David O Zakharov

Curriculum vitae

Citizenship: U.S., Russia
Address: University of Lausanne, Institute of Earth Sciences, Géopolis, Lausanne, Switzerland
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RESEARCH INTERESTS

Isotope geochemistry, $\Delta^{17}O$ 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 Gremyakha-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, SUBMITTED AND ACCEPTED PAPERS

1. Zakharov D.O., Lundstrom C.C., Laurent O., Reed M.H., and Bindeman I.N. Influence of high marine Ca/SO_4 ratio on alteration of submarine basalts at 2.41 Ga documented by triple O and Sr isotopes of epidote. *Precambrian Research (accepted)*
2. Zakharov D.O., Marin-Carbonne J., Alleon J. and Bindeman I.N. (2021) Temporal triple oxygen isotope trend recorded by Precambrian cherts: 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 $\delta^{18}O$ rocks in the Belomorian belt, NW Russia and Scourie dikes, NW Scotland: A record of ancient meteoric water captured by the early Paleoproterozoic global magic 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
  "Evolving Precambrian environments: Interactions in the crust-hydrosphere-biosphere-atmosphere system" at EGU2021, Online
  "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)