The trans-disciplinary and community-driven subduction zone initiation (SZI) database

Crameri et al., (in review with Nature Communications)

We built a database that puts together Geologic evidence, Geodynamic interpretation, Plate reconstruction, and Seismic tomography to characterise Subduction Zone Initiation (SZI) events in the last 100 Ma.

Take a tour!

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We define "Subduction-zone initiation (SZI)" as the onset of downward plate motion forming a new slab, which later evolves into a self-sustaining subduction zone.

All SZI events can be classified with these SZI types:

- Newly destructive
- Episodic subduction
- Polarity reversal
SZI events are either **mainly horizontally forced**, via external forces that arise, for example, from tectonic or mantle-convection induced stresses, or **mainly vertically forced**, via a planetary gravitational force acting on density gradients in the plate-mantle system.
What is the SZI database?

Our vision is to create a

- ✔ Trans-disciplinary
- ✔ Community driven
- ✔ Accessible
- ✔ Inclusive

database that can be used and improved by the community via an online platform.
What’s in the SZI Database?

13 SZI events

100 data entries per SZI event

➡ Direct evidence (ages)
  • Metamorphic sole formation & cooling
  • Youngest and oldest Early basalts (‘FABs’)
  • Youngest & oldest Boninites
  • Oldest arc rocks
  • ...

➡ Plate reconstruction
  • Nature of overriding and parent plate
  • Proximity to plate boundaries
  • Other subduction zones
  • Ridges
  • Transform faults
  • Passive margins
  • Pre-existing volcanic arcs
  • Collision events
  • Plate reorganisation events
  • ...

➡ Seismic tomography
  • Location with respect to LLSVPs
  • Location of the present-day slab
  • Presence of mantle plume
  • ...
Subduction zones form preferentially at or near a pre-existing plate weakness.

- Purely plate-buoyancy driven ("spontaneous") SZI is unlikely on the present-day Earth.

- Collision of buoyant features with pre-existing subduction trenches is often a precursor of SZI events.

- Subduction breeds subduction.
How to access and contribute the SZI database

• For a convenient overview:
  www.SZIdatabase.org

• Detailed glossary:
  www.SZIdatabase.org > Glossary

• Download data and event summaries:
  www.SZIdatabase.org > Resources > Data

• Contribute to the database:
  www.SZIdatabase.org > Contribute

• Community-wide discussions in the online SZI Forum:
  www.SZIdatabase.org > Forum
Acknowledgement


Any relevant references contained in the individual database files (see Data Source and/or Comments fields in the database sheets).

Follow the SZI Database project

www.SZIdatabase.org  @CEEDoslo  #SZIDatabase