

# Emerging Investigator Series

## International Association of GeoChemistry (IAGC)

Shohei Hattori, January 2024

[Shohei Hattori](#) is a Tenured Associate Professor at the [International Center for Isotope Effects Research Center \(ICIER\)](#), Nanjing University, China. He is Japanese and earned his Ph.D. from the Tokyo Institute of Technology (Tokyo Tech), Japan.



Before joining Nanjing University, he served as an Assistant Professor at Tokyo Tech from 2013 to 2021. Shohei is an Isotope Geochemist with a broad interest in various topics within Environmental Geochemistry, including atmospheric chemistry, biogeochemistry, and cryosphere sciences. His motivation extends beyond specific "spheres" (such as the atmosphere, biosphere, cryosphere, etc.) and "phases" (gas, liquid, and solid phases) to encompass the Earth system. His original research paper, titled "Latitudinal Difference in Sulfate Formation from Methanesulfonate Oxidation in Antarctic Snow Imprinted on  $^{17}\text{O}$ -Excess Signature" was published in *Applied Geochemistry*. This paper is featured in the Emerging Investigator Series and has been selected as the Editor's Choice.

### Reference:

Hattori, S., Ishino, S., Suzuki, N., Nakazawa, F., Oyabu, I., Tsutaki, S., Hirabayashi, M., Noro, K., Takenaka, N., Kawamura, K., Yoshida, N., Motoyama, H., Latitudinal difference in sulfate formation from methanesulfonate oxidation in Antarctic snow imprinted on  $^{17}\text{O}$ -excess signature, *Applied Geochemistry*. 162, 10590 <https://doi.org/10.1016/j.apgeochem.2024.105901>

*What excites you most about the work published in Applied Geochemistry?*

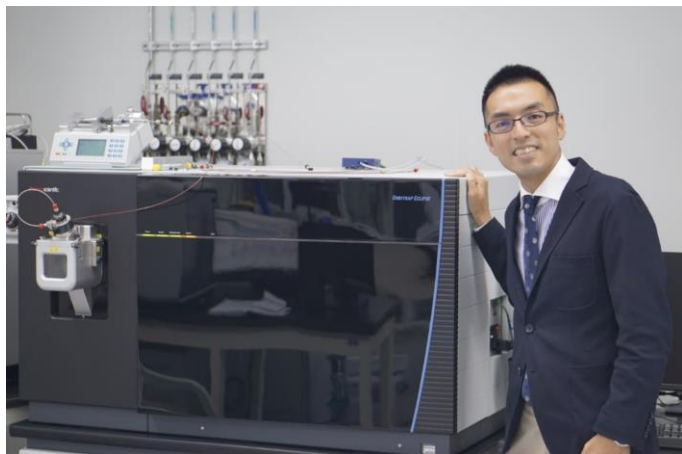
This study represents a significant milestone as it combines the valuable snow samples collected by the Japanese Antarctic Research Expedition (JARE) with analysis of triple oxygen isotopic composition of sulfate that we developed. The paper, which builds upon the hypothesis we proposed in our 2021 publication (Ishino et al. 2021 JGR-A) with my former Ph.D. student [Sakiko Ishino](#) (now Assistant Professor at Kanazawa University, Japan), allowed us to validate our ideas using Antarctic snow samples. Seeing the results was incredibly exhilarating. Moreover, this work necessitates a reevaluation of previous ice core interpretations about past atmospheric oxidant chemistry, marking it as an exceptionally important contribution to our field.



*A group photo when Shohei was in Tokyo Tech, Japan (2018 April).*

*Describe your research group at ICIER in Nanjing University. What are you working on and with whom are you collaborating?*

International Center for Isotope Effects Research (ICIER) at Nanjing University is a unique institute, specializing in 'Isotope Effects.' I was recruited by the ICIER Director, Prof. Huiming Bao, at the AGU meeting in 2019, and I joined in 2022. Currently, we are in the initial phase of setting up our lab/group, focusing on developing our analysis systems. Although I have experience in developing several isotopic analytical systems in Japan, I am eager to venture into unexplored areas rather than just continuing past work. I am particularly advancing a new isotopologue analysis using Orbitrap-MS.



*Shohei with his new gear ESI-Orbitrap-MS.*

ICIER comprises faculty members with diverse specializations. While we operate independently as PIs, we foster a culture of regular communication and mutual support among faculty members. We particularly emphasize collaborative education of our students, aiming to broaden their potentials. One aspect of ICIER that truly amazed me is Prof. Yongbo Peng's laboratory management. We often discuss how to make ICIER a great place. It's incredibly rewarding to create an international research institute, not just for conducting research but also for building a culture that facilitates new research. All members of ICIER are open and supportive, making this culture quite

feasible. We are looking forward to hiring more international researchers, eagerly anticipating their contributions.



*ICIER group photo (2023 November)*

*Where do you see your research program heading, and what topics are you most interested in pursuing?*

One of my current focuses is particularly on Methanesulfonate (MSA), given its anticipated high 17O-excess in MSA based on our studies. I am keen on measuring it accurately. I'm fascinated by how sulfur compounds, originating from marine biogenic activity, undergo chemical reactions in the atmosphere, transforming into sulfate and/or MSA. I aim to elucidate the formation of such natural aerosols and their climate impacts through isotopic analysis and model interpretation. To this end, we plan to analyze atmospheric aerosols collected from the Greenland ice core and Antarctica. Additionally, I have a growing interest in glacier darkening and the related biological activities. One of my motivations for coming to China was to participate in field observations of glaciers. I intend to delve deeper into the geochemistry involving the atmosphere and biology of the cryosphere.



*Shohei at glacier field (2023 September)*

*As an early career investigator, are there any advice or experience that you want to share with the audience of Applied Geochemistry?*

In meetings with my new students, I've been focusing not just on the content of our research, but also on topics like 'what kind of scientist do you want to become?' or 'which journals do you like and the reason?' Since we come from different countries and cultures, even within Asia, I try to engage in discussions that stimulate their inner motivations, not just about research. Life in research can be tough and often competitive. Therefore, it's crucial to remember why we're spending such a significant part of our lives on this endeavor, recalling the initial motivation and inspiration that started it all.

It is important to live each day as if you are on a journey. Maintaining a keen sense of awareness and openness to external stimuli, much like when you are traveling, can bring a freshness to everyday life. That's why rest is so important! When research gets busy and overwhelming, the first step should be to take a good rest, to refresh both the body and mind. Furthermore, I always emphasize to my students the importance of communication! Most problems have already been thought of by someone, and talking with others often helps in organizing thoughts and sparking new ideas. I truly believe in the saying I once heard, 'The fruits of your research are proportional to the number of your conversations with others.' Therefore, early career folks including students, remember

that our doors are always open for you. Feel free to come by anytime!



*Group photo of Shohei's research group at ICIER/NJU (2024 January)*

The aim of the [IAGC Emerging Investigator Series](#) is to highlight excellent work by independent researchers in their early career that bring new insights into the field of geochemistry or to promote geochemical applications. Multidisciplinary work related to applied geochemistry, biogeochemical processes, and environmental geochemistry are also highly welcomed. Featured articles as well as the authors as emerging investigators will be extensively advertised to diverse disciplines and communities through multiple platforms of the journal and the International Association of GeoChemistry.