

Kyungmin Kim

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Education

University of Alaska Fairbanks

Aug. 2021 – Present

Ph.D. in Geophysics

Fairbanks, AK

- Advisor: Dr. Tarsilo Girona
- Dissertation: *Gas-driven seismicity and data assimilation for volcanic eruption forecasting*
- Research focus: volcanic LP and tremor source modeling, Bayesian inversion, Ensemble Kalman Filter, laboratory analog experiments
- Relevant Coursework: Foundation of Geophysics, Presentation techniques in Geosciences, Applied Multivariate Statistics, Inverse Problems and Parameter Estimations, Selected Topics in Volcanology, Nonparametric Statistics, Numerical Linear Algebra, Numerical Analysis of Differential Equations, Applied Seismology
- Affiliation: Alaska Volcano Observatory (AVO)

Tohoku University

Apr. 2018 – Mar 2020

M.S. in Earth Science (MEXT scholarship)

Sendai, Japan

- Advisor: Dr. Nakamura Michihiko
- Thesis: *Petrological Constraints on the Magma Fragmentation Pressure on the Hiei eruption (AD 1707) of Fuji Volcano -Implications for the Dynamics of Basaltic Plinian Eruptions*
- Research Focus: Petrological experiment to constrain eruptive magma conditions at Fuji Volcano, Conduit flow model to constrain basaltic eruptive conditions

Seoul National University

Mar. 2011 – Aug. 2017

B.S. in Earth and Environmental Sciences

Seoul, South Korea

- Advisor: Dr. Jinho Ahn
- Thesis: Greenhouse gas formation in ice wedge at Cuyue, central Yakutia

Visiting Research Experience

Istituto Nazionale di Geofisica e Vulcanologia (INGV)

Sept. 2023 – Dec. 2023

Visiting Researcher

Rome, Italy

- Performing laboratory experiments simulating volcano seismicity by injecting gas to the conduit and pass through water and porous media.

Other Education Experiences

Seismology Skill Building Workshop

June 2022 – August 2022

Remote

- Developed practical skills in seismic data processing using Jupyter Notebook and SAC (Seismic Analysis Code), including waveform preprocessing, event location, and basic spectral analysis

ROSES (Rising Online Session for Emerging Seismologists)

June 2021 – August 2021

Remote

- Participated in an international seminar series covering diverse seismological topics (e.g., earthquake source physics, volcanic and environmental seismology), strengthening interdisciplinary research perspectives

Publications

Yang, J. W., Ahn, J., Iwahana, G., Han, S., **Kim, K.**, & Fedorov, A. (2020). Brief Communication: The reliability of gas extraction techniques for analysing CH₄ and N₂O compositions in gas trapped in permafrost ice wedges. *The Cryosphere*, 14(4), 1311–1324. doi:10.5194/tc-14-1311-2020

Yang, J. W., Ahn, J., Iwahana, G., Ko, N., Kim, J. H., **Kim, K.**, *et al.* (2023). Origin of CO₂, CH₄, and N₂O trapped in ice wedges in central Yakutia and their relationship. *Permafrost and Periglacial Processes*, 34(1), 122–141. doi:10.1002/ppp.2176

Kim, K., Yang, J. W., Yoon, H., Byun, E., Fedorov, A., Ryu, Y., & Ahn, J. (2019). Greenhouse gas formation in ice wedge at Cyuie, central Yakutia. *Permafrost and Periglacial Processes*, 30(1), 48–57. doi:10.1002/ppp.1994

Manuscripts in Preparation

Kim, K., Girona, T., Spina, L., Taddeucci, J., Loughlin, T., Clor, L., Pennacchia, F., Cornelio, C., & Spagnuolo, E. (in prep.). Experimental insights into gas flow–driven seismicity in porous media: Estimating volcanic gas emissions from seismic data.

Kim, K., Girona, T., Anderson, K., & Matthe, H. (in prep.). Characterizing the onset of the 2021 Great Sitkin dome-building eruption through trans-dimensional Bayesian inversion of long-period seismicity.

Kim, K., Girona, T., & Power, J. (in prep.). Data assimilation of seismicity during the Great Sitkin eruption (2021- 2026): Implication for gas flow rate and eruption dynamics

Conference Presentations

06/2025. IAVCEI Scientific Assembly, Geneva, Switzerland. *Poster Presentation*. “Characterizing pre- and syn-eruptive processes at Great Sitkin Volcano, Alaska, by integrating seismic data assimilation and satellite-based thermal anomalies.” **Kim, K.**, Girona, T., Anderson, K., Power, J., Yang, X., & Haney, M.

06/2025. IAVCEI Scientific Assembly, Geneva, Switzerland. *Poster Presentation*. “Investigating volcanic tremor and long-period seismic events through experiments on porous media gas flow.” **Kim, K.**, Spina, L., Taddeucci, J., Pennacchia, F., Cornelio, C., Spagnuolo, E., & Girona, T.

12/2024. American Geophysical Union Annual Meeting, Washington, DC. *Oral Presentation*. “Characterization of the 2021–2022 Great Sitkin dome-building eruption through Bayesian inversion of LP seismicity.” **Kim, K.**, Girona, T., & Anderson, K.

09/2024. NASA Solid Earth Team Meeting, Washington, DC. *Poster Communication*. “Constraining the pre-eruptive and co-eruptive conditions of dome-building eruptions through the analysis of thermal anomalies and the inversion of long-period seismicity: The case of Great Sitkin Volcano, Alaska.” **Kim, K.**

04/2024. Seismological Society of America Annual Meeting, Anchorage, AK. *Poster Communication*. “Laboratory experiments on gas-driven volcanic tremor and long-period seismicity.” **Kim, K.**, Spina, L., Taddeucci, J., Pennacchia, F., Cornelio, C., Spagnuolo, E., & Girona, T.

04/2024. Seismological Society of America Annual Meeting, Anchorage, AK. *Poster Communication*. “Characterization of the onset of the Great Sitkin dome-building eruption through trans-dimensional Bayesian inversion of LP seismicity.” **Kim, K.**, Girona, T., & Anderson, K.

02/2023. IAVCEI Scientific Assembly, Rotorua, New Zealand. *Oral Presentation (Virtual)*. “Characterization of the 2021–2022 Great Sitkin dome-building eruption through Bayesian inversion of LP seismicity.” **Kim, K.**, Girona, T., & Anderson, K.

02/2023. IAVCEI Scientific Assembly, Rotorua, New Zealand. *Poster Communication (Virtual)*. “Petrological constraints on the magma fragmentation pressure of the 1707 Hoei eruption of Fuji Volcano and inferred eruption dynamics.” **Kim, K.**, Nakamura, M., Kozono, T., & Yoshimoto, M.

06/2022. Cities on Volcanoes, Heraklion, Greece. *Oral Presentation (Virtual)*. “Characterization of the 2021–2022 Great Sitkin dome-building eruption through the inversion of LP seismicity.” **Kim, K.**, & Girona, T.

09/2019. Volcanological Society of Japan, Kobe, Japan. *Oral Presentation*. “Petrological constraints on the magma fragmentation pressure of the 1707 CE Hoei eruption of Fuji Volcano: Implications for the dynamics of basaltic Plinian eruptions.” **Kim, K.**, Nakamura, M., Kozono, T., & Yoshimoto, M.

06/2016. International Conference on Permafrost, Potsdam, Germany. *Poster Communication.* “Ancient environments and climate of central Siberia inferred from ice wedges at Cyuie Village near Yakutsk.” **Kim, K.**, Ahn, J., Byun, E., Yoon, H., Fedorov, A., & Yang, J. W.

Work Experience

Republic of Korea Air Force, K-16 Air Base (Seoul Air Base)

Mar. 2013 – Feb. 2015

Weather Observer (Mandatory Military Service)

Seongnam, South Korea

- Served as a weather observer responsible for continuous meteorological monitoring in support of flight operations.
- Conducted real-time observations of atmospheric conditions, including visibility, cloud cover, wind, temperature, and precipitation.
- Prepared and communicated aviation weather briefings to support safe airbase operations.
- Completed service as part of the Republic of Korea’s mandatory military service requirement.

Field Work Experience

06/2025. IAVCEI Scientific Assembly 2025 Field Trip, Eifel Volcanic Field, Germany. Participated in field excursions focused on volcanic structures, eruptive products, and regional magmatic processes.

08/2024. Alaska Volcano Observatory field work, Redoubt Volcano, Iliamna Volcano, and Ninilchik receiver site, Alaska. Assisted with maintenance and repair of seismic network sites and receiver installations (with Ellie Boyce).

05/2018. Asama Volcano field excursion, Japan. Conducted field observations of volcanic deposits and eruptive features as part of graduate-level training.

07/2015. Yakutsk and Cyuie Village, central Yakutia, Russia. Collected ice wedge samples and conducted field observations for permafrost and paleoclimate studies.

Community Service

Geophysical Institute Graduate Student Association (GIGSA)

May 2022 – Aug. 2023

Treasurer

University of Alaska Fairbanks

- Managed the associations budget, tracked expenditures, and handled reimbursement processes.
- Coordinated funding allocation to support graduate student activities and community events.

Awards & Honors

Best Student Poster Award. Geological Society of Korea Annual Meeting. Awarded for the poster presentation titled “Ancient biogeochemical environments and climate inferred from ice wedge at Cyuie Village near Yakutsk, Siberia.”

Travel Grant Award. International Conference on Permafrost (ICOP), 2016, Potsdam, Germany. Awarded competitive travel support to attend and present research at the international conference.

SKILLS

Programing Languages Python, Jupyter notebook, MATLAB

Spoken and Written Language Korean (Native Language), English (Advanced), Japanese (Advanced)