

Shangqin Hao

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La Jolla, CA 92093, United States

EDUCATION

- **University of California San Diego** Sept., 2020 - Now
Ph.D. candidate in Geophysics, Advisor: Dr. Peter M. Shearer La Jolla, United States
- **University of Science and Technology of China** Sept., 2017 - Jul., 2020
M.S. in Geophysics, Advisor: Dr. Zhongqing Wu Hefei, China
- **Nanjing University** Sept., 2013 - Jul., 2017
B.S. in Geology, Advisor: Dr. Zhongqing Wu, Dr. Tao Wang Nanjing, China

PROJECTS

- **Substantial global radial variations of basalt content near the 660-km discontinuity** May, 2023 - Oct., 2024
 - Constrained seismic velocity, density, and basalt content at and below the 660-km discontinuity (d660) by S660S waveform inversions
 - Found that slabs exhibit a smaller impedance jump across the d660 but a steeper gradient below the d660 compared to other regions
 - Suggested that basalt accumulates at the d660, especially in subduction zones, but decreases significantly below it, forming a harzburgite-enriched layer
- **Upper-mantle structure beneath Alaska imaged by teleseismic S-wave reverberations** May, 2021 - May, 2023
 - Imaged the Moho and mantle transition zone (MTZ) discontinuities beneath Alaska by stacking long-period teleseismic SH waves
 - Observed crustal thickness is generally consistent with surface topography and gravity measurements
 - Suggested that the Pacific slab may have penetrated into the upper MTZ under central Alaska but not under the Alaska Peninsula
- **Thermoelasticity of phase D and implications for low-velocity anomalies and local discontinuities at the uppermost lower mantle** Sept., 2019 - Sept., 2021
 - Obtained elasticity and density of phase D under the lower-mantle conditions
 - Proved that the accumulation of phase D may account for seismic anisotropy rather than low-velocity anomalies in the uppermost lower mantle (ULM)
 - Suggested that the decomposition of phase D in the ULM causes a density jump, possibly explaining some discontinuities in subduction zones
- **Compositional and thermal state of the lower mantle from joint 3D inversion with seismic tomography and mineral elasticity** Oct., 2018 - June, 2023
 - Inverted for the 3D chemical composition and thermal state of the lower mantle based on seismic tomography and mineral elasticity data
 - Found that velocity heterogeneities in the upper lower mantle mainly result from thermal anomalies, whereas those in the lowermost mantle mainly result from compositional or phase variations
 - Found that LLSVPs have ~500 K higher temperature, higher Bridgmanite and iron content than the ambient mantle, supporting the origin from an ancient basal magma ocean
- **Elasticity of akimotoite under the mantle conditions: Implications for multiple discontinuities and seismic anisotropies at the depth of ~600-750 km in subduction zones** Oct., 2017 - Sept., 2019
 - Calculated the elasticity of akimotoite under the mantle conditions using first-principles calculations
 - Estimated the V_P , V_S , and density contrasts caused by the akimotoite-related transitions and
 - Proved that the discontinuity at the depth of ~700-750 km in cold slabs could result from the decomposition of pyrope rather than the akimotoite-bridgmanite transition

PUBLICATIONS

- [1] **Hao, S.**, Wei, S. S., & Shearer, P. M. Substantial global radial variations of basalt content near the 660-km discontinuity. Minor revision submitted to AGU Advances.
- [2] **Hao, S.**, Yang, D., Wang, W., Zou, F., & Wu, Z. (2024). Thermoelasticity of phase D and implications for low-velocity anomalies and local discontinuities at the uppermost lower mantle. *American Mineralogist*.
- [3] Deng, X., Xu, Y., **Hao, S.**, Ruan, Y., Zhao, Y., Wang, W., ... & Wu, Z. (2023). Compositional and thermal state of the lower mantle from joint 3D inversion with seismic tomography and mineral elasticity. *Proceedings of the National Academy of Sciences*, 120(26), e2220178120.
- [4] **Hao, S.**, Shearer, P., & Liu, T. (2023). The Upper-Mantle Structure Beneath Alaska Imaged by Teleseismic S-Wave Reverberations. *Journal of Geophysical Research: Solid Earth*, 128(6), e2023JB026667.
- [5] Song, J., Qian, W., **Hao, S.**, Wang, W., Sun, D., & Wu, Z. (2023). Elasticity of high-pressure clinoenstatite under mantle conditions: Implications for the origin of the X-discontinuity. *Science China Earth Sciences*, 66(4), 718-729.
- [6] Song, Z., Wu, Z., Wang, W., **Hao, S.**, & Sun, D. (2022). Elasticity of phase H under the mantle temperatures and pressures: Implications for discontinuities and water transport in the mid-mantle. *Journal of Geophysical Research: Solid Earth*, 127(11), e2022JB024893.
- [7] Zhao, Y., Wu, Z., **Hao, S.**, Wang, W., Deng, X., & Song, J. (2022). Elastic properties of Fe-bearing Akimotoite at mantle conditions: Implications for composition and temperature in lower mantle transition zone. *Fundamental Research*, 2(4), 570-577.
- [8] **Hao, S.**, Wang, W., Qian, W., & Wu, Z. (2019). Elasticity of akimotoite under the mantle conditions: Implications for multiple discontinuities and seismic anisotropies at the depth of ~600–750 km in subduction zones. *Earth and Planetary Science Letters*, 528, 115830.

SKILLS

- **Programming Languages:** Python, Matlab, C, Fortran
- **Other Tools & Technologies:** GMT, Quantum Espresso, VASP Origin

HONORS AND AWARDS

- **National Scholarship** 2019
University of Science and Technology of China
- **Outstanding Student** 2015
Nanjing University
- **Cyrus Tang Scholarship** 2014 - 2017
Cyrus Tang Foundation
- **National Scholarship for Encouragement** 2014 - 2016
Nanjing University