

David O Zakharov

Curriculum vitae

Citizenship: U.S., Russia

Address: Institute of Earth Sciences, University of Lausanne, Géopolis, UNIL-Mouline
Lausanne, Switzerland, CH-1015

Email: david.zakharov@unil.ch

Website: <https://davidzakharov.com>

RESEARCH INTERESTS

Isotope geochemistry, $\Delta^{17}\text{O}$ in terrestrial systems, crustal evolution, water-rock interaction, Precambrian surface conditions

EDUCATION

1. University of Oregon, Eugene, OR 06/2014-09/2019
PhD thesis: Triple Oxygen Isotopes in High-Temperature Hydrothermally Altered Rocks: A Record of Paleoclimate and Ancient Hydrosphere-Rock Interactions
Advisor: Ilya Bindeman
2. Russian State Geological Prospecting University, Moscow 09/2008-07/2013
A specialist degree in mineralogy, petrology and applied geochemistry
Degree thesis: Geochemistry and Petrography of Peralkaline Granites from the 1.9 Ga Gremyakh-Vyrmes complex, Kola Peninsula
Hosted at L. Kogarko's lab, Vernadsky Institute

EMPLOYMENT

1. University of Lausanne, Switzerland 01/2020-present
Postdoctoral researcher
2. University of Oregon 06/2014-12/2019
Graduate student employee/research associate
- University of Manitoba 09/2013-05/2014
Research and Teaching Assistant
3. University of Illinois, Urbana-Champaign 06/2013-09/2013
Research Assistant
4. Vernadsky Institute of Geochemistry, Moscow 04/2012-05/2013
Research Assistant

PUBLISHED AND ACCEPTED PAPERS

1. Zakharov D.O., Lundstrom C.C., Laurent O., Reed M.H., and Bindeman I.N. (2021) Influence of high marine Ca/SO₄ ratio on alteration of submarine basalts at 2.41 Ga documented by triple O and Sr isotopes of epidote. *Precambrian Research*, **358**, 106164.
2. Zakharov D.O., Marin-Carbonne J., Alleon J. and Bindeman I.N. (2021) Temporal triple oxygen isotope trend recorded by Precambrian certs: A perspective from combined bulk and in situ secondary ion probe measurements. *Reviews in Mineralogy & Geochemistry*, vol. **86**, 323-365.
3. Waterton P., Hyde W.R., Tusch J., Hollis J.A., Kirkland C.L., Kinney C., Yakymchuk C., Gardiner N.J., Zakharov D., Olierook H.K.H., Münker C., Lightfoot P.C. and

- Szilas K. Geodynamic implications of synchronous norite and TTG formation in the 3 Ga Maniitsoq Norite Belt, West Greenland. *Frontiers in Earth Sciences* **8**, 562062, <https://doi.org/10.3389/feart.2020.562062>
4. Zakharov D.O., Bindeman I.N., Tanaka R., Fridleifsson G.O., Reed M.H. and Hampton R.L. (2019) Triple oxygen isotope systematics as a tracer of fluids in the crust: A study from modern geothermal systems of Iceland. *Chemical Geology* **530**, 119312, <https://doi.org/10.1016/j.chemgeo.2019.119312>
 5. Zakharov D.O., Bindeman I.N., Serebryakov N.S., Prave A.R., Azimov P.Ya. and Babarina I.I. (2019) Low $\delta^{18}\text{O}$ rocks in the Belomorian belt, NW Russia and Scourie dikes, NW Scotland: A record of ancient meteoric water captured by the early Paleoproterozoic global magmatism. *Precambrian Research* **333**, 105431, <https://doi.org/10.1016/j.precamres.2019.105431>
 6. Zakharov D.O. and Bindeman I.N. (2019) Triple oxygen and hydrogen isotopic study of hydrothermally altered rocks from the 2.43-2.41 Ga Vetreny belt, Russia: An insight into the early Paleoproterozoic seawater. *Geochimica Cosmochimica Acta* **248**, 185-209, <https://doi.org/10.1016/j.gca.2019.01.014>
 7. Bindeman I.N., Zakharov D.O., Palandri J., Greber N.D., Retallack G.J., Hofmann A., Dauphas N., Lackey J.S. and Bekker, A. (2018) Rapid growth of subaerial crust and the onset of a modern hydrologic cycle at the Archean-Proterozoic transition. *Nature* **557**, 545-548, <https://doi.org/10.1038/s41586-018-0131-1>
 8. Avice, G., Marty, B., Burgess, R., Hofmann, A., Philippot, P., Zahnle, K., and Zakharov, D. (2018) Evolution of atmospheric xenon and other noble gases inferred from Archean to Paleoproterozoic rocks. *Geochimica Cosmochimica Acta* **232**, 82-100, <https://doi.org/10.1016/j.gca.2018.04.018>
 9. Zakharov D.O., Bindeman I.N., Slabunov A.I., Ovtcharova M., Coble M.A., Serebryakov N. S. and Schaltegger U. (2017) Dating the Paleoproterozoic snowball Earth glaciations using contemporaneous subglacial hydrothermal systems. *Geology* **45**, 5-8, <https://doi.org/10.1130/G38759.1>
 10. Bindeman I.N., Bekker, A. and Zakharov D.O. (2016) Oxygen isotope perspective on crustal evolution on early Earth: A record of Precambrian shales with emphasis on Paleoproterozoic glaciations and Great Oxygenation Event. *Earth Planet. Sci. Lett.* **437**, 101-113, <https://doi.org/10.1016/j.epsl.2015.12.029>
 11. Khisamutdinova A.I., Zakharov D.O. and Soloviev A.V. (2015) The Western Kamchatka sedimentary basins: origin, age and composition of basal conglomerates. *Russian Journal of Pacific Geology*, **34**, 78-92.
 12. Onikienko L.D., Uganov, S.S., Zakharov D.O. and Ivanov, M.A. (2012) Geology, mineralogy and formation conditions “Oskolskiy” gold-bearing conglomerates from Kursk Magnetic Anomaly. *Razvedka i Ohrana Nedr (Prospect and Protection of Mineral Resources; in Russian)* **12**, 3-7, <https://elibrary.ru/item.asp?id=18208329>

SELECTED ORAL PRESENTATIONS

1. Temporal triple oxygen isotope trend recorded by Precambrian certs: A perspective from combined bulk and in situ secondary ion probe measurements. Mineralogical Society of America workshop 2020.
2. Hydrothermal seawater-basalt exchange reactions traced by triple oxygen and strontium isotope values of fluids and epidotes, EGU 2020.
3. Modern and ancient hydrosphere-rock interactions constrained from triple oxygen isotope and *in situ* measurements, Goldschmidt 2020, *invited*.
4. The effect of low sulfate in the Precambrian oceans on seawater-basalt reaction traced by triple oxygen and strontium isotopes. AGU 2019.
5. Triple Oxygen and Hydrogen Isotopes in Syn-glacial Hydrothermally Altered Rocks: Comparison Between Modern Rocks of Iceland and Snowball Earth Age Rocks from the Baltic Shield , GSA 2017.

AWARDS AND INDEPENDENT FUNDING

- Russian Federal Agency of Mineral Resources award for undergraduate research
- Manitoba Province Graduate Scholarship
- GSA Student Research Grant 2017 (\$1265)
- National Geographic Young Explorer Grant 2017 (\$4620)
- Evolving Earth Foundation Grant 2018 (\$2780)

EXPERIENCE AS A TEACHING ASSISTANT

At University of Manitoba:

- Mineralogy (GEOL2500 Fall 2013; Instructor: Anton Chakhmouradian)
- Igneous and Metamorphic Petrology (GEOL2520 Winter 2014; Instructor: Anton Chakhmouradian)

At University of Oregon:

- Introduction to Geology (GEOL101 Fall 2014; Instructor: Dana Johnston)
- Volcanoes and Earthquakes (GEOL306 Winter 2015; Instructor: Ilya Bindman)
- Earth Materials (GEOL311 Spring 2015 & Spring 2016 Instructor: James Watkins)
- Mineralogy (GEOL331 Fall 2015; Instructor: David Blackwell)
- Isotope Geochemistry (GEOL 473/573 Winter 2016; Instructor: Ilya Bindeman)
- Introduction to Petrology (GEOL332 Winter 2017 & Winter 2018; Instructor: Ilya Bindeman)
- Evolving Earth (GEOL203 Spring 2017; Instructor: Gregory Retallack)
- Paleopedology (GEOL435 Spring 2017; Instructor: Gregory Retallack)
- Earth Recourses (GEOL310, Fall 2017; Instructor: David Blackwell)
- Earth and Environmental Data Analysis (GEOL418/518 Winter 2019; Instructor: Edward Davis)
- Exploring Earth History (GEOL103 Spring 2019; Instructor: Mary Baxter)

At University of Lausanne:

- Metamorphic Petrology (Fall 2020; Instructor: Lukas Baumgartner)

OUTREACH AND INVOLVEMENT IN THE COMMUNITY

- Co-organizer and chair of the sessions:
 - “Triple isotopes of oxygen and sulfur in terrestrial systems” at AGU 2018, Washington DC, USA
 - “Applications and Advances in triple oxygen isotope systematics” at Goldschmidt 2021, Lyon, France
- Invited lectures and lab tours at the University of Oregon for interested undergraduates: Oxygen isotopes and paleoclimate for Earth Materials (geology department), Stable Isotope Lab (geology department), Oxygen (chemistry department), Early Earth (geology department)
- Volunteer for science fair middle-school students from Western and Central Oregon (Central Western Oregon Science Expo, CWOSE)
- Founder of Curiosity: community science project:
<http://blogs.uoregon.edu/curiosity/>
- Reviewer for: *Lithos*, *Geochimica Cosmochimica Acta*, *Contributions to Mineralogy and Petrology*, *Nature Geoscience*, *Geology*, *Reviews in Mineralogy and Geochemistry*, *American Journal of Science*, *American Mineralogist*, *International Geology*, *New Zealand Journal of Geology and Geophysics*.

ADVISING AND GUIDANCE OF UNDERGRADUATE STUDENTS

Charlotte Honait (Spring 2016; University of Oregon), Wesala Basri (Winter 2017; University of Oregon), Nicole Russo (bachelor project; ongoing Winter 2021; University of Lausanne)