

# Diandian Peng

Postdoctoral Scholar

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## EDUCATION

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**Doctor of Philosophy in Geology** May 2022

Department of Geology, University of Illinois at Urbana-Champaign

Thesis: *Quantifying slab evolution and mantle flow using global subduction models with data assimilation*

Committee: Lijun Liu (advisor), Jay Bass, Patricia Gregg, William Guenther

**Master of Science in Geophysics** June 2017

School of Earth and Space Sciences, University of Science and Technology of China

Thesis: *Geodynamic modeling of the evolution around the southeastern Tibetan Plateau*

Advisor: Wei Leng

**Bachelor of Science in Geophysics** June 2014

School of the Gifted Young, University of Science and Technology of China

Thesis: *A preliminary dynamical simulation for the evolution of the Tibetan Plateau*

## PROFESSIONAL EXPERIENCE

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**Postdoctoral Scholar** June 2022 - current

IGPP, Scripps Institution of Oceanography, UC San Diego

*Studying the fast-converging Tonga subduction zone with mantle convection models*

*Investigating plume-slab interaction processes and their geological implications*

**Graduate Research Assistant** 2017 - 2022

Department of Geology, University of Illinois at Urbana-Champaign

*Developed global and regional mantle convection models with data-assimilation*

*Investigated the formation of special slabs worldwide and their influences on the surface*

*Studied the seismic anisotropy and slab material migration following mantle flow*

**Graduate Research Assistant** 2014 - 2017

School of Earth and Space Sciences, University of Science and Technology of China

*Explored the uplift of Tibetan Plateau and the formation of its steep boundaries*

*Analyzed the crustal channel flow with analytical calculation and numerical simulations*

**Undergraduate Research Assistant** 2013 - 2014

School of the Gifted Young, University of Science and Technology of China

*Explored the evolution of Tibetan Plateau using numerical models*

*Studied the thermal structure of continental lithosphere with heat flow data*

## RESEARCH INTERESTS

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Mantle convection simulation with data-assimilation models  
Global-scale migration history of subducted slabs  
Special slabs, including flat, stagnant and fragmented slabs  
Formation and deformation of LLSVPs  
Slab evolution and the interaction with plumes  
Mantle flow induced plate deformation  
Seismic anisotropy in the mantle  
Heat flow and evolution of continental lithosphere  
Convection and recycle of continental material in the mantle  
Formation of different mantle reservoirs

## TEACHING AND MENTORING EXPERIENCES

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Mentoring experience at UIUC	2020-2022
<i>Mentored a visiting student and two junior graduate students. Yiming Liu published a research paper on EPSL. Yanchong Li published a research paper on ESR and another one on Nature Communications. Multiple abstracts are published in the AGU Fall Meetings.</i>	
Teaching experience at USTC	Fall, 2016
<i>Instructed an entry-level course, Introduction to Earth Science, for undergraduate students in the School of Earth and Space Sciences.</i>	

## HONORS AND AWARDS

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Green Scholar (Scripps, UCSD)	2022
Bluestem Fellowship (UIUC)	2017 - 2018
Graduate Student First-class Academic Scholarship (USTC)	2014, 2015, 2016
Outstanding Student Paper Award (CGU)	2015
National Encouragement Scholarship (USTC)	2013
Outstanding Student Scholarship (USTC)	2013
Outstanding Freshman Scholarship (USTC)	2010

## FIELDWORKS

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R/V Thomas G. Thompson cruise in south Pacific Ocean	Nov-Dec 2023
<i>OBS setup and deployment near Lau Basin and Samoa Hotspot</i>	
<i>Dredging near Samoa Hotspot and Cook Islands</i>	
Field work in Baraboo (WI, US)	2021
Field work in Kentland and Williamsport (IN, US)	2019
Field work in Sugar Creek (IN, US)	2017
Field work in Chaohu (Anhui, China)	2014

## SERVICES

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Reviewer for *Geoscience Letters*, *Geophysical Research Letters*, *Geology*, *G-Cubed*, *Scientific Reports*

## PUBLICATIONS

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### Peer reviewed journal articles

**Peng, D.** and Stegman, D.R., 2024. Geodynamic evolution of the Lau basin. *Geophysical Research Letters*, 51(15), p.e2024GL110127.

Li, Y., Liu, L., Li, S., **Peng, D.**, Cao, Z. and Li, X., 2024. Cenozoic India-Asia collision driven by mantle dragging the cratonic root. *Nature Communications*, 15(1), p.6674.

Xue, T., **Peng, D.**, Liu, K.H., Obrist-Farner, J., Locmelis, M., Gao, S.S. and Liu, L., 2023. Ongoing fragmentation of the subducting Cocos slab, Central America. *Geology*, 51(12), pp.1106-1110.

Li, Y., Liu, L., **Peng, D.**, Dong, H. and Li, S., 2023. Evaluating tomotectonic plate reconstructions using geodynamic models with data assimilation, the case for North America. *Earth-Science Reviews*, p.104518.

Wang, Y., Cao, Z., Peng, L., Liu, L., Chen, L., Lundstrom, C., **Peng, D.** and Yang, X., 2023. Secular craton evolution due to cyclic deformation of underlying dense mantle lithosphere. *Nature Geoscience*, pp.1-9.

**Peng, D.** and Liu, L., 2023. Importance of global spherical geometry to model slab dynamics and evolution in models with data assimilation. *Earth-Science Reviews*, p.104414.

Liu, Y., Liu, L., Li, Y., **Peng, D.**, Wu, Z., Cao, Z., Li, S. and Du, Q., 2022. Global back-arc extension due to trench-parallel mid-ocean ridge subduction. *Earth and Planetary Science Letters*, 600, p.117889.

**Peng, D.** and Liu, L., 2022. Quantifying slab sinking rates using global geodynamic models with data-assimilation. *Earth-Science Reviews*, 230, p.104039.

**Peng, D.**, Liu, L. and Wang, Y., 2021. A newly discovered Late-Cretaceous East Asian flat slab explains its unique lithospheric structure and tectonics. *Journal of Geophysical Research: Solid Earth*, p.e2021JB022103.

**Peng, D.**, Liu, L., Hu, J., Li, S. and Liu, Y., Formation of East Asian stagnant slabs due to a pressure-driven Cenozoic mantle wind following Mesozoic subduction. *Geophysical Research Letters*, p.e2021GL094638.

Liu, L., **Peng, D.**, Liu, L., Chen, L., Li, S., Wang, Y., Cao, Z. and Feng, M., 2021. East Asian lithospheric evolution dictated by multistage Mesozoic flat-slab subduction. *Earth-Science Reviews*, p.103621.

**Peng, D.** and Leng, W., 2017. Analytical and numerical simulations of uplift processes at the Tibet-Sichuan boundary. *Earthquake Science*, 30(3), pp.135-143.

## Preprint articles

**Peng, D.** and Stagman, D. 2024. Modeling subduction with extremely fast trench retreat.

<https://essopenarchive.org/doi/full/10.22541/essoar.171288715.53824453>

Suo, Y., Dong, H., Liu, L., **Peng, D.**, Li, Y., Liu, J., Dai, L., Cao, X. and Li, S., 2022. Landward mantle flow associated with the Pacific subduction system opened the South China Sea.

<https://doi.org/10.21203/rs.3.rs-2332418/v1>

## Book chapters

Li, S., Zhu, J., Cao, X. Liu, L., Zhou, J., and **Peng, D.**, 2023. *Atlas of global mantle microplates with tomographic images*. Science Press (Beijing). ISBN: 9787030752086

## Submitted articles

**Peng, D.** and Stegman, D.R., 2024. Modeling subduction with extremely fast trench retreat.

*Under review in JGR.*

Zhu, T., **Peng, D.** and Liu, L. Effect factors of the Pacific plate subduction towards and under the Changbaishan volcanic province since the Cenozoic: Insights from geodynamic modeling based on data assimilation. *Submitted to Earth-Science Reviews*.

## Articles in preparation

**Peng, D.**, Stegman, D., Day, J., Parnell\_Turner, R., Liu, L., Bai, R. and Wang, Y. Title: Identification of a new type of plume. *In preparation for Nature*.

Origin of the Capricorn Plate.

**Peng, D.**, and Liu, L., Li, Y. and Wang, Y. Continental lithospheric structure controls the Cenozoic uplift of western US. *In preparation for Nature*.

## INVITED TALKS

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Nanjing University. Applications of Mantle Convection Models Across Diverse Subduction Zones and Insights into Overriding Plate Deformation. 2024

Southern University of Scientific and Technology. Studying subduction zone dynamics using numerical models with different dimensions. 2024

Chinese University of Hong Kong. Studying circum-Pacific subduction zones with geodynamic models. 2023

## CONFERENCE ABSTRACTS

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Li, Y., Liu, L. and **Peng, D.**, 2022, December. What drives the post-collisional northward Indian motion?. In *AGU Fall Meeting Abstracts*

**Peng, D.**, Liu, L., Chen, L. and Li, S., 2021, East Asian lithospheric evolution in response to west Pacific subduction since 100 Ma, In *AGU Fall Meeting Abstracts*.

**Peng, D.** and Liu, L., 2021, Quantifying horizontal vs vertical motions of subducted slabs using global geodynamic models with data-assimilation, In *AGU Fall Meeting Abstracts*.

Liu, L., **Peng, D.**, Liu, L., Li, Y. and Chen, L., 2021, A new geodynamic framework for the evolution from intraplate orogeny to continental extension, In *AGU Fall Meeting Abstracts*.

Li, Y., **Peng, D.**, Cao, Z. and Liu, L., 2021, Continental-scale converging mantle flow beneath Eurasia and America, from model to observation, In *AGU Fall Meeting Abstracts*.

Liu, L., Zhou, Q. and **Peng, D.**, 2021, Cenozoic topographic evolution of western-central US, In *GSA Annual Meeting*.

**Peng, D.**, Liu, L., Chen, L. and Li, S., 2020, December. Late-Cretaceous Izanagi flat subduction below East Asia and tectonic responses. In *AGU Fall Meeting Abstracts*.

Liu, L., **Peng, D.**, Wang, Y. and Hu, J., 2020, December. Differences and similarities of lithosphere deformation during flat-slab subduction and plume underplating. In *AGU Fall Meeting Abstracts*.

**Peng, D.**, Liu, L., Liu, Y., Hu, J. and Li, S., 2019, December. Formation of East Asian stagnant slabs due to a westward Cenozoic mantle wind. In *AGU Fall Meeting Abstracts*.

Liu, L., Hu, J., Zhou, Q., Liu, Y. and **Peng, D.**, 2019, December. Formation of slab tears controls Earth's major silicic volcanisms. In *AGU Fall Meeting Abstracts*.

**Peng, D.**, Liu, L. and Hu, J., 2018, December. Understanding subduction dynamics in the Southwest Pacific. In *AGU Fall Meeting Abstracts*.

**Peng, D.** and Leng, W., 2016, December. Analytical and numerical simulation of uplift at the Tibet-Sichuan boundary. In *AGU Fall Meeting Abstracts*.

## BLOG POSTS

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Why do some slabs stagnate? *Posted on EGU Blogs*.

<https://blogs.egu.eu/divisions/gd/2022/03/09/why-do-some-slabs-stagnate/>

## ACADEMIC REFERENCES

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**Prof. Dave Stegman** (Postdoctoral advisor)  
 Institute of Geophysics and Planetary Physics  
 Scripps Institution of Oceanography  
 UC San Diego  
 Email: [dstegman@ucsd.edu](mailto:dstegman@ucsd.edu)  
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**Prof. Lijun Liu** (Ph.D. advisor)  
 Department of Earth Science & Environmental Change  
 University of Illinois Urbana-Champaign  
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**Prof. Doug Wiens** (Collaborator on the SaLOON project)  
Department of Earth, Environmental, and Planetary Sciences  
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**Prof. Shawn Wei** (Collaborator on the SaLOON project)  
Department of Earth and Environmental Sciences  
Michigan State University  
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