

Becoming (Geo)Scientist

Email: jyotirmoyp@iisc.ac.in
Find me: <https://jyotirmoyp.github.io>
or <http://ceas.iisc.ernet.in/~jyotirmoy/>
Twitter: [@JyoGeoPhy](https://twitter.com/JyoGeoPhy)

Jyotirmoy Paul
Centre for Earth Sciences
Indian Institute of Science



Who am I?

Pursuing PhD in Geodynamics at IISc

Develop numerical models of Earth

Music, Read, Travel

JU Years: 2010 - 2015

Which year are you studying

☐ UG 1

☐ UG 2

☐ UG 3

☐ PG 1

☐ PG 2

☐ Others

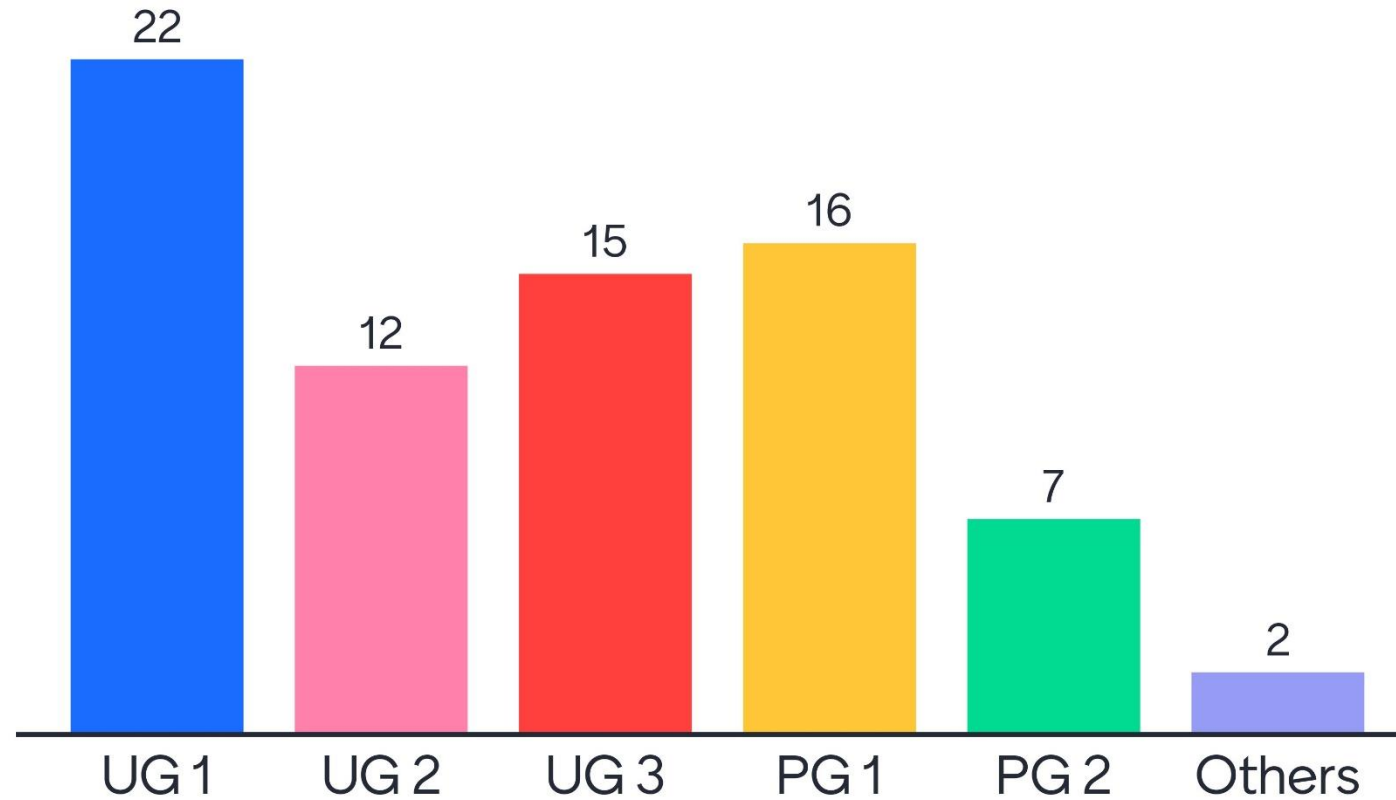
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Break the ice!

<https://www.menti.com/d9mx5x3mai>



Which year are you studying



Why did you choose to study Geoscience

☐ Didn't get Phy/Chem/Math

☐ I don't know

☐ Loved geography In school

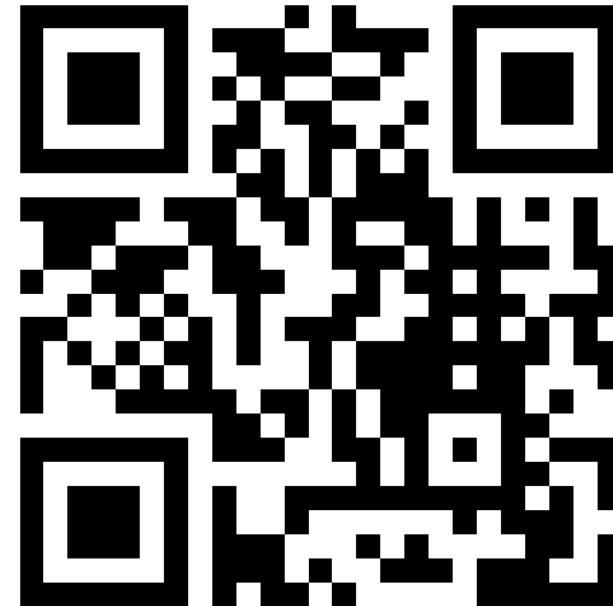
☐ Family/ Relatives studied before

☐ Want to understand earth

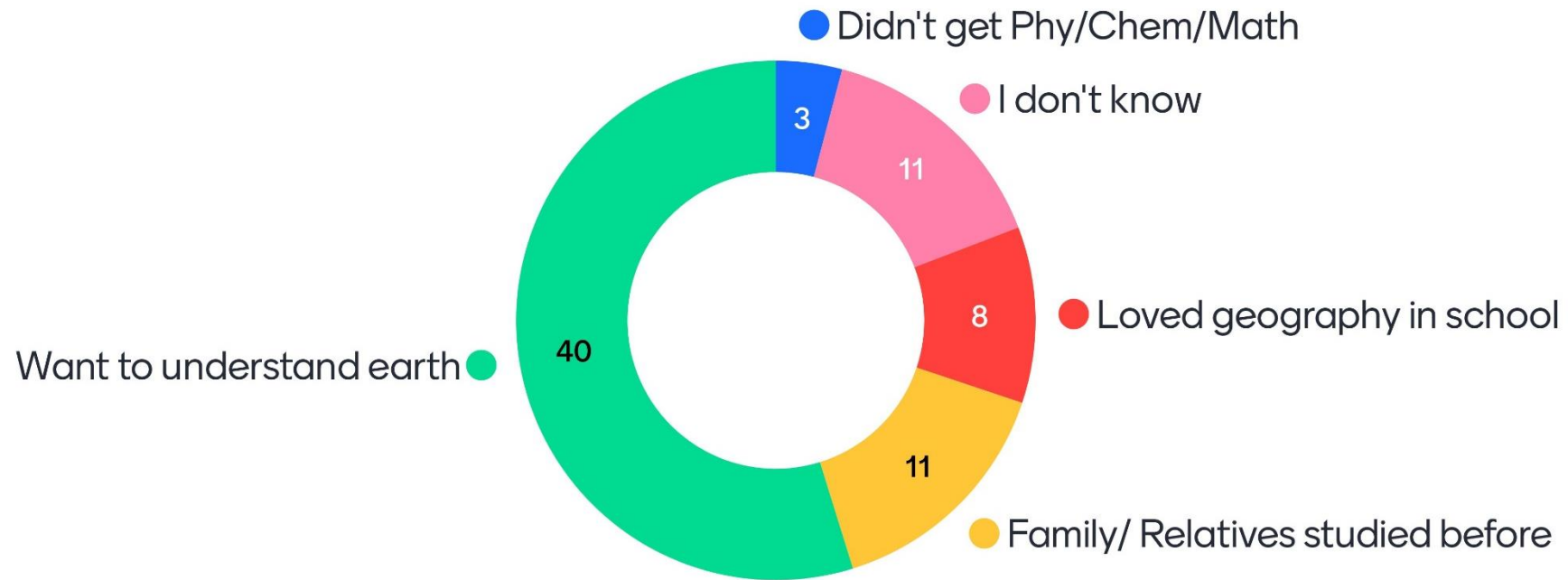
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Break the ice!

<https://www.menti.com/d9mx5x3mai>



Why did you choose to study Geoscience



My influence



Beautiful nature
Love for mountain
How did they form?

A book by Prof. Sudipta
Sengupta, Antarctica.

And the Journey begins...

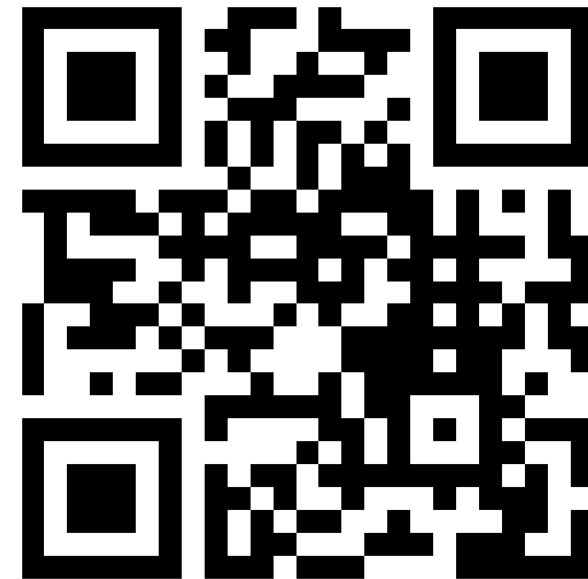


Geo-xxxxxx?

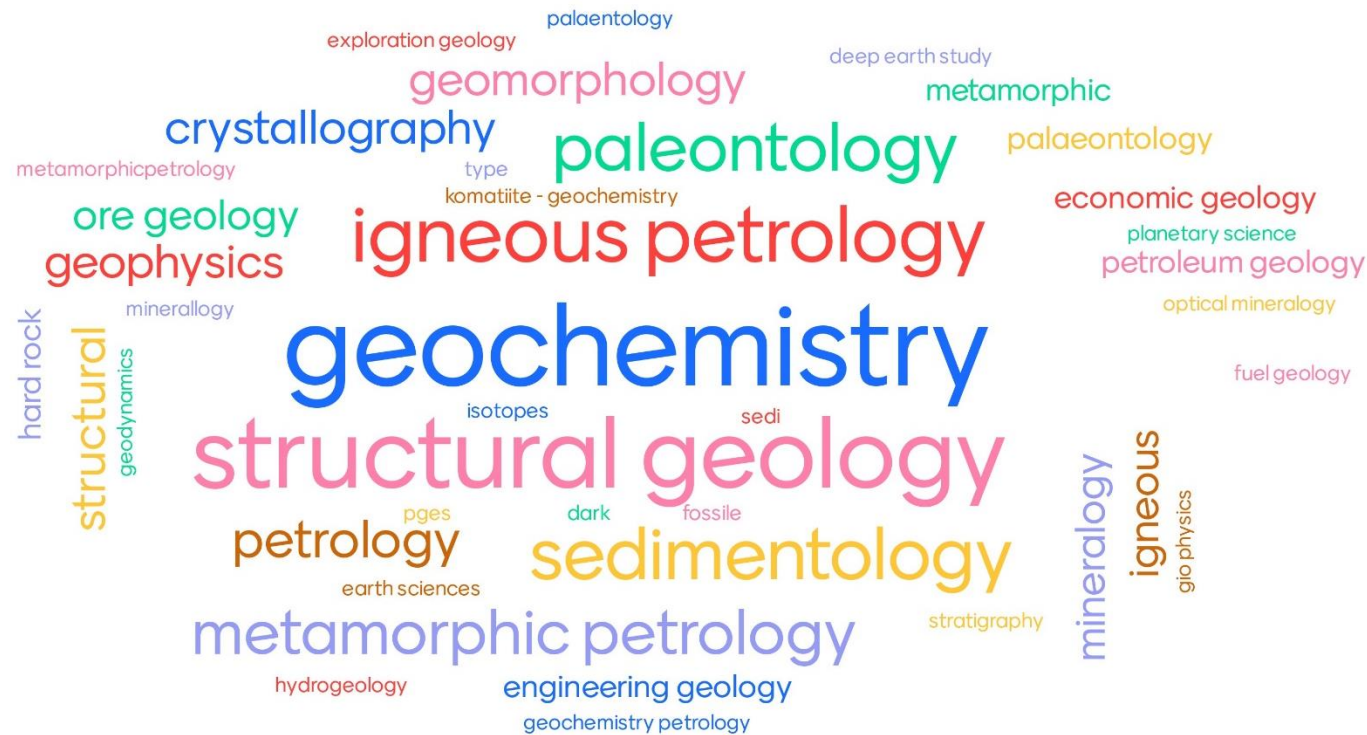
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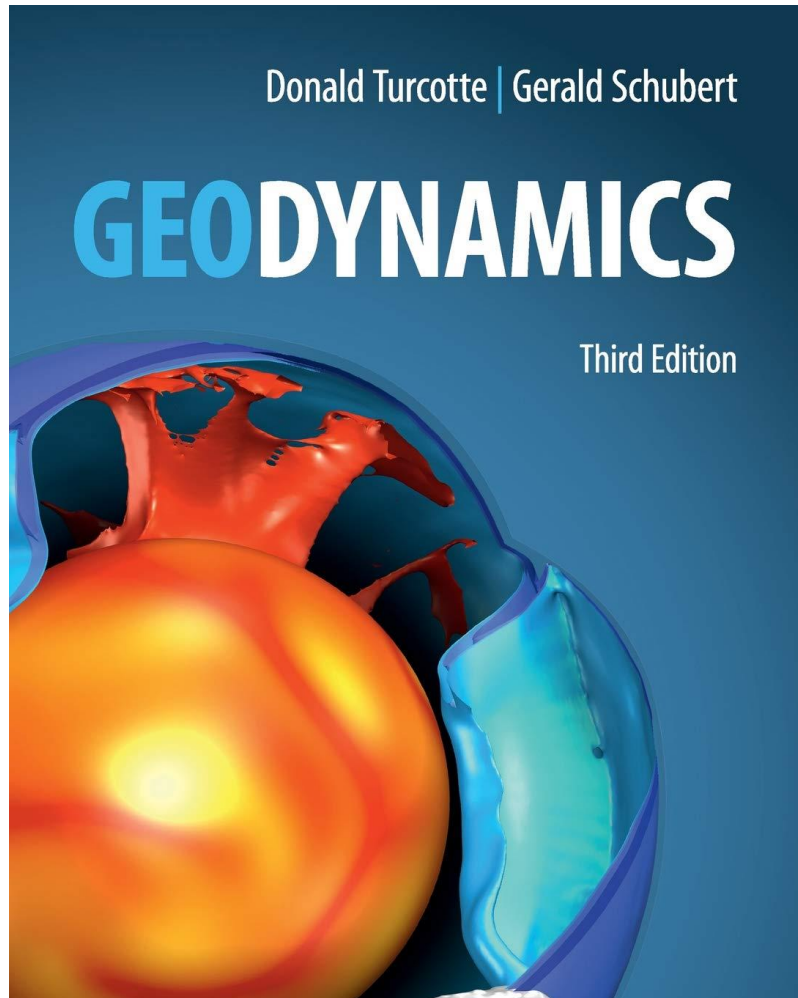
What are your favourite branches in Geoscience?

Enter a word	25
Enter another word	25
Enter another word	25
Submit	



What are your favourite branches in Geoscience?





Geodynamics

Dynamics: Relationship between force and motion (Also force in equilibrium)

Geodynamics: Dynamics of Earth (Mantle has a hegemony here)

Why?

Crust : Geology

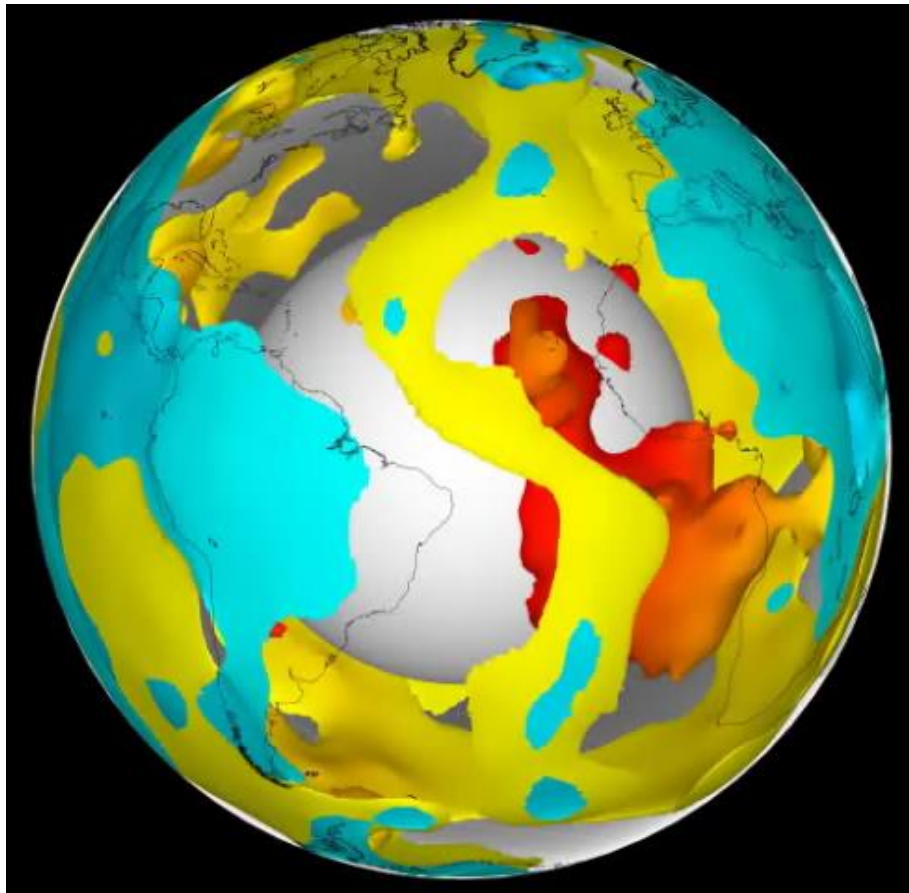
Core: Magneto-Hydrodynamics (MHD)

Into the modeling world



A scientific model is a physical and/or mathematical and/or conceptual representation of a system of ideas, events or processes.

All models are beautiful!



Why Geodynamicists model?

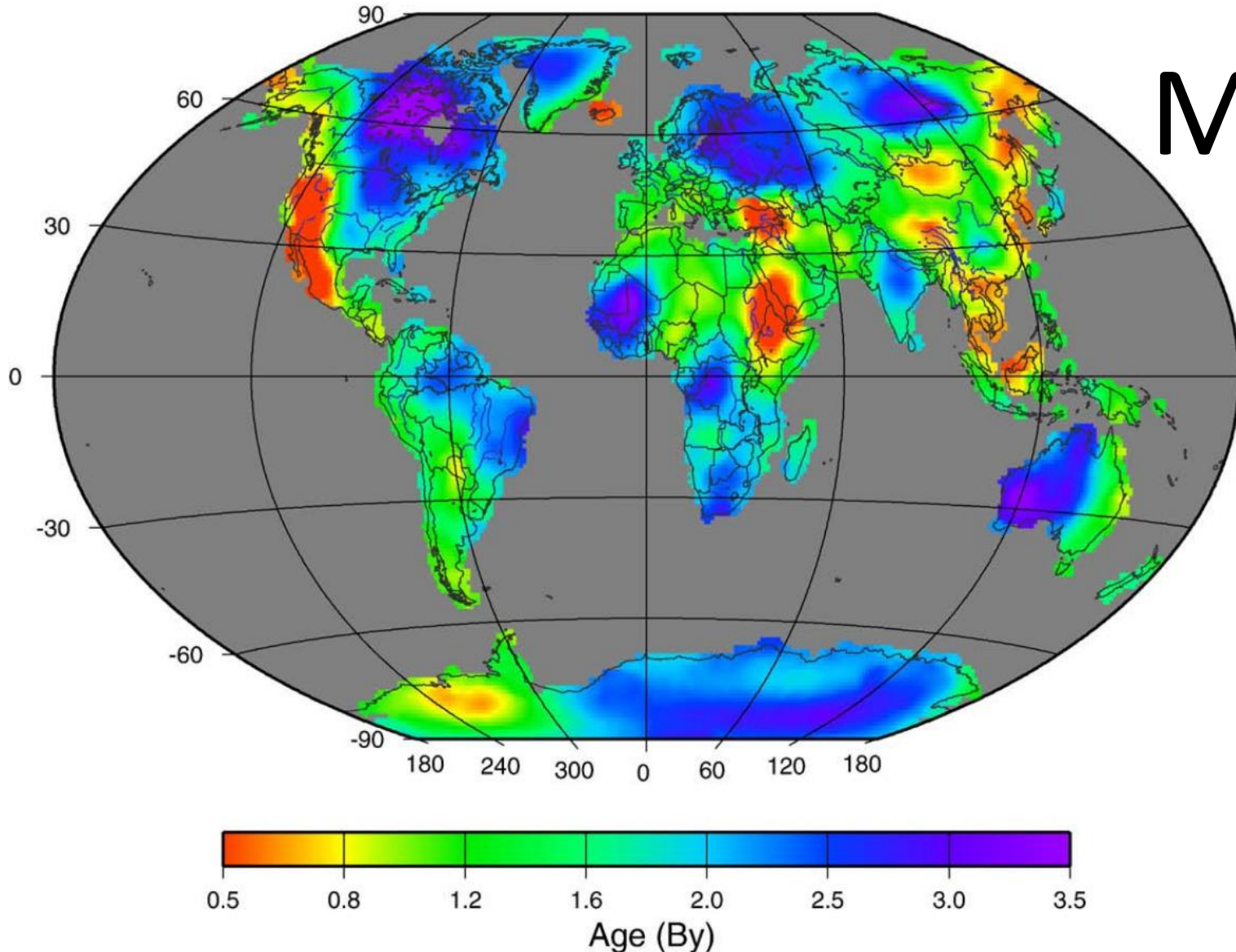
- Time scale of natural process: Real time experiment is impossible
- Number of variables/ unknown in natural system
- Non-intuitive nature of physical properties
- Non-linear nature of governing equations

My Present Work

Why **cratons** are still here?

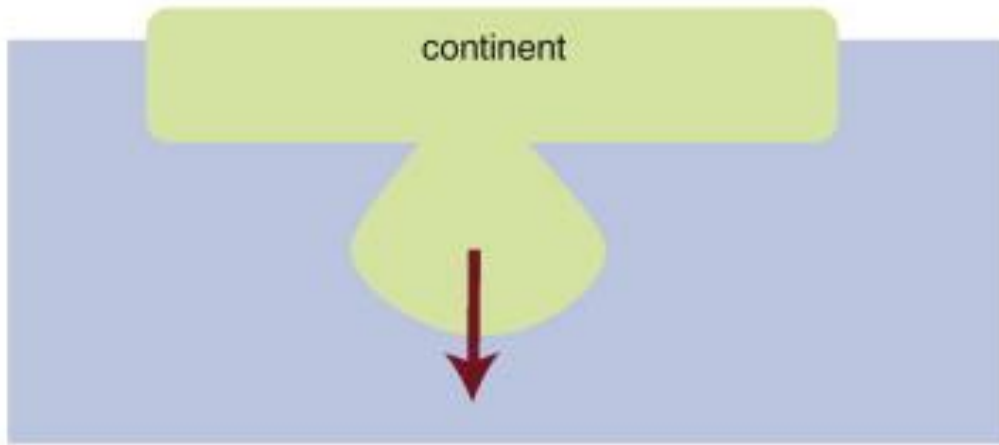
One of the grand
challenges in Geodynamics
(*Olson et al. 2010*)

(*Poupinet and Shiparo, 2008, Lithos*)

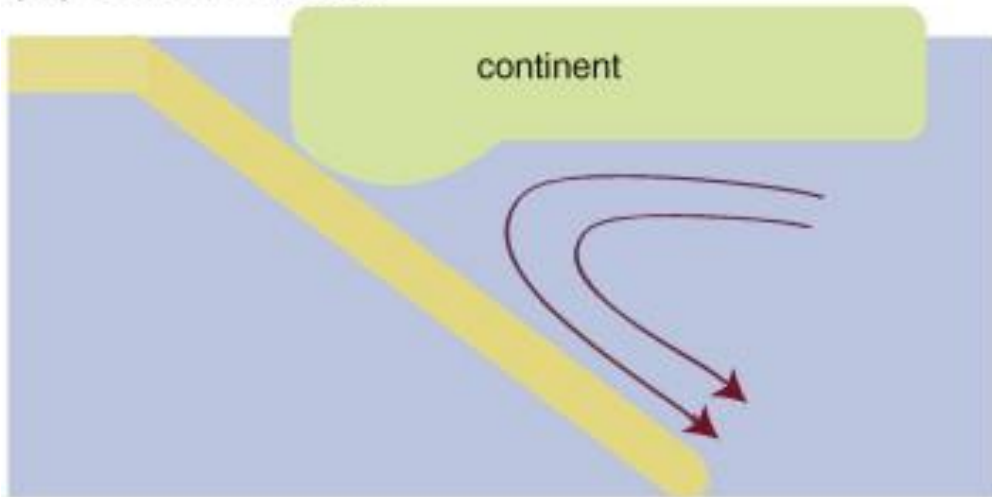


How do continents destroy?

(a) Rayleigh-Taylor instability



(b) convective erosion

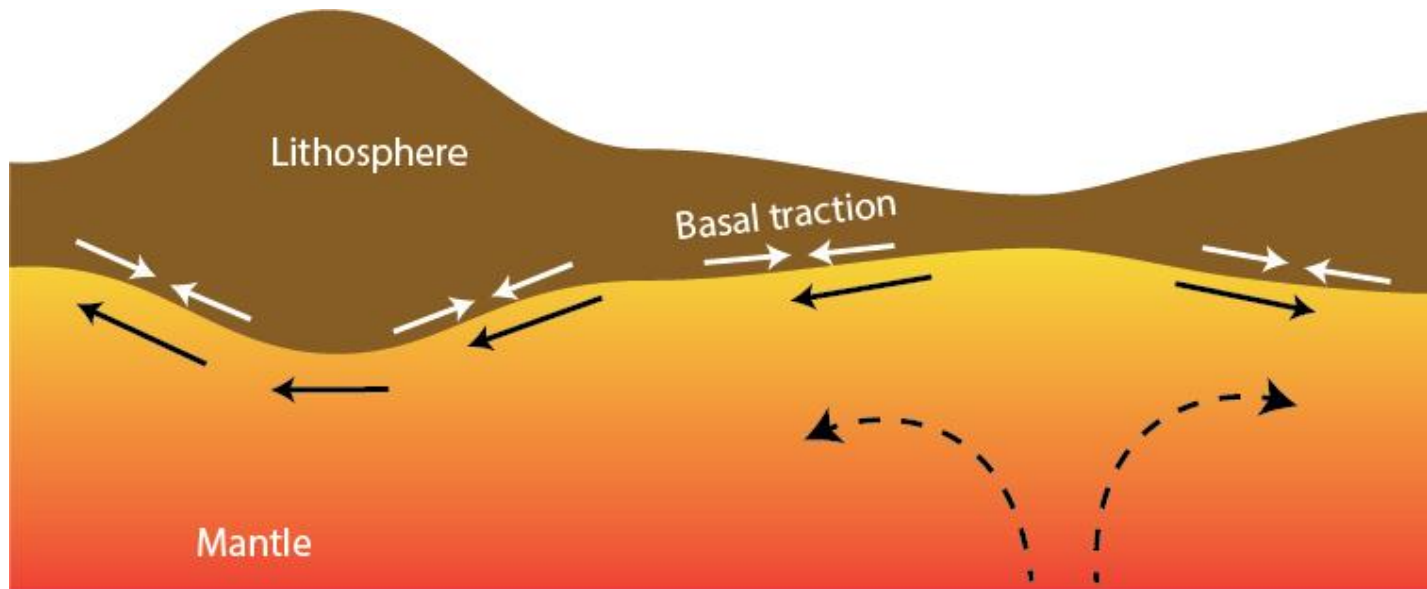


(Karato 2010)

Hypothesis for craton survival:
Cratons are lighter in density

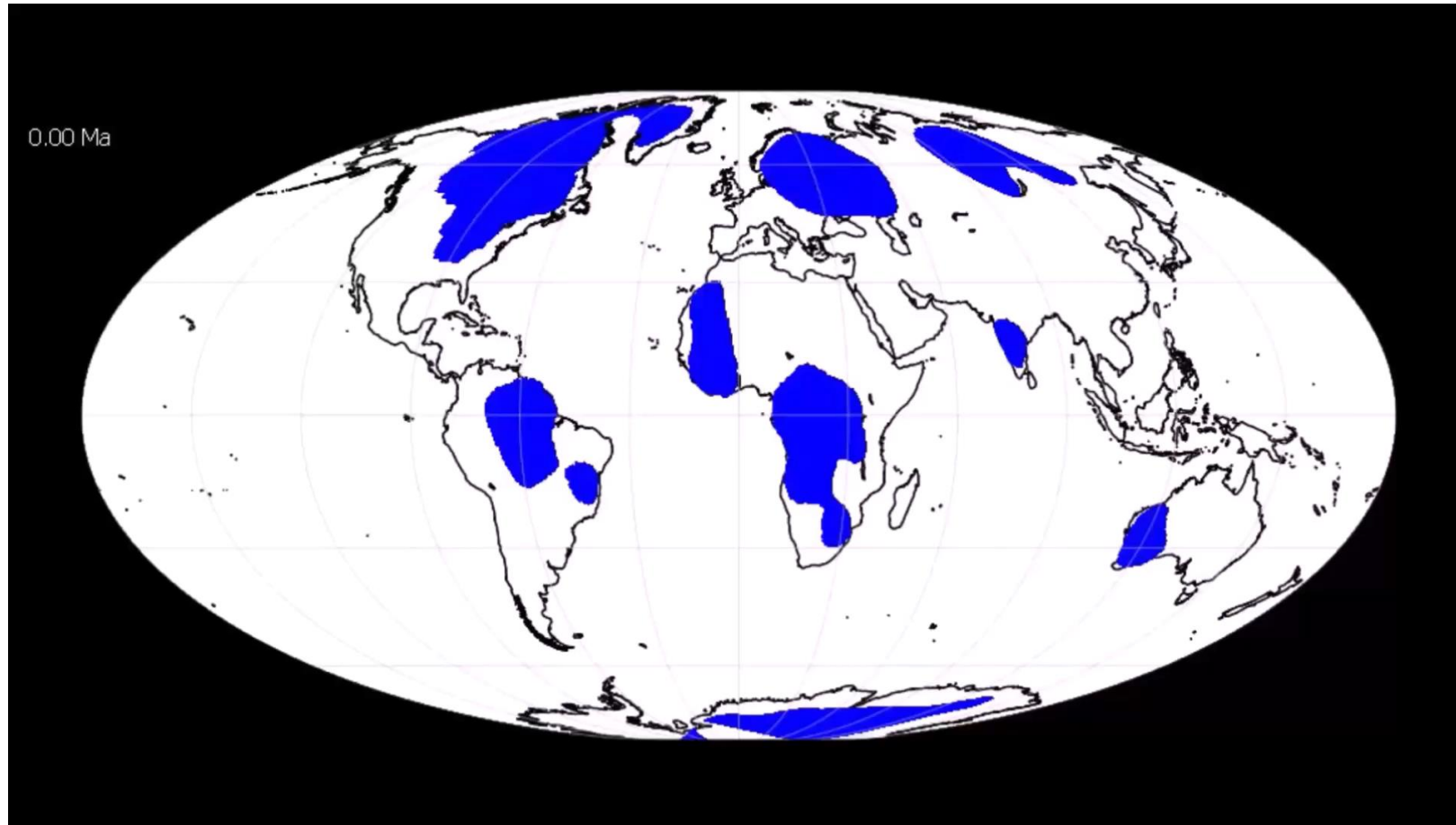
What about convective erosion?

Convective erosion

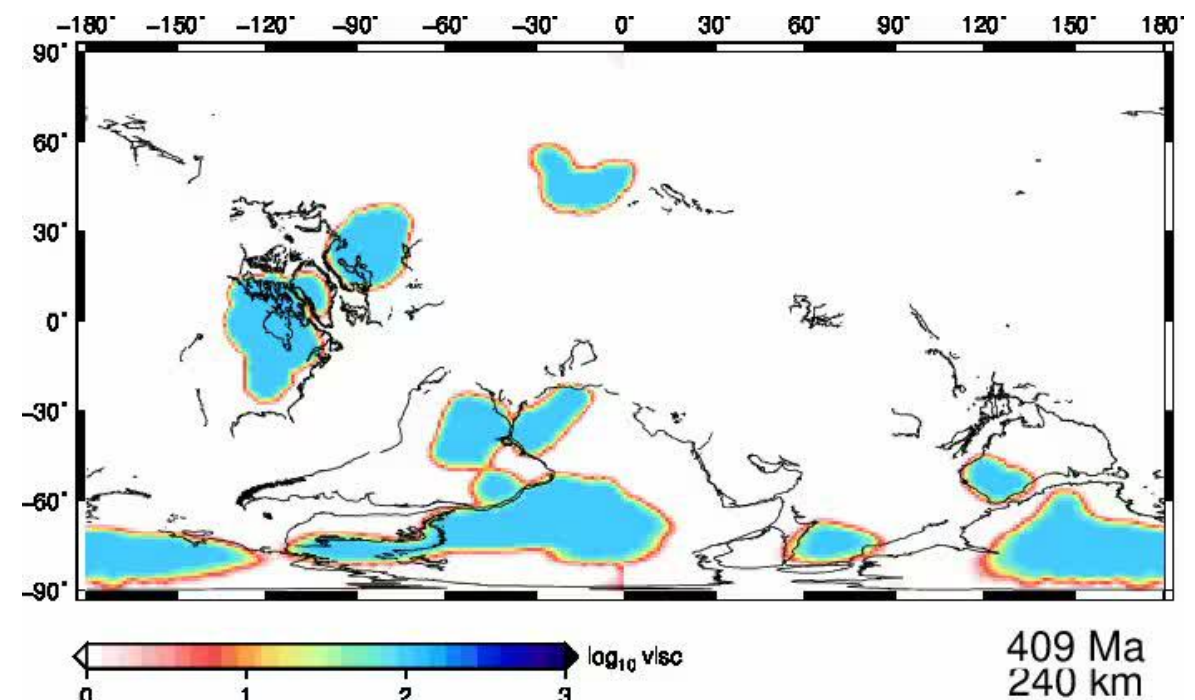
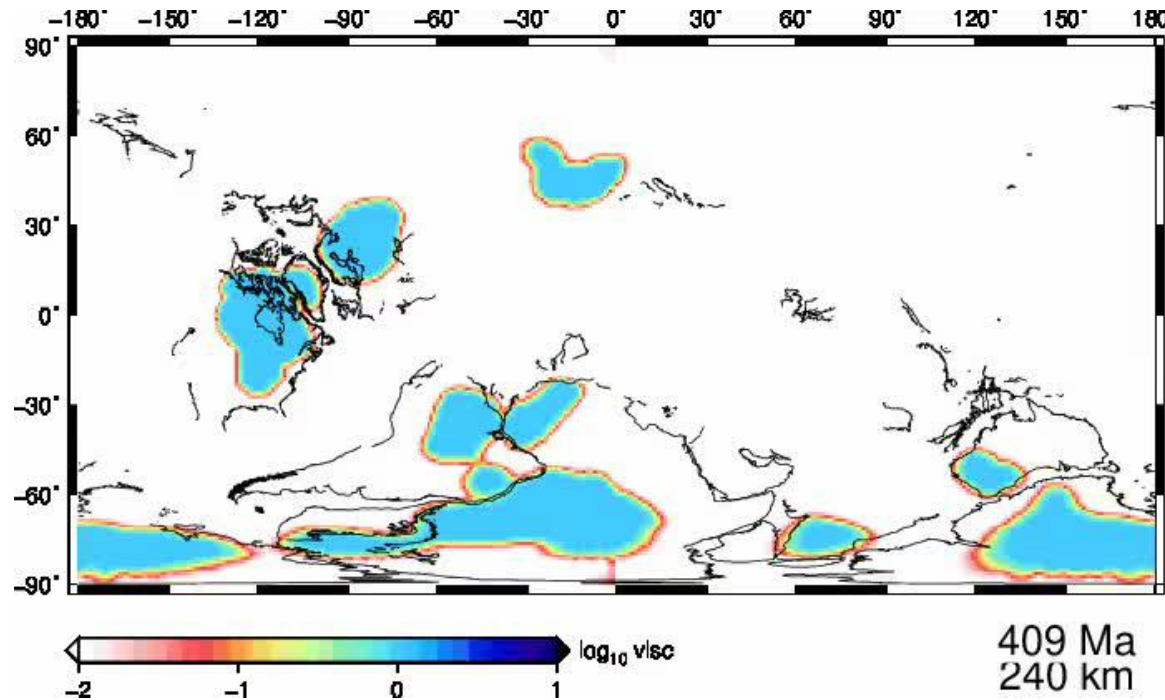


Do the cratons need
to be strong?
How strong?

Cratons: Now and then

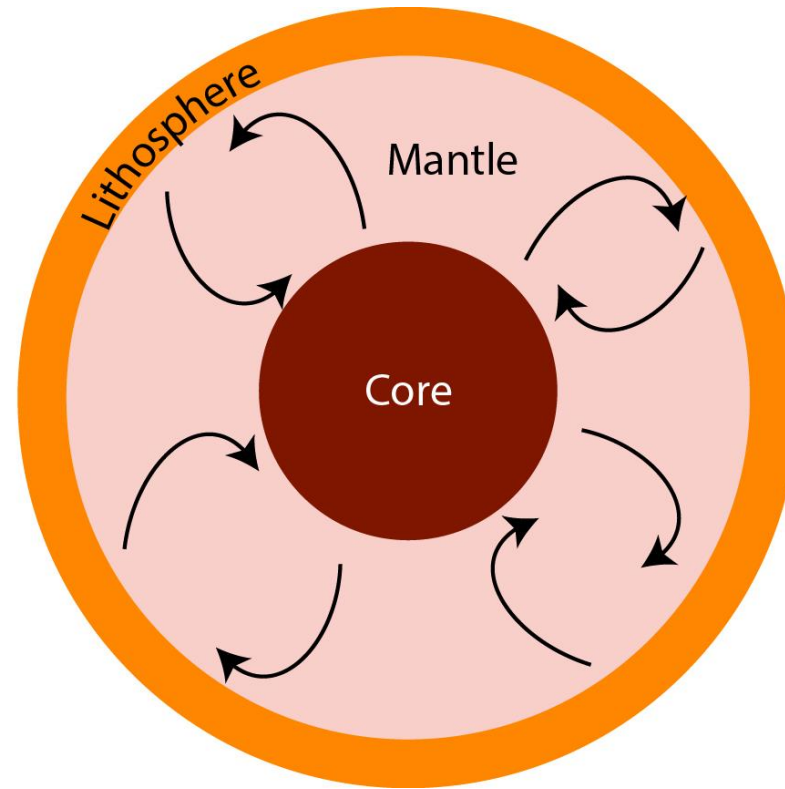
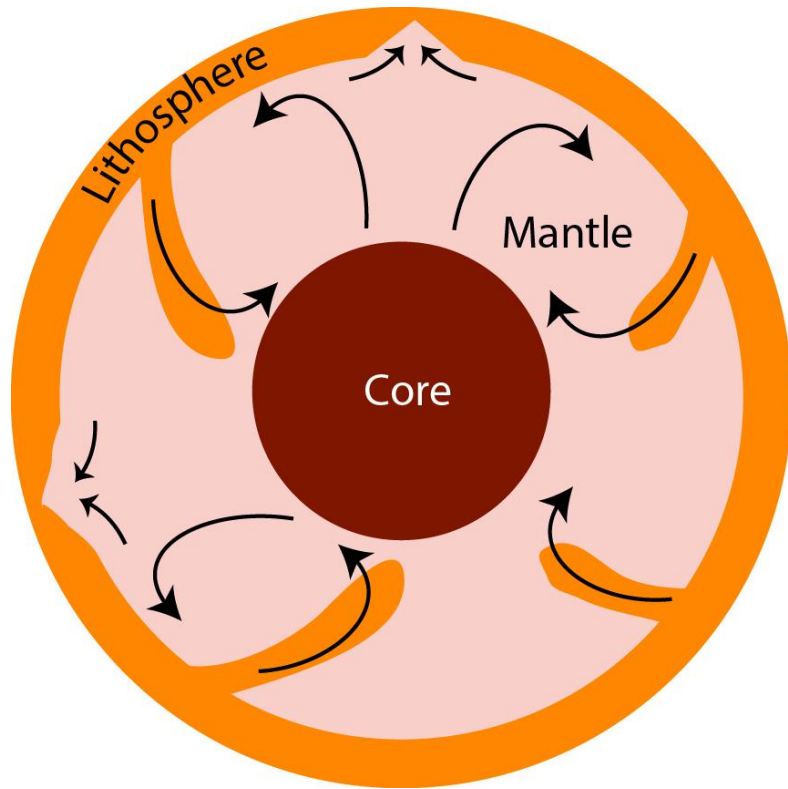


Modeling evolution of cratons



(Paul and Ghosh, 2020, EPSL)

Digging deeper into the time



Stagnant-lid and Mobile-lid (Plate-tectonics)

(Paul 2020, AGU Eos)

Transition of
tectonic regime ~
3 Ga?
Origin of plate-
tectonics and
stabilization of
cratons are closely
related?

Re-Search



Interest



Curiosity



Imagination

May not Join a PhD, if

01 Will prepare for jobs in these years!

02 Will prepare for jobs in these years!

03 Lots of money after PhD is over!

Of course you have a right enrol into a PhD program anytime, but doing PhD is not an enrolment

Where are you better fitted?

What you want to do in future

Select as many as you want in the order you prefer. There are 3 options in total.

1st

...

Academic research

↕

×

+

...

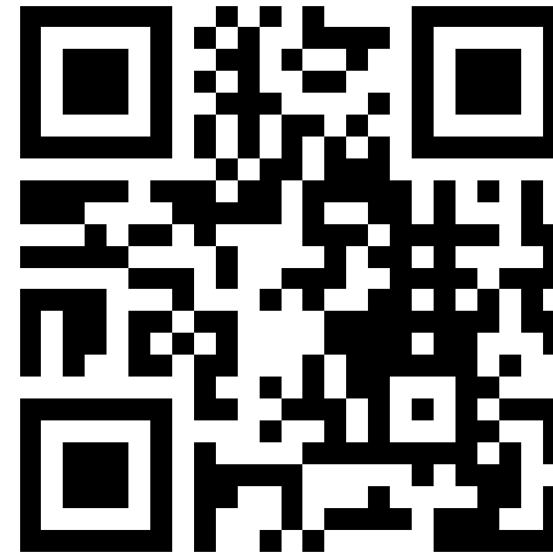
Select an option

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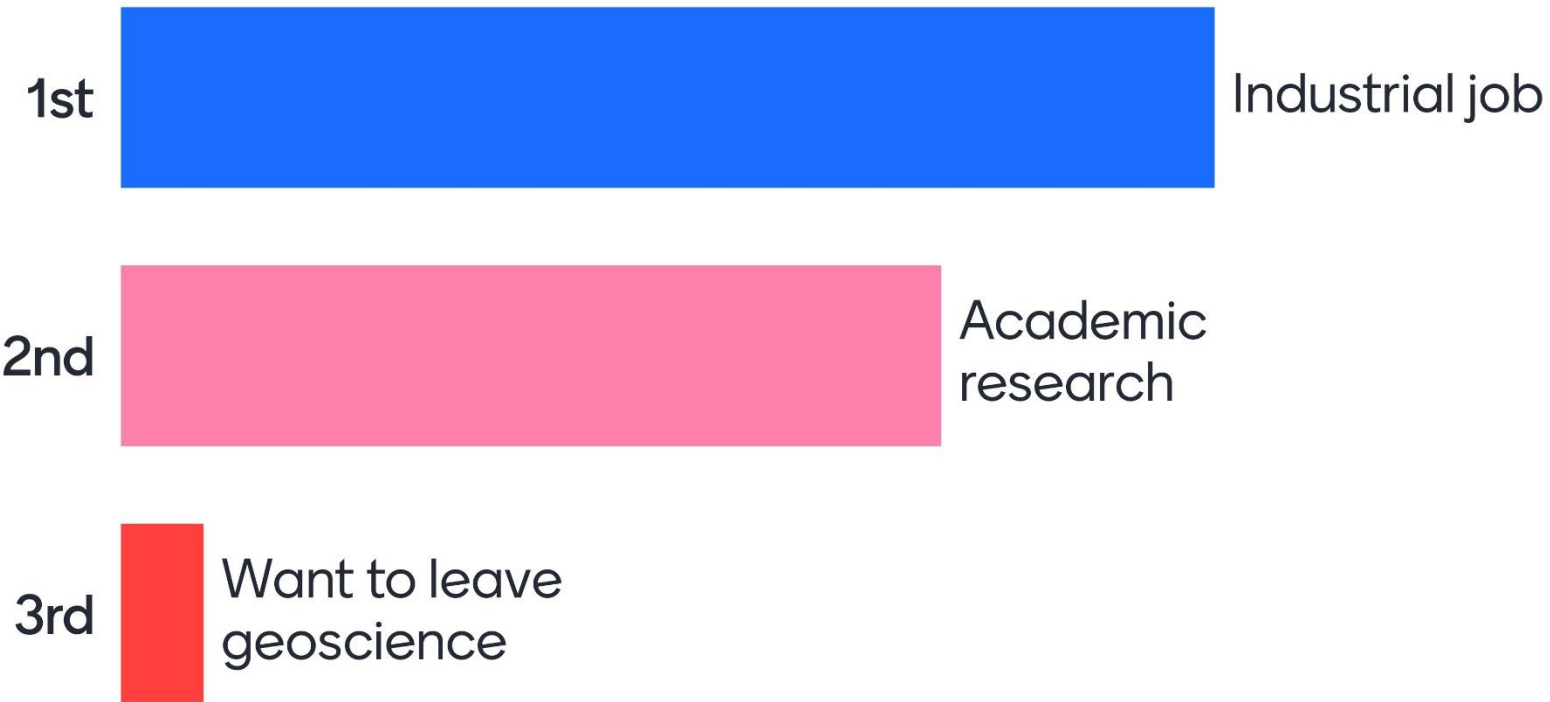
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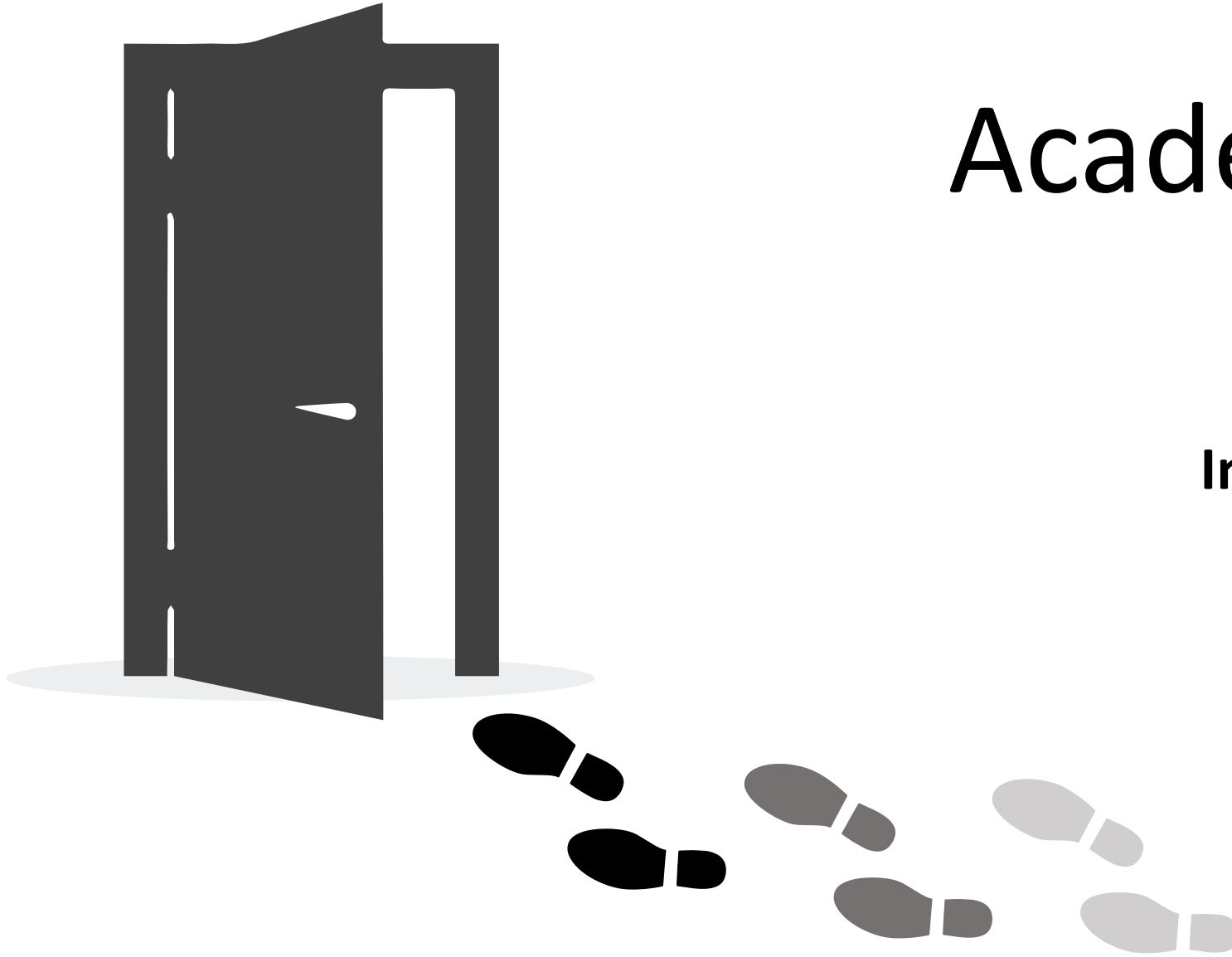


What you want to do in future

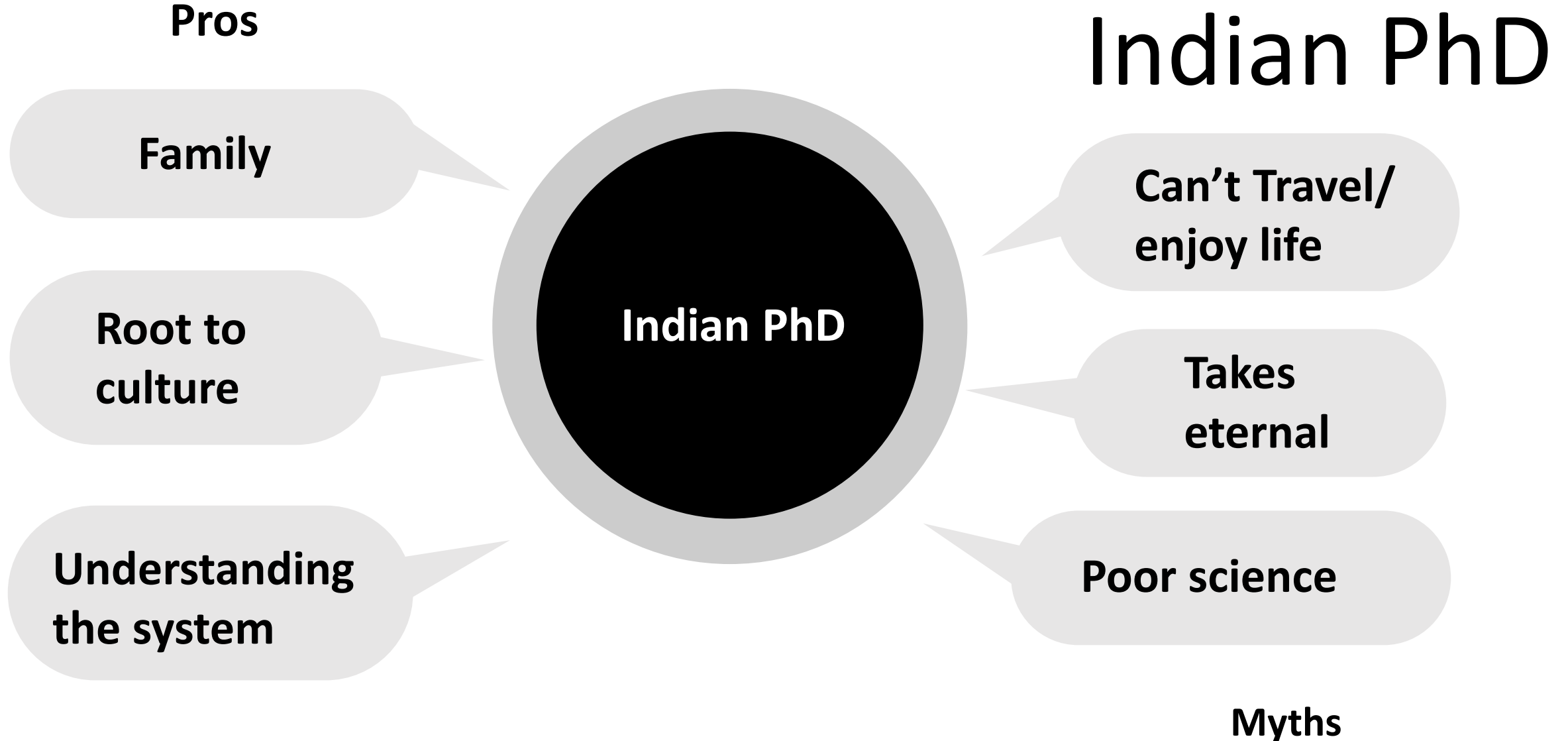


Academic nomads

India or Abroad?



Disclaimer! All pros and myths can not be generalised. They do vary from cases to cases.



Disclaimer! All cons and myths can not be generalised. They do vary from cases to cases.

PhD in abroad

Cons

**Mental
Health**

Racism

**Adjusting to
Indian system
later**

Abroad

**Lot of
Money**

**Supercool
advisors**

Quality PhD

Myths

What do you think?

<https://www.menti.com/a86uezqgvr>

If you are interested in research, where do you want to pursue it from?

Select as many as you want in the order you prefer. There are 10 options in total.

1st



India



2nd



China - Hong Kong - Taiwan



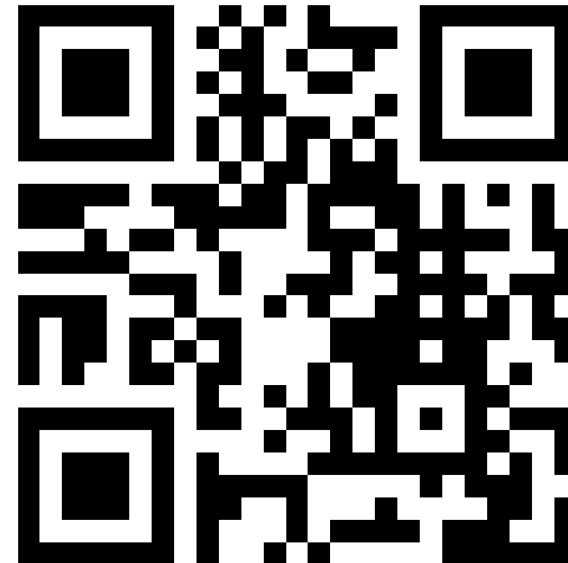
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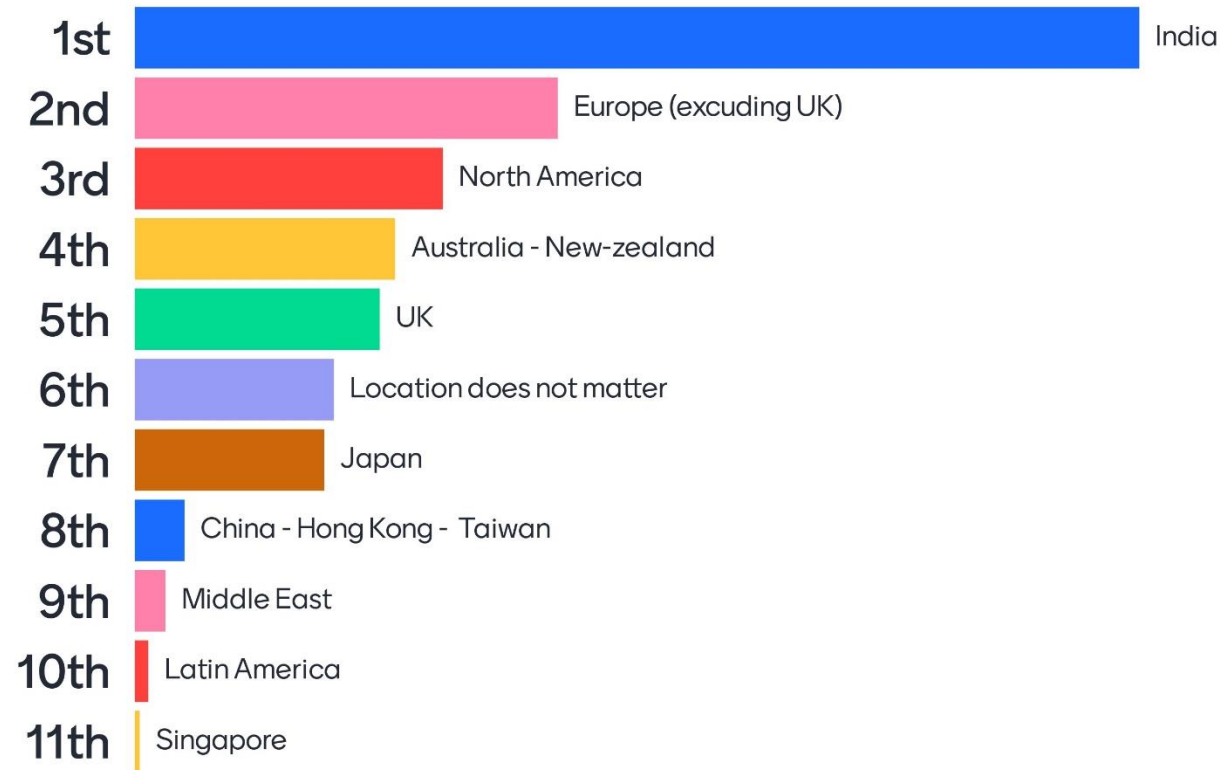
Select an option



Submit



If you are interested in research, where do you want to pursue it from?



Published: 11 June 2014

A test that fails

Casey Miller & Keivan Stassun

Nature **510**, 303–304(2014) | [Cite this article](#)

4746 Accesses | **46** Citations | **730** Altmetric | [Metrics](#)

A standard test for admission to graduate school misses potential winners, say Casey Miller and Keivan Stassun.

Universities in the United States rely too heavily on the graduate record examinations (GRE) – a standardized test introduced in 1949 that is an admissions requirement for most US graduate schools. This practice is poor at selecting the most capable students and severely restricts the flow of women and minorities into the sciences.

#GeoGReExit

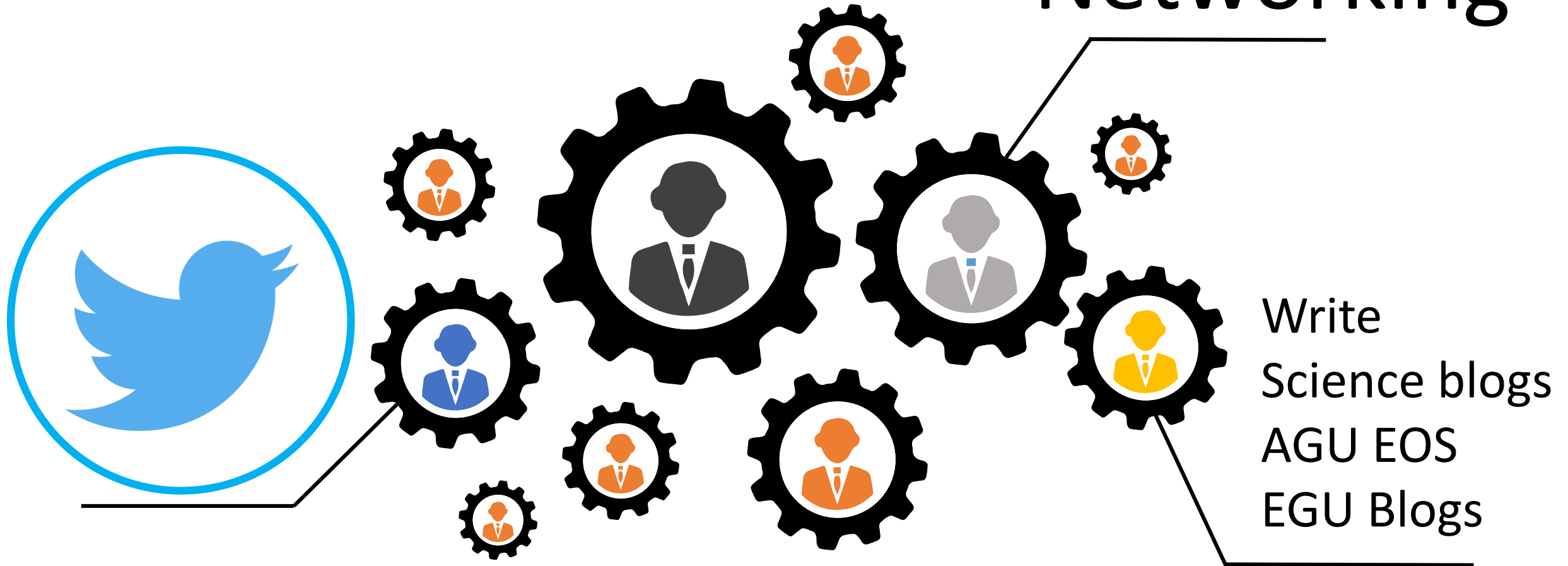
Promote anti-racism

Why #GRExit?

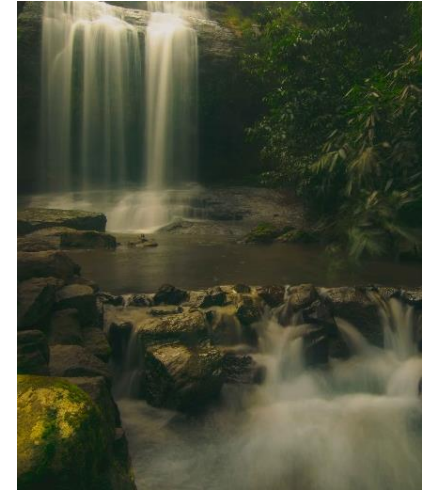
“The GRE does not test the skill set and knowledge base to be a strong scientist. Nor does it test the ability to form strong research questions, conduct research, and synthesize results for consumption by other scientists and the public.”

Sense of superiority still remains.
When I told the same, people laughed,
Now Americans are telling
So, people are accepting.

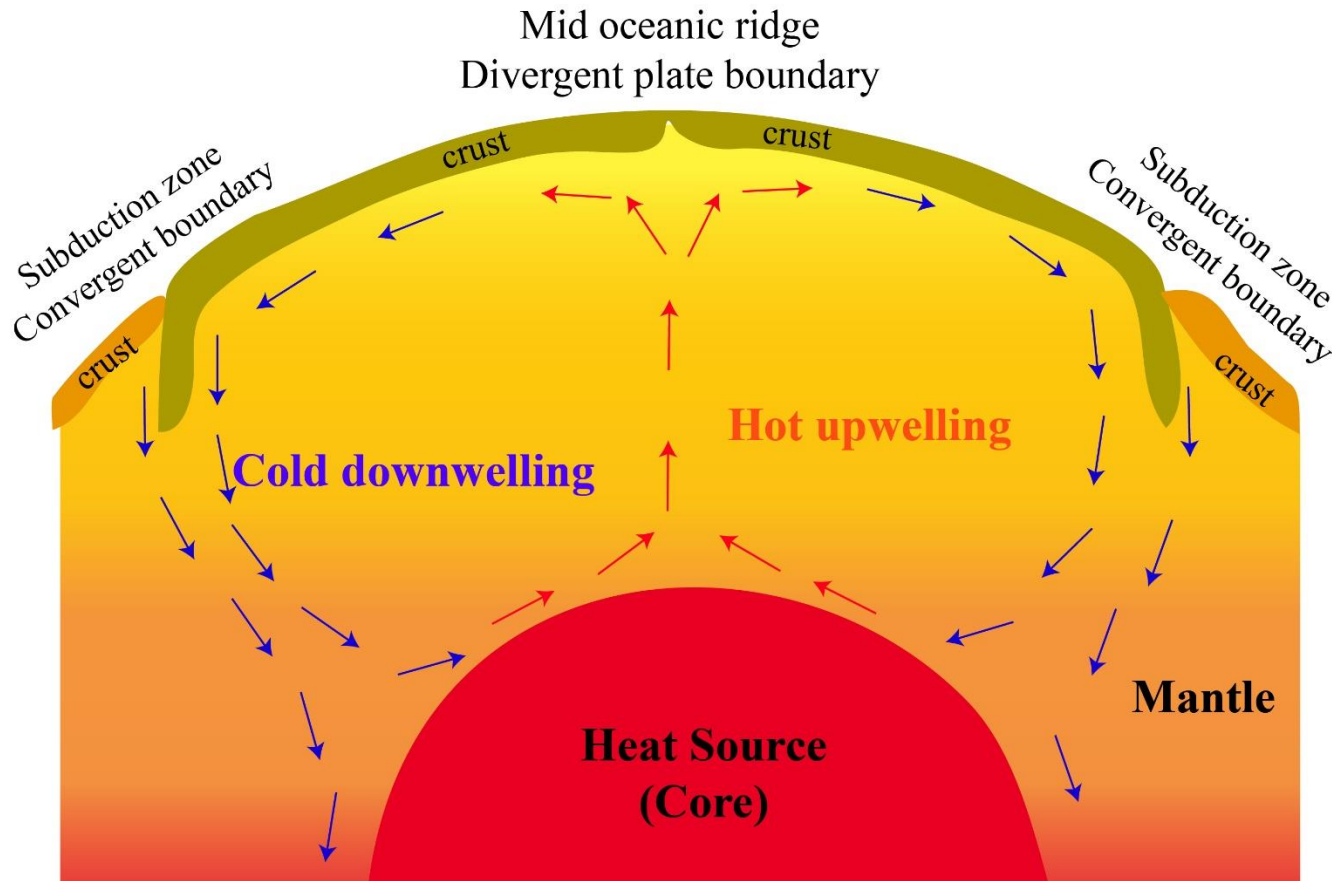
Networking



Travel log



Food for Thought



Does this figure
correctly demonstrate
mantle convection /
Plate tectonics?

Let me know!