Ryan Ben Ickert

CURRICULUM VITAE

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RESEARCH INTERESTS

I use geochemistry, especially isotope geochemistry, to attack a broad range of scientific problems. This includes using high-precision ID-TIMS U-Pb geochronology to determine timescales of magmatic processes and to date geological events; using radiogenic isotopes (Sr-Nd-Pb) to trace the age and origin of rocks, meteorites, teeth, and archeological materials; and using light stable isotopes to trace the origin of diamonds and the deep carbon cycle. I am also interested in the fundamental basis of isotope measurements and geochronology. This has led me to work on improving our understanding of decay rates of radioactive nuclides, mass spectrometry techniques, and optimizing data handling and reduction.

POSITIONS HELD

2019 – present Senior Research Scientist, Purdue University
2015-2019 Lecturer (Assistant Professor), Scottish Universities Environmental Research Centre
2012-2015 Postdoctoral Fellow, Berkeley Geochronology Center and UC Berkeley
2009-2012 Postdoctoral Fellow, Canadian Centre for Isotopic Microanalysis, University of Alberta

EDUCATION

2010 – PhD Research School of Earth Sciences, The Australian National University
Advisor: Ian S. Williams
2006 – MSc Department of Earth Sciences, Simon Fraser University
Advisor: Derek J. Thorkelson
2003 – BSc Department of Earth and Atmospheric Sciences, University of Alberta
Advisor: Octavian Catuneanu

SERVICE

- Member of the Commission on Isotopic Abundances and Atomic Weights (CIAAW) Subcommittee on Isotopic Abundance Measurements (SIAM) (2021-present)
- Member of the Joint IUPAC-IUGS Task Group on Isotope Data in Geosciences (2017-present)
- Production Editor (executive member) of *Advances in Geochemistry and Cosmochemistry* (2023-present)
- Associate Editor of *Geochronology* (2024-present)
- Journal reviewer for Earth and Planetary Science Letters, Chemical Geology, Geochimica et Cosmochimica Acta, Lithos, Journal of Analytical Atomic Spectroscopy, Journal of Volcanology and Geothermal Research, Economic Geology, Earth Science Reviews, Precambrian Research, Journal of the Geological Society of India, Scientific Reports, Contributions to Mineralogy and Petrology, Rapid Communications in Mass Spectrometry
- Grant proposal reviewer for NSF, NSERC, STFC, NERC
- Language editor of Central European Journal of Geoscience, 2010-2016

STUDENT SUPERVISION

Rasika S. Mahajan (PhD) SUERC. 2016-2020.
Emma Roberts (PhD) SUERC. 2017-2020.
Duncan Bowyer (BSc, Paneth Internship) SUERC 2018
Sourav Karmakar (committee member, PhD) Purdue University. 2022-present

Disha Okhai (committee member, PhD) Purdue University. 2020-2024

Keita Wade (BSc, Stahura Meteorite Intern) Purdue University. 2021-2022.

FUNDING

- (PI of several fixed price contracts at Purdue University)
- (Co-I): Purdue Resources Empowering Coordinated Investigations for Sample Exploration (PRECISE)" (24-PSEF24-0003) $5,220,380.80
- (Co-I) NERC Standard Grant *"Convection clashes: Plume splitting beneath eastern Australia"*. (PI: Lara Kalnins) £1 127 353.05; Funded 2019
- (Co-I) STFC Standard Proposal "*Building capability for Mars Sample Return: development of geochronological tools for dating of jarosite*". £87 570; Funded 2019
- (PI) Royal Society Research Grant *"Evaluating the use of the Rb-Sr system to date young (Amazonian) aqueous alteration on the surface of Mars"* (£19 728.50) Funded 2018
- (PI) Carnegie Research Incentive Grant "*Pb isotopes: A novel high-resolution correlation tool for cyclostratigraphy*" (£7 357 (Funded 2017)
- (Postdoc) NSR EAR "*Collaborative Research: Filling a 30 Ma gap: Building a chronostratigraphic framework for Late Triassic sedimentary and paleobiologic archives*" (Lead PI – Roland Mundil and Randall Irmis) $169 975 (Funded 2014)

TEACHING

- Mentor as a Corporate Partner at the Purdue University Data Mine (overseeing a Data Science student project on mass spectrometry data)
- Purdue University: EAPS 100: Planet Earth, Summer 2021, 2022, 2023, 2024; Wasatch-Uintas Field Camp 2023, 2024.
- SUERC: Geochronology Seminar (not for credit), 2016

PUBLICATIONS IN PREP/REVIEW

Ickert, R.B., (sole author), Trace actinide interferences in common U reference materials may bias measurements of UO_2^+ by TIMS. In prep for JAAS.

Okhai, D., **Ickert R.B.,** Eddy, M.P., Interfere at Your Own Risk: Avoiding Organic Interferences on Pb Isotopic Measurements of Zircon via Thermal Ionization Mass Spectrometry. In prep for Geochronology.

PUBLICATIONS

Nardini, N., Casetta, F., **Ickert, R.B.**, Tavazzani, L., Okhai, D.C., Peres, S., Dellantonio, E., Ntaflos, T., Coltorti, M., 2025. The timing of the Middle Triassic magmatism in the Dolomites area (Southern Alps, Italy): U-Pb geochronology of zircon and titanite hosted in plutonic rocks and phonolite dykes. Lithos 494–495, 107894. https://doi.org/10.1016/j.lithos.2024.107894

Tremblay, M.M., Mark, D.F., Barfod, D.N., Cohen, B.E., **Ickert, R.B.**, Lee, M.R., Tomkinson, T., Smith, C.L., 2024. Dating recent aqueous activity on Mars. Geochemical Perspectives Letters 32, 58–62. https://doi.org/10.7185/geochemlet.2443

Donaghy, E.E., Eddy, M.P., Ridgway, K.D., **Ickert, R.B.**, 2024. Sedimentary record of oceanic plateau accretion: Revisiting the Eocene to Miocene stratigraphy of the northern Olympic Peninsula, Washington (USA). Geosphere. https://doi.org/10.1130/GES02778.1

Condon, D., Schoene, B., Schmitz, M., Schaltegger, U., **Ickert, R.B.**, Amelin, Y., Augland, L.E., Chamberlain, K.R., Coleman, D.S., Connelly, J.N., Corfu, F., Crowley, J.L., Davies, J.H.F.L., Denyszyn, S.W., Eddy, M.P., Gaynor, S.P., Heaman, L.M., Huyskens, M.H., Kamo, S., Kasbohm, J., Keller, C.B., MacLennan, S.A., McLean, N.M., Noble, S., Ovtcharova, M., Paul, A., Ramezani, J.,

Rioux, M., Sahy, D., Scoates, J.S., Szymanowski, D., Tapster, S., Tichomirowa, M., Wall, C.J., Wotzlaw, J.-F., Yang, C., Yin, Q.-Z., 2024. Recommendations for the reporting and interpretation of isotope dilution U-Pb geochronological information. GSA Bulletin 136, 4233–4251. https://doi.org/10.1130/B37321.1

Fink, J., Tremblay, M.M., Tobin, T.S., Stockli, L.D., Stockli, D.F., **Ickert, R.B.**, 2024. Diagenesis of fossil gar fish scales with implications for geochronology and paleoenvironmental applications. Geochimica et Cosmochimica Acta 372, 196–213. https://doi.org/10.1016/j.gca.2024.03.004

Li, R., Zhou, X., Eddy, M.P., **Ickert, R.B.**, Wang, Z., Tang, D., Huang, K.-J., Peng, P., 2024. Stratigraphic evidence for a major unconformity within the Ediacaran System. Earth and Planetary Science Letters 636, 118715. https://doi.org/10.1016/j.epsl.2024.118715

KDK Collaboration, Stukel, M., Hariasz, L., Di Stefano, P.C.F., Rasco, B.C., Rykaczewski, K.P., Brewer, N.T., Stracener, D.W., Liu, Y., Gai, Z., Rouleau, C., Carter, J., Kostensalo, J., Suhonen, J., Davis, H., Lukosi, E.D., Goetz, K.C., Grzywacz, R.K., Mancuso, M., Petricca, F., Fijałkowska, A., Wolińska-Cichocka, M., Ninkovic, J., Lechner, P., **Ickert, R.B**., Morgan, L.E., Renne, P.R., Yavin, I., 2023. Rare ^{40}K Decay with Implications for Fundamental Physics and Geochronology. Phys. Rev. Lett. 131, 052503. https://doi.org/10.1103/PhysRevLett.131.052503

KDK Collaboration, Hariasz, L., Stukel, M., Di Stefano, P.C.F., Rasco, B.C., Rykaczewski, K.P., Brewer, N.T., Stracener, D.W., Liu, Y., Gai, Z., Rouleau, C., Carter, J., Kostensalo, J., Suhonen, J., Davis, H., Lukosi, E.D., Goetz, K.C., Grzywacz, R.K., Mancuso, M., Petricca, F., Fijałkowska, A., Wolińska-Cichocka, M., Ninkovic, J., Lechner, P., **Ickert, R.B**., Morgan, L.E., Renne, P.R., Yavin, I., 2023. Evidence for ground-state electron capture of ^{40}K. Phys. Rev. C 108, 014327. https://doi.org/10.1103/PhysRevC.108.014327

Villa, I.M., Holden, N.E., Possolo, A., Ickert, R.B., Hibbert, D.B., Renne, P.R., Bonardi, M.L., Bièvre, P.D., 2022. IUGS–IUPAC recommendations and status reports on the half-lives of 87Rb, 146Sm, 147Sm, 234U, 235U, and 238U (IUPAC Technical Report). Pure and Applied Chemistry. https://doi.org/10.1515/pac-2021-1202.

Stone, A., Inglis, R., Barfod, D., **Ickert, R.B.**, Hughes, L., Waters, J., Jourdan, A.-L., Alsharek, A., 2022. Hydroclimatic and geochemical palaeoenvironmental records within tufa: A cool-water fluvio-lacustrine tufa system in the Wadi Dabsa volcanic setting, western Saudi Arabia. *Sedimentary Geology* 106181. https://doi.org/10.1016/j.sedgeo.2022.106181.

Drake S.J., Gomez-Rivas E., **Ickert R.B.**, Macdonald D.I.M. 2022. Temporal and spatial variations in calcium carbonate deposition in a mixed siliciclastic-carbonate deep marine system: The Ediacarian Deeside Limestone Formation; Aboyne, Scotland. *Scottish Journal of Geology*. v.58(1). https://doi.org/10.1144/sjg2021-017.

Cannings T., Balmer E.M., Coletti G., **Ickert R.B.,** Kroon D., Raffi I., Robertson A.H.F., 2021. Microfossil and strontium isotope chronology used to identify the controls of Miocene reefs and related facies in NW Cyprus. *Journal of the Geological Society*. v.178, 18p. https://doi.org/10.1144/jgs2020-081

Casetta F., **Ickert R.B.**, Mark D.F., Giacomoni P.P., Bondiman C., Ntaflos T., Zenetti A., Coltorti M., 2021. The Variscan subduction inheritance in the Southern Alps Sub-Continental Lithospheric Mantle: Clues from the Middle Triassic shoshonitic magmatism of the Dolomites (NE Italy). *Lithos*. v.380-381, 105856. https://doi.org/10.1016/j.lithos.2020.105856.

Carter J., **Ickert R.B.,** Mark D.F., Tremblay M.M., Cresswell A.J., Sanderson D.C.W., 2020. Production of ^{40}Ar by an overlooked mode of ^{40}K decay with implications for K-Ar geochronology. *Geochronology*. v.2(2) p.355-365. https://doi.org/10.5194/gchron-2-355-2020

Villa I.M., Holden N.E., Possolo A., **Ickert R.B.**, Hibbert B., Renne P.R. 2020. IUPAC-IUGS recommendation on the half-lives of ^{147}Sm and ^{146}Sm. *Geochimica et Cosmochimca Acta*. v.285, p. 70-77. https://doi.org/10.1016/j.gca.2020.06.022

Iles K.A., Hergt J.M., Woodhead J.D., **Ickert R.B.,** Williams I.S., 2020. Petrogenesis of granitoids from the Lachlan Fold Belt, southeastern Australia: the role of disequilibrium melting. *Gondwana Research*. v.79, p. 87-109. https://doi.org/10.1016/j.gr.2019.08.011

Tulan E., Sachsenhofer R.F., Tari G., Flecker R., Fairbank V., Pupp M., **Ickert R.B.**, 2020. Source rock potential and depositional environment of the Lower Oligocene Ihsaniye Formation in NW Turkey (Thrace, Karaburun). *Turkish Journal of Earth Sciences*. v.28, p. 64-84. http://dx.doi.org/10.3906/yer-1906-14

Casetta F., **Ickert R.B.**, Mark D.F., Bonadiman C., Giacomoni P.P., Coltorti M., 2019. The alkaline lamprophyres of the Dolomitic Area (Southern Alps, Italy): markers of the Late Triassic change from orogenic-like to anorogenic magmatism. *Journal of Petrology*. v.60(6), p. 1263-1298. http://dx.doi.org/10.1093/petrology/egz031

Regier M., Mišković A., **Ickert R.B.,** Pearson G.D., Stachel T., Stern R.A., Kopylova M. 2018. An oxygen isotope test for the origin of Archean mantle roots. *Geochemical Perspectives Letters*, v.9, p.6-10. http://dx.doi.org/10.7185/geochemlet.1830

Casetta F., Coltorti M., **Ickert R.B.**, Bonadiman C., Giacomoni P.P., Ntaflos T., 2018. Intrusion of shoshonitic magmas at shallow crustal depth: T-P path, H2O estimates and AFC modelling of the Middle Triassic Predazzo Intrusive Complex (Southern Alps, Italy). *Contributions to Mineralogy and Petrology,* v.173, 27pg. https://doi.org/10.1007/s00410-018-1483-0

Riches A.J.V., **Ickert R.B.,** Pearson D.G., Stern R.A., Jackson S.A., Ishikawa A., Kjarsgaard B.A., Gurney J.J., 2016. In situ oxygen-isotope, major-, and trace-element constraints on the metasomatic modification and crustal origin of a diamondiferous eclogites from Roberts Victor, Kaapvaal Craton. *Geochimica et Cosmochimica Acta* v.174, p. 345-359. http://dx.doi.org/10.1016/j.gca.2015.11.028

Fox M., **Ickert R.B.,** 2015. Model selection during sample-standard-bracketing using reversible jump Markov chain Monte Carlo. *Journal of Analytical Atomic Spectrometry* v.30, p. 2208-2213. http://dx.doi.org/10.1039/c5ja00102a

Ickert R.B., Mulcahy S.R., Sprain C.J., Manaszak J.F., Renne P.R., 2015. Chemical and Pb isotope composition of phenocrysts from bentonites constrains the chronostratigraphy around the Cretaceous-Paleogene boundary in the Hell Creek region, Montana. *Geochemistry, Geophysics, Geosystems* v.16, p. 2743-2761. http://dx.doi.org/10.1002/2015GC005898

Ickert R.B., Stachel T., Stern R.A., Harris J.W., 2015. Extreme ^{18}O-enrichement in majorite constrains a crustal origin of transition zone diamonds. *Geochemical Perspectives Letters* v.1, p. 65-74. http://dx.doi.org/10.7185/geochemlet.1507

Ickert R.B., Mundil R., Magee C.W., Mulcahy S.R., 2015. The U-Th-Pb systematics of zircon from the Bishop Tuff: A case study in the challenges to high-precision Pb/U geochronology at the millennial scale. *Geoc8himica et Cosmochimica Acta* v.168, p. 88-110. http://dx.doi.org/10.1016/j.gca.2015.07.018

Smit, K.V., Stachel, T., Creaser, R.A., **Ickert, R.B.,** DuFrane, S.A., Stern, R.A., Seller, M. 2014. Origin of eclogite and pyroxenite xenoliths from the Victor kimberlite, Canada, and implications for Superior craton formation. *Geochimica et Cosmochimica Acta* v.125, p. 308-337. http://dx.doi.org/10.1016/j.gca.2013.10.019

Ickert R.B., Stern R.A. 2013. Matrix corrections and error analysis in high-precision SIMS $^{18}O/^{16}O$ measurements of Ca-Mg-Fe garnet. *Geostandards and Geoanalytical Research*. http://dx.doi.org/10.1111/j.1751-908X.2013.00222.x

Ickert, R.B., Stachel, T., Stern R.A., Harris, J.W., 2013. Diamond from recycled crustal carbon documented by coupled $\delta^{18}O$- $\delta^{13}C$ measurements of diamonds and their inclusions. *Earth and Planetary Science Letters* v.364, p. 85-97. http://dx.doi.org/10.1016/j.epsl.2013.01.008

Ickert, R.B. 2013. Algorithms for estimating uncertainties in initial radiogenic isotope ratios and model ages. *Chemical Geology* v.340, p 131-138. http://dx.doi.org/10.1016/j.chemgeo.2013.01.001

Park, J.-W., Campbell, I.H., **Ickert, R.B.,** Allen, C.M., 2012. Chalcophile element geochemistry of the Boggy Plain zoned pluton, southeastern Australia: a S-saturated barren compositionally diverse magmatic system. *Contributions to Mineralogy and Petrology,* v.165(2), 217-236. http://dx.doi.org/10.1007/s00410-012-0806-9

Smart, K.A., Chacko, T., Stachel, T., Tappe, S., Stern, R.A., **Ickert, R.B.**, EIMF, 2012. Eclogite formation beneath the northern Slave craton constrained by diamond inclusions: Oceanic lithosphere

origin without a crustal signature. Earth and Planetary Science Letters v.319-320, p. 319-320. http://dx.doi.org/10.1016/j.epsl.2011.12.032

Ickert R.B., Williams I.S, 2011. U- Pb Zircon Geochronology of Siluro-Devonian Granites in Southeastern Australia: Implications for the Timing of the Benambran Orogeny and the I-S Dichotomy. Australian Journal of Earth Sciences, v.58(5), p. 501-516. http://dx.doi.org/10.1080/08120099.2011.562922

Ickert R.B., Williams I.S., Wyborn D, 2011. Ti in Zircon from the Boggy Plain Zoned Pluton; Implications for Zircon Petrology and Hadean Tectonics. Contributions to Mineralogy and Petrology. v.162(2), p. 447-461. http://dx.doi.org/10.1007/s00410-010-0605-0

Ickert R.B., Thorkelson D.J., Marshall D.D., Ullrich T.D., 2009. Eocene adakitic volcanism in southern British Columbia: Remelting of arc basalt above a slab window. Tectonophysics, v.464(1-4), p. 164-185. http://dx.doi.org/10.1016/j.tecto.2007.10.007.

Ickert R.B., Hiess J., Williams I.S., Holden P., Ireland T.R., Lanc P., Schram N., Foster J.J., Clement S.W., 2008. Determining high precision in situ, oxygen isotope ratios with a *SHRIMP II*: Analyses of MPI-DING silicate-glass reference materials and zircon from contrasting granites. Chemical Geology, v.257(1-2), p. 114-128. http://dx.doi.org/10.1016/j.chemgeo.2008.08.024.

Yeo G.M., Percival J.B., Jefferson C.W., **Ickert R**., and Hunt P., 2007. Environmental significance of oncoids and crypto-microbial laminites from the Late Paleoproterozoic Athabasca Group, Saskatchewan and Alberta; in *EXTECH IV*: Athabasca Uranium Multidisciplinary Study, Saskatchewan and Alberta, (ed.) C.W. Jefferson and G. Delaney; Geological Survey of Canada, Bulletin 588, p. 315-323. http://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/shorte.web&search1=R=223777.

CONFERENCE PROCEEDINGS (highlights from last 12 years)

Tremblay, M.M., Mark, D.F., Barfod, D.N., Cohen, B.E., **Ickert, R.B**., Lee, M.R., Tomkinson, T., Smith, C., Dating recent aqueous activity on mars. AGU Fall Meeting.

Ickert, R.B., Eddy, M.P., The Spike of Damocles: Availability of ^{205}Pb and ^{202}Pb threatens the future of U-Pb and Pb-Pb ID geochronology. Goldschmidt 2024.

Karmakar, S., Eddy, M.P., Ibanez-Meija, M., **Ickert, R.B.,** Multi-step chemical abrasion and dissolution applied to complex zircon from the Proterozoic Mt. Marcy Massif Anorthosite, New York. GSA 2024.

Fink J., Tremblay M.M., Tobin T., Stockli L.D., Stockli D.F., **Ickert R.B**., Diagenesis of fossil gar fish scales with implications for geochronological and paleoenvironmental applications. Goldschmidt 2023. https://conf.goldschmidt.info/goldschmidt/2023/meetingapp.cgi/Paper/14030

McLean N.M., **Ickert R.B.,** Multidynamic Mass Spectrometer Measurements Revisited, 2022. Goldschmidt 2022. https://doi.org/10.46427/gold2022.11634

Ickert R.B., Trace actinides in common U reference materials may bias measurements of UO_2^+ by TIMS. Goldschmidt 2022. https://doi.org/10.46427/gold2022.12278

Casetta F., **Ickert R.B.**, Mark D.F., Bonadiman C., Giacomoni P.P., Ntaflos T., Coltorti M., 2020. Volatile-rich melts as markers of the asthenospheric influx prior to rifting events: the case of the alkaline-carbonatitic lamprophyres of the Dolomitic Area (Southern Alps, Italy). EGU General Assembly 2020.

Mahajan R.S., **Mark D.F.,** Ickert R.B., 2019. Building an accurate and precise chronological framework fo rthe British Palaeogene Igneous Province. AGU Fall Meeting, San Francisco.

Ickert R.B., Carter J.N., Mark D.F., Tremblay M.M., Cresswell A., Sanderson D.C.W., Percent-level production of ^{40}Ar by an overlooked mode of ^{40}K decay. AGU Fall Meeting, San Fancisco.

Mahajan R.S., **Ickert R.B.**, Mark D.F., 2019. Building an acccurate and precise chronological framework for the British Paleogene Igneous Province. EGU: Mass extincitons, recovery and resiliance meeting, Utrecht.

Papadopoulos V., Boyce A., Mark D., **Ickert R.**, Tsikos H., 2019. Investigation of large-scale brine circulation as mechanism of ore formation in the Kalahari and Postmasburg Fe-Mn fields, South Africa. Society for Geology applied to Mineral Deposits Biennial Meeting, Glasgow.

Ickert R.B., Mahajan R.S., Carter J., Gallagher V., Kelly A., Mark D.F., 2017. Extending the utility of multi-dynamic MC-TIMS by optimal use of redundant data. Goldschmidt 2017.

Mahajan R.S., **Ickert R.B.,** Mark D.F., 2017. Assembly of the British Tertiary Igneous Province. Goldschmidt 2017.

Mark D.F., Ickert R.B., Mahajan R.S., Dymock R., Imlach J., 2017. Interrogation of apparent age dispersion in ^{40}Ar/^{39}Ar neutron fluence monitor minerals. Goldschmidt 2017.

Pearson D.G., Stachel T., Palot M., **Ickert R.B.**, 2015. History of crustal recycling recorded in transition zone diamonds. AGU Fall Meeting, San Francisco, California.

Mundil R., **Ickert R.B.**, Simon J.I., Renne P.R., 2015. Considering the Complexities of U-Pb geochronology at the millenial scale. AGU Fall Meeting, San Francisco, California.

Ickert R.B., Mundil R., Sharp W.D., 2014. High-precision Th-Pb dating by isotope-dilution TIMS+MC-ICPMS – Preliminary Results. AGU Fall Meeting, San Francisco, California.

Ickert R.B., Mundil R., Magee C.W., 2014. U-Th-Pb systematics of the Bishop Tuff zircon. Goldschmidt 2014.

Ickert R.B., Renne P.R., Deino A.L., Sharp W.D., 2014. Rapid and precise Pb isotope analysis of K-feldspar: A new tool for tephrochronology. Goldschmidt 2014.

Mundil R., Irmis R.B., **Ickert R.B.**, 2014. Integrated Chronostratigraphy from outcrop and drill core samples (Late Triassic, Colorado Plateau). Goldschmit 2014.

Ickert R.B., Magee C.W., Mundil R., 2013. SIMS and TIMS U-Th-Pb geochronology of zircon from the Bishop Tuff. AGU Fall Meeting.

Ickert R.B., Mundil R. 2013. Alternative approaches to evaluating geochemical data: Beyond the weighted-mean. William Smith Meeting 2013: The first century of isotope geochronology. London.

Mundil R., Irmis R. B., **Ickert R.B.**, 2013. Understanding the early Mesozoic world: New geochronological data from terrestrial and marine strata. EGU General Assembly, Vienna.

Ickert R.B., and Mundil R., 2012. An objective method to determine the probability distribution of the minimum apparent age of a sample of radio-isotopic dates. AGU Fall Meeting, San Francisco, California.