, Quidelleur, X., Pavlov, P., Orlov, S., Shatsillo, A., Courtillot, V., (2013). New $^{40}\text{Ar}/^{39}\text{Ar}$ and K-Ar ages of the Viluy traps (Eastern Siberia): Further evidence for a relationship with the Frasnian-Famennian mass extinction. *Palaeogeography, Palaeoclimatology, Palaeoecology* 386, 531-540.

In prep.

- Marti, J., **Ricci, J.**, Planaguma, L., Aguirre Diaz, G. J. The Quaternary La Garrotxa Volcanic Field (Girona, Spain): A new geochronological approach.
- Ricci, J.**, Quidelleur, X., Pavlov, V. The Viluy traps and the End-Devonian mass extinction. *Book Chapter for Elsevier*.
- Germa, A., Quidelleur, X., Rouchon, V., **Ricci, J.**, Shea, T. Preservation of inherited argon in plagioclase crystals: implication for residence time after reservoir remobilization. *Contribution mineralogy*.
- Ricci, J.**, et al. High-precision $^{40}\text{Ar}/^{39}\text{Ar}$ dating of Matuyama-Brunhes reversal.

CONFERENCES

- Hughes, L. H., Amato, J. M., **Ricci, J.** (2024). Geochemical Evolution and $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology of the Uvas Basaltic Andesite: Insights into the Early Rio Grande Rift. New Mexico Geological Society Annual Spring Meeting, Socorro (USA).
- Salladin, N. J., Valenzuela, T. A., Hampton, B. A., Hobbs, K. M., Heizler, M. T., **Ricci, J.** (2024). New $^{40}\text{Ar}/^{39}\text{Ar}$ Detrital Sanidine Geochronology From the Eocene San Jose Formation, Eastern San Juan Basin, Northwestern New Mexico. New Mexico Geological Society Annual Spring Meeting, Socorro (USA).
- Germa, A., Quidelleur, X., Shea, T., **Ricci, J.** (2023). Preservation of inherited argon in plagioclase crystals in the Lesser Antilles: implication for residence time after reservoir remobilization. Goldschmid, Lyon (France).
- Raszewski, D. A., Cline, K. M., Rosenmeier, M. F., Hackett, W. R., Heizler, M., **Ricci, J.**, Petronis, M., Foucher, M., Kobs Nawotniak, S. (2023). Paleomagnetic variation and $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of a 1,538-foot borehole from the eastern Snake river Plain, Idaho. GSA Meetings, Pittsburg (USA).
- Reed, C., Karlstrom, K., Heizler, M. T., Rodriguez, B., **Ricci, J.**, Crossey, L. (2023). Tectonic Geomorphology of the Jemez System: Resolving Quaternary River Response to Dynamic Landscapes Using $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology. GSA Meetings, Pittsburg (USA).
- Attia, S., **Ricci, J.** (2023). Unearthing the mid-Cenozoic Cordilleran magmatic periphery of eastern New Mexico. New Mexico Geological Society Annual Spring Meeting, Socorro (USA).
- Hampton, B., Houde, P., Heizler, M. T., **Ricci, J.** (2023). Applying $^{40}\text{Ar}/^{39}\text{Ar}$ Detrital Sanidine Geochronology to Constrain Stratigraphic Ages from Proboscidean-Bearing Strata of the Plio-Pleistocene Camp Rice Formation, Southern New Mexico. New Mexico Geological Society Annual Spring Meeting, Socorro (USA).
- Reed, C., Karlstrom, K., Heizler, M. T., Rodriguez, B., **Ricci, J.**, Crossey, L. (2023). Tectonic Geomorphology of the Jemez System: Resolving Quaternary River Response to Dynamic Landscapes Using $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology. New Mexico Geological Society Annual Spring Meeting, Socorro (USA).
- Koning, D., Heizler, M. T., Zeigler, K. E., Chamberlin, R., Peppe, D. J., Connell, S., Jochems, A., Hobbs, K. **Ricci, J.** (2022). Temporal constraints and causes for early ancestral rio grande integration, south-central New Mexico. GSA Meetings, Denver (USA).
- Reed, C., Karlstrom, K., Heizler, M. T., Gillam, M. L., Aslan, A., **Ricci, J.**, Rodriguez, B. (2022). QGG Donald R. Coates Award: Resolving Differential Incision Rates to Infer Uplift Using New and Legacy $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology of Lava Creek B Ash in the Rocky Mountain Region. GSA Meetings, Denver (USA).
- Ricci, J.**, Beaufort, D., Munch, Ph., Patrier, P., Monié, P., Caffé, P. (2021). Evolution du gisement polymétallique de Chinchillas : apport de la datation $^{40}\text{Ar}/^{39}\text{Ar}$ sur minéraux argileux. Réunion des Sciences de la Terre (RST 2020 - 2021), Lyon, (France).
- Ricci, J.**, Munch, Ph., Monié, P., Patrier, P., Beaufort, D., Buatier, M., Charpentier, D., Quidelleur, X., Hildenbrand, A., Allard, T. (2021). La datation $^{40}\text{Ar}/^{39}\text{Ar}$ des minéraux argileux : un outil pour l'étude des processus Basse-Température - applications aux enjeux sociétaux critiques. Réunion des Sciences de la Terre (RST 2020 - 2021), Lyon, (France).
- Ricci, J.**, Carlut, J., Marques, F.O, Hildenbrand, A., Valet, J.P., (2018). New paleomagnetic record of the Matuyama-Brunhes reversal in a lava flow sequence from the Azores islands. AGU Fall meeting, Washington D.C. (USA).
- Quidelleur, X., **Ricci, J.**, Lahitte, P., Pallares, C., (2017). The K-Ar Cassinot-Gillot technique as a tool to reveal evolution of volcanic systems: example of Basse-Terre Island (Lesser Antilles). IAVCEI, Portland (USA).
- Germa, A., Charbonnier, S., Connor, C., Connor, L., Malservisi R., Perry, C., Tavarez, S., Clynnne, M., Quidelleur, X., **Ricci, J.**, (2015). New geochronological constraints of the Lassen segment's regional volcanism. AGU Fall meeting, San Francisco (USA).

- Ricci, J.**, Quidelleur, X., Lahitte, P., (2014). A new volcanic evolution of the Axial Chain of Basse-Terre Island (Guadeloupe, Lesser Antilles). Doctoral School MIPEGE meeting, Univ. Paris Sud (France).
- Ricci, J.**, Quidelleur, X., Lahitte, P., Pallares C. (2013). Space and time evolution of volcanism within Basse-Terre Island (Guadeloupe, Lesser Antilles) based on new geochronology, geochemistry and geomorphology data. AGU Fall meeting, San Francisco (USA).
- Ricci, J.**, Lahitte P., Quidelleur X. (2013). Evaluation of mechanical erosion and volcanic construction rates in the Basse Terre Island (Guadeloupe, Lesser Antilles). 8th International Conference on Geomorphology, Paris (France).
- Ricci J.**, Lahitte P., Quidelleur X. (2013). Evaluation of mechanical erosion and volcanic construction rates in the Basse Terre Island (Guadeloupe, Lesser Antilles). Doctoral School MIPEGE meeting, Univ. Paris Sud (France).
- Ricci J.**, Quidelleur X., Lahitte P., Pallares C. (2013). L'évolution du volcanisme de l'île de Basse-Terre (Guadeloupe) revisitée à partir de nouvelles données géochronologiques, géochimiques et géomorphologiques. IDES doctoral students.
- Médard E., Paquette J.L., Devouard B., **Ricci J.**, Boivin P., Gaillou E., Rochault J., Hardiagon M. (2012). Gem sapphires and zircons from Cenozoic volcanism of the French Massif Central. 1st IAVCEI, Olot (Spain).
- Ricci J.**, Quidelleur X., Lahitte P. (2012). Evolution of the mechanical erosion rate and the volcanic construction in the Basse Terre Island (Guadeloupe, Lesser Antilles). Doctoral School MIPEGE meeting, Univ. Paris Sud (France).
- Ricci J.**, Lahitte P., Quidelleur X. (2012). Démantèlement des volcans par érosion ou effondrements de flanc: Application à la Guadeloupe. Colloque CNFGG, Mesure et Modélisation en Volcanologie, Clermont-Ferrand (France).
- Devouard, B., Paquette, J.-L., **Ricci J.**, Medard, E., Boivin, P., Gaillou, P., Vielzeuf, D. and Rochault, J. (2010) - Saphirs et zircons gemmes d'Auvergne (Massif Central Français): occurrences, pétrogenèse et géochronologie. 23ème Réunion des Sciences de la Terre (RST 2010), Bordeaux (France).

RESEARCH PROJECTS / Pending

Submit to the US Department of Energy - DE-FOA-0002711

Southern Arizona CO₂ storage complex feasibility in Harquahala basin (CO₂HQ)

Carbon Storage Assurance Facility Enterprise (CarbonSAFE), University of Arizona, Arizona Geological Survey

NSF proposal pending (Spring 2024)

San Rafael volcanic Field, Utah.

University of South Florida, University of Wisconsin Milwaukee.

NSF proposal pending (Fall 2024)

Identification, dating and characterization of landslides at high tsunami risk in volcanic islands.

PI: J. Ricci (NMT)

Collaboration: Lisbonne university, Paris-Saclay university, IPNA csic, NMT

MAIN ONGOING RESEARCH PROJECTS / Collaborative Research

● **New Mexico projects:**

- High precision dating of La Jencia Tuff and underlying rhyolite lava domes at Nogal Canyon
- Late Eocene $^{40}\text{Ar}/^{39}\text{Ar}$ Age from the Yeso Hills Dikes, Eddy County, New Mexico.
- Quaternary age of the Gatuna Formation at Livingston Ridge, New Mexico (USA).
- Timing constrain of a dike in northern San Juan Basin, New Mexico

● **New Mexico STATEMAP: Mapping and Geochron Database.**

The STATEMAP program is a federally funded initiative in the United States that supports geologic mapping at the state level. The New Mexico Geochronology Research Laboratory contributes by providing temporal constraints on various materials (e.g. lava flows, Detrital Sanidine, single mineral analyses) throughout New Mexico, used on the maps conducted by the Bureau's mappers.

● **Identification, dating, and characterizing landslides at high tsunami risk in volcanic islands: a major hazard for US coasts.** *(NMT, Lisbonne university, Paris-Saclay university, IPNA csic)*

Provide a multi-disciplinary, in-depth study of volcanic landslide-generated tsunamis that occurred during the Quaternary. By better understanding the phenomenon, we will better control the associated risk to sensitive coastal areas. *Pending for NSF application.*

● **High precision $^{40}\text{Ar}/^{39}\text{Ar}$ of the Viluy Traps and their relationship with the End-Devonian mass extinction.** *(Paris Saclay University, Inst. Phys. Earth Moscow)*

This study is a continuation of the study by Ricci et al. 2013. A new high-precision study will be carried out on a new series of samples. The aims is to highlight the volcanic phases during the establishment of the Viluy traps and their potential relationship with the End-Devonian mass extinction.

● **$^{40}\text{Ar}/^{39}\text{Ar}$ dating of clay minerals for application to tectonics, hydrothermalism, and diagenesis studies.** *(NMT, Nevada Bureau of mines)*

● **High precision $^{40}\text{Ar}/^{39}\text{Ar}$ of the last magnetic reversal** *(Lisbonne university, Paris-Saclay university, IPGP)*

● **Preservation of inherited argon in plagioclase crystals: implication for residence time after reservoir remobilization** *(University of South Florida, Paris-Saclay university, IFP Energies Nouvelles, University of Hawaii)*

First systematic study of micro-textures, chemical profiles, K-Ar and Ar/Ar dating, and Ar diffusion.

● **Evolution of the Teide and La Garrotxa volcanic field** *(Institute of Environmental Assessment and Water Research, Barcelona)*

● **The San Rafael volcanic Field, Utah (USA).** *(University of South Florida, University of Wisconsin Milwaukee)* Pluri-disciplinary studies, combining a large-scale geochronological study with paleomagnetism and geochemical studies.

● **Volcanic evolution of Medicine lake volcano.** *(University of South Florida)*

● **The challenge of zero-age dating.** *(Paris Saclay University)*

In different parts of the world, in various geological contexts, the dating of certain recent ages, known as zeros, presents a major challenge. In fact, when analyzed by Ar/Ar, these ages show negative ages, probably due to an excess of ^{36}Ar . Understanding the scientific reasons and solving the analytical challenges will enable us to provide chronological constraints to better understand recent volcanic activities and the associated major volcanic hazards.

CERTIFICATION

2022: Radiation Safety Officer (San Diego, California).

PROFESSIONAL MEMBERSHIPS

New Mexico Geological Society (NMGS)
American Geophysical Union (AGU)
Geological Society of America (GSA)

TECHNICAL SKILLS

Geochronology

Mass spectrometer : Argus VI, HELIX MC, multi-collector home-made mass spectrometers

K-Ar : unspiked Cassinol-Gillot technique

$^{40}\text{Ar}/^{39}\text{Ar}$: multi-collector mass spectrometers

Mineralogy

Rocks sampling for geochemistry, geochronology and paleomagnetism

Mineralogical preparation : Acid treatment, heavy-liquid, magnetic separation, hand-picking

Microscopic observation and petrological analyses: optical microscope, SEM, MET

Mineral encapsulation : Under vacuum encapsulation of samples in quartz vials for Ar/Ar dating

Geochemistry

Sample preparation

Flame spectrometry

Microprobe chemical analyses

Magnetism

Rock Magnetism analyses: Alternating Gradient Force Magnetometer, Agico KLY-3 / CS-3

Paleomagnetism analyses: Alternating fields and thermal stepwise demagnetization techniques (JR6 spinner magnetometer and 2G magnetometer)

Geomorphology

GIS analyses / Numerical reconstructions of paleo-surfaces / ArcGis software, Shapevolc software

Analytical skills

Analytical developments of extraction line and calibration of associated multi-collector mass spectrometers.

Device maintenance : e.g., mass spectrometer calibration, regular maintenance and reparations of mass spectrometers and extraction lines

Analytical developments of : (1) Clay mineral dating; (2) in situ K-Ar dating by LIBS

ADMINISTRATIVE RESPONSABILITIES

- Publication Reviewer (e.g. Precambrian Research, Quaternary Geology)

TEACHING

- **Student research committee member**

Damaris Washington: Exploring the timing of stress and intrusion at an undescribed dike in Northern San Juan Basin, New Mexico, Through geologic mapping.

- **AGeS program (NSF)**

Yuly Rave (University of South Florida): Newly identified monogenetic volcanoes in Antioquia, Colombia: the possibly northernmost monogenetic volcanic field of Andes Cordillera.

Funding April 2024 (\$9.690)

- **Classes:**

Bachelor 1st year: The Earth Planet; General Geology

Bachelor 2nd year: Crystallography and mineralogy; Geochemistry

Bachelor 3rd year: Geochemistry; Volcanology; Petrology

Master : Petrology, Mineralogy, Physical magmatology, Volcanology, Geochemistry, Mapping

- **CAPES contest preparation** (French contest for high school teaching): Petrology, metamorphism, magmatism, sedimentology

- **Co-supervising of Bachelor and master's degree field trip:**

Bachelor : Earth's Internal Dynamics: the volcanoes of Auvergne (France).

Master 1: Sedimentary Basins, Resources, Paleoclimates - Sedimentary basin filling: sedimentation, paleogeography and past climates: Corbières and Minervois, France

Master 2: Volcanism and Geodynamics: Study of Volcanoes of the Bay of Naples (collision and orogenesis).

- **Supervision of several bachelor and master's degree research projects:**

Valentine Combaudon - Bachelor (2019): Enregistrement thermochronologique autour de la faille de Py (Pyrénées Orientales, France). Co-encadrants: P. Monié

Gauthier de Montbrun - Bachelor (2019): Enregistrement thermochronologique autour de la faille de Py (Pyrénées Orientales, France). Co-encadrants: G. Milesi

Coline Dejean - Bachelor (2018): Caractérisations minéralogiques de laves provenant des îles des Açores et de La Palma (Canaries, Espagne). Co-encadrant: J. Carlut.

Louise Dauchy - Bachelor (2018): Etude paléomagnétique de séquences de laves provenant des îles des Açores. Co-encadrant: L. Meynadier.

Mathilde Bablon - Master (2014): Etude de l'évolution spatio-temporelle du Tungurahua Cordillère Est - Équateur): datation, géomorphologie. Co-encadrant: X. Quidelleur.

Mathilde Bablon - Bachelor (2013): Le volcanisme des Ilets Pigeon »: préparation de roches et datations K-Ar. Co-encadrant: X. Quidelleur.

Chloé Verly - Bachelor (2013): Acquisition et interprétation des données géologiques et géochronologiques. Co-encadrant: C. Pallares.