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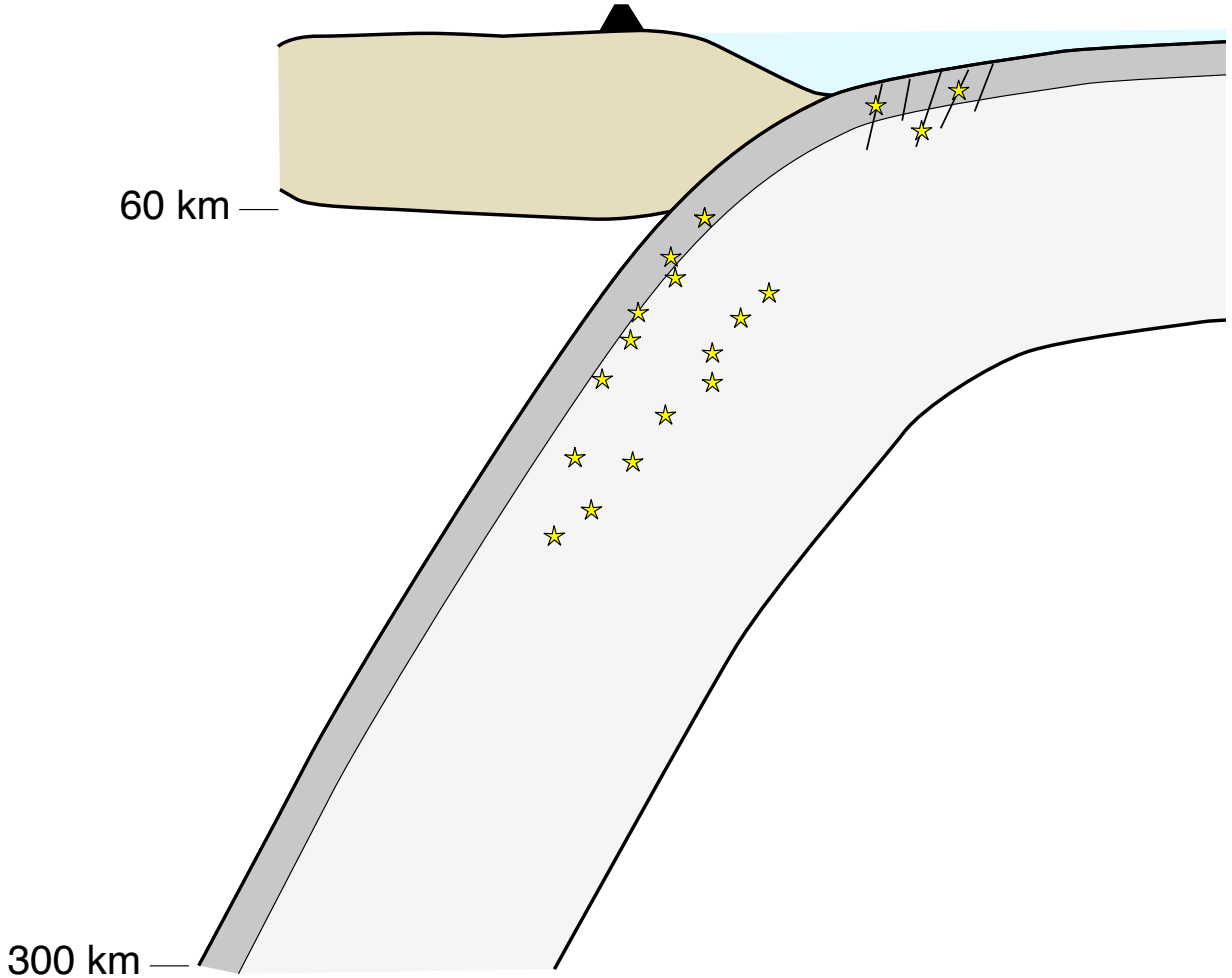
Re-examining Temporal Variations in Intermediate-Depth Seismicity

S. Wimpenny*, T. Craig, S. Marcou – University of Leeds



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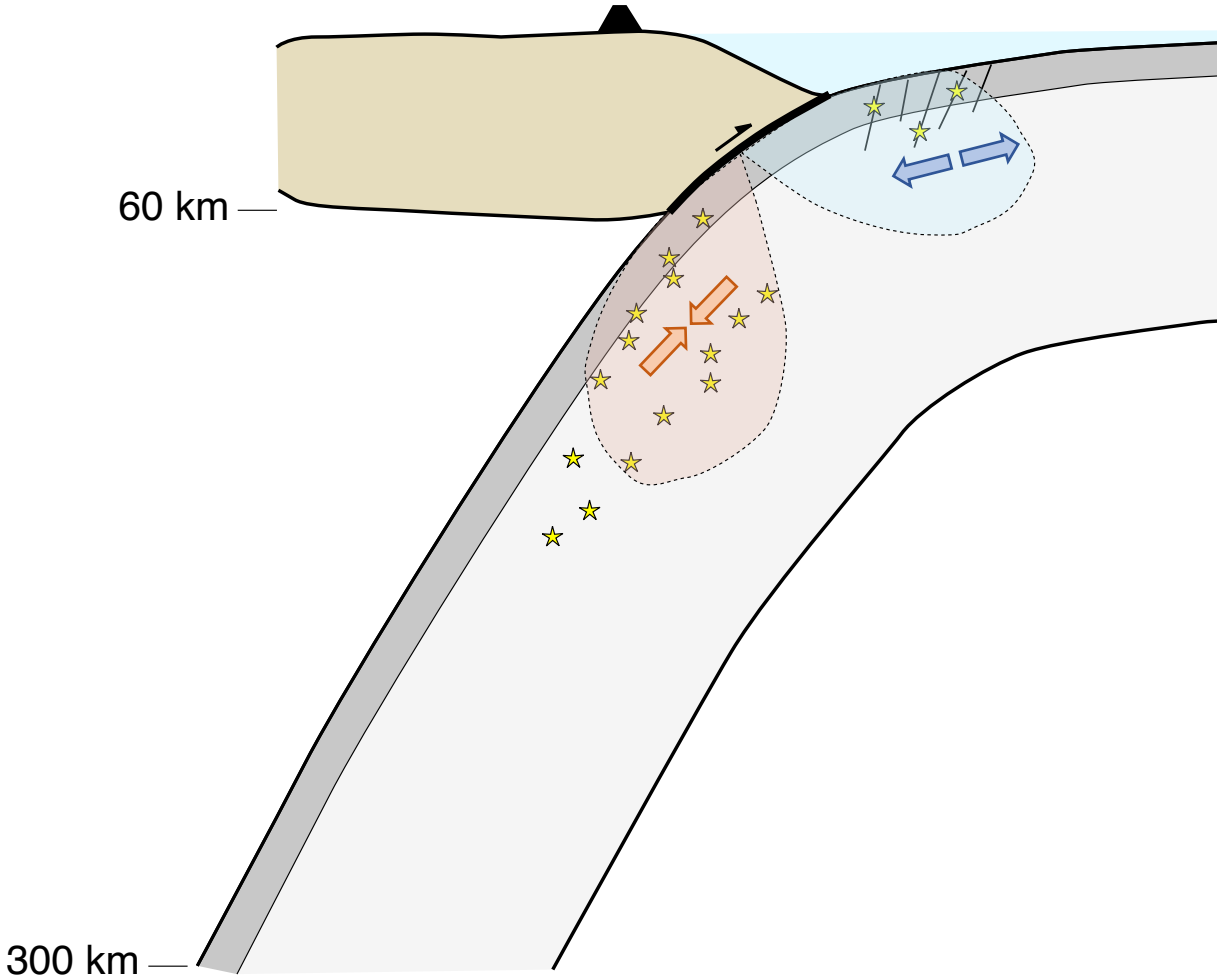
UNIVERSITY OF LEEDS



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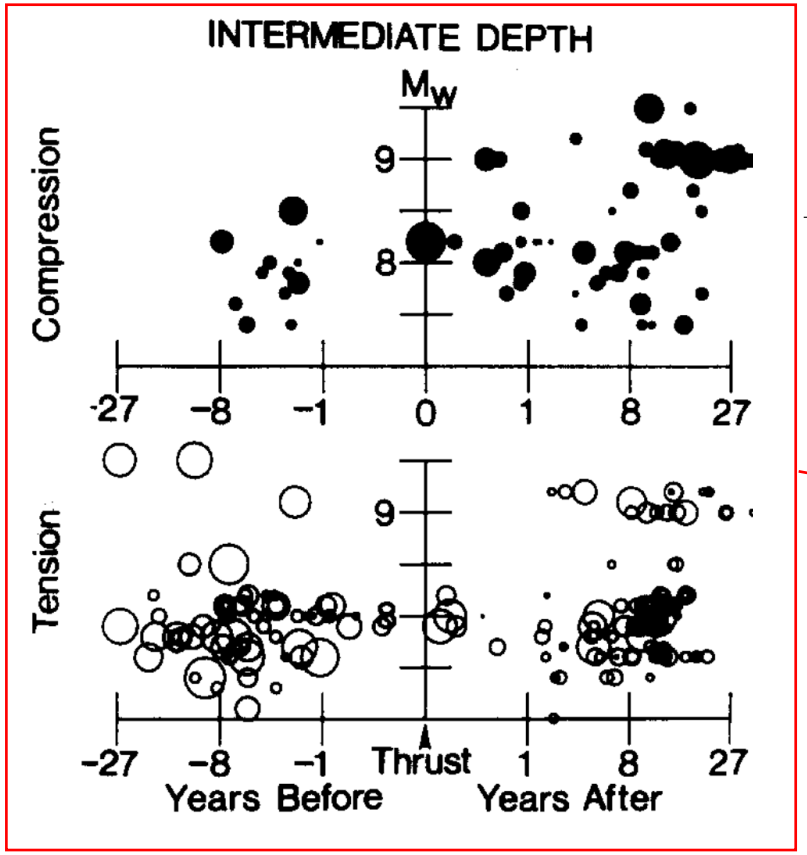

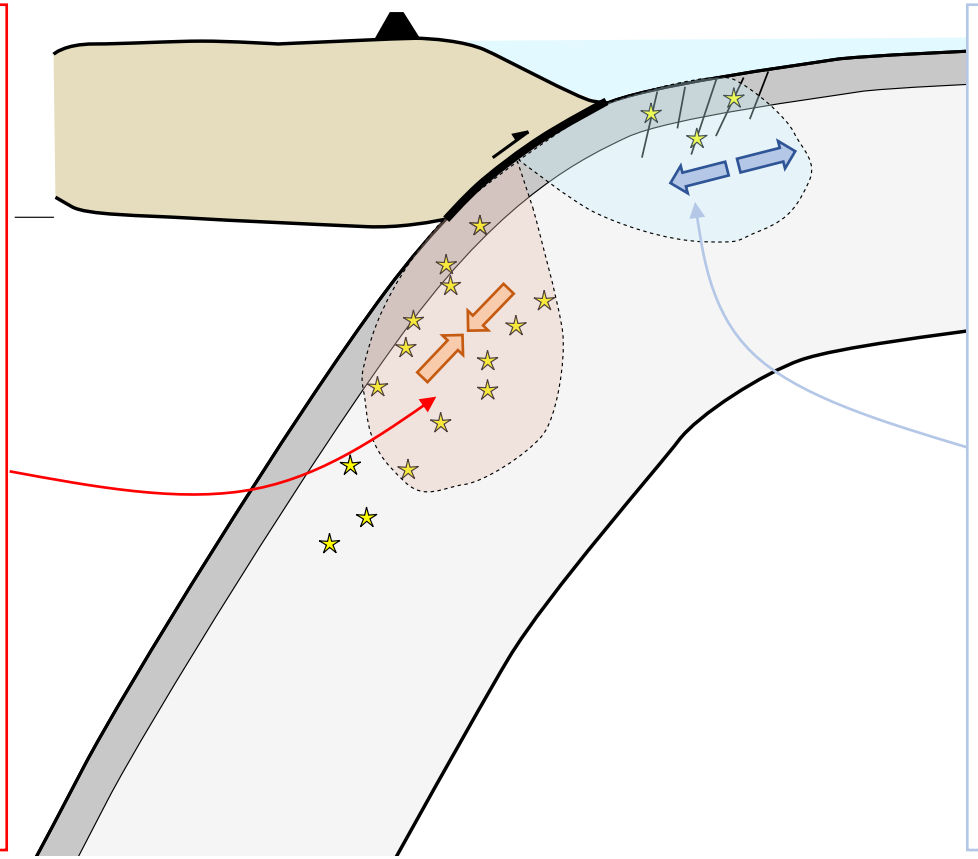

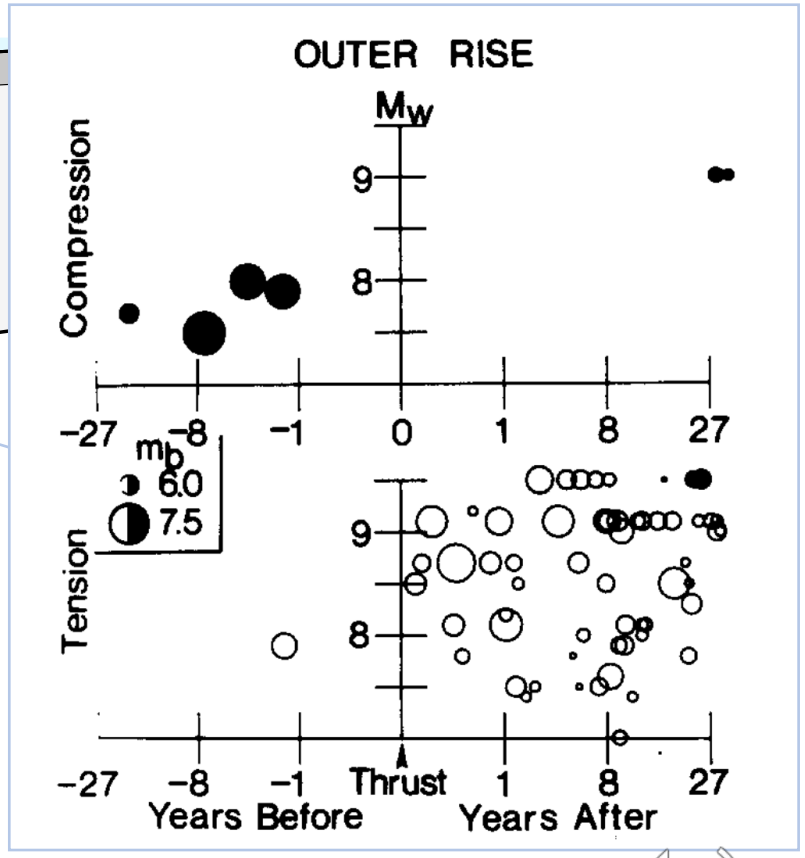

Less robust – only a few possible examples [e.g. Delbridge et al., 2017]

Robust trend – seen after mul[illegible]e megathrust events that slip to trench.

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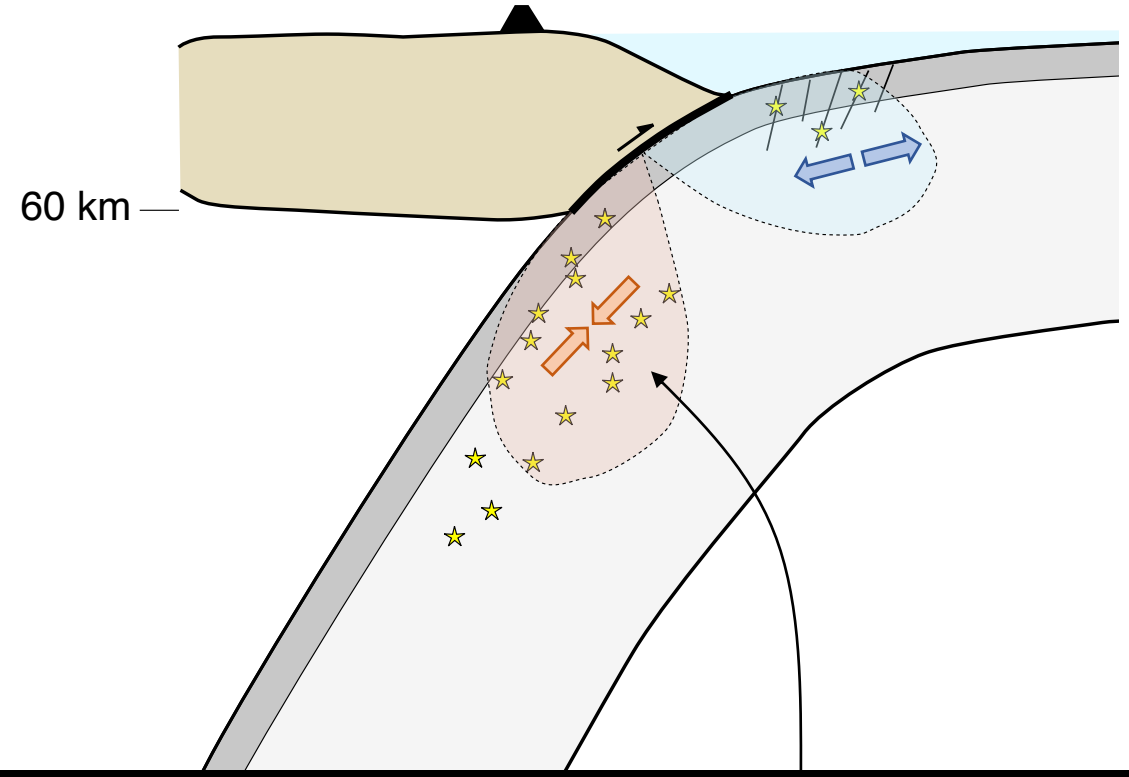
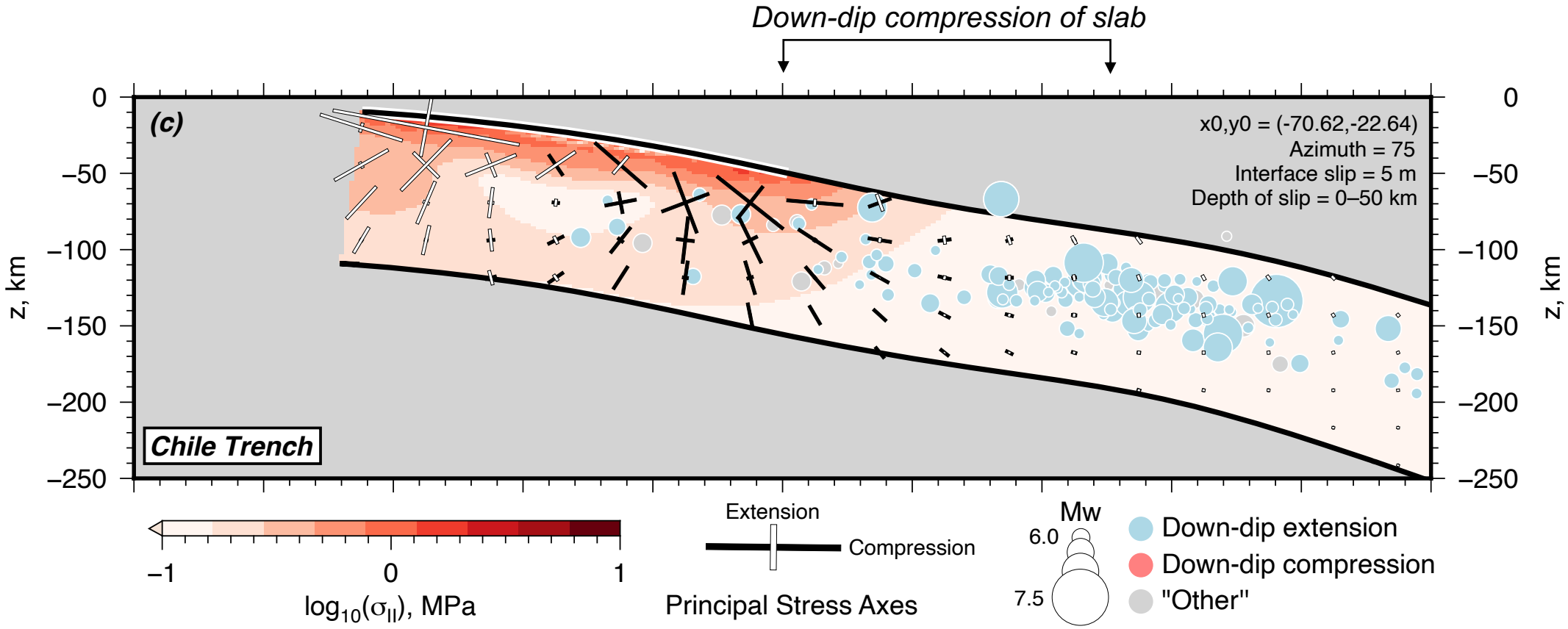


Aim: Re-examine how intermediate-depth seismicity responds to the stress changes caused by megathrust earthquakes.

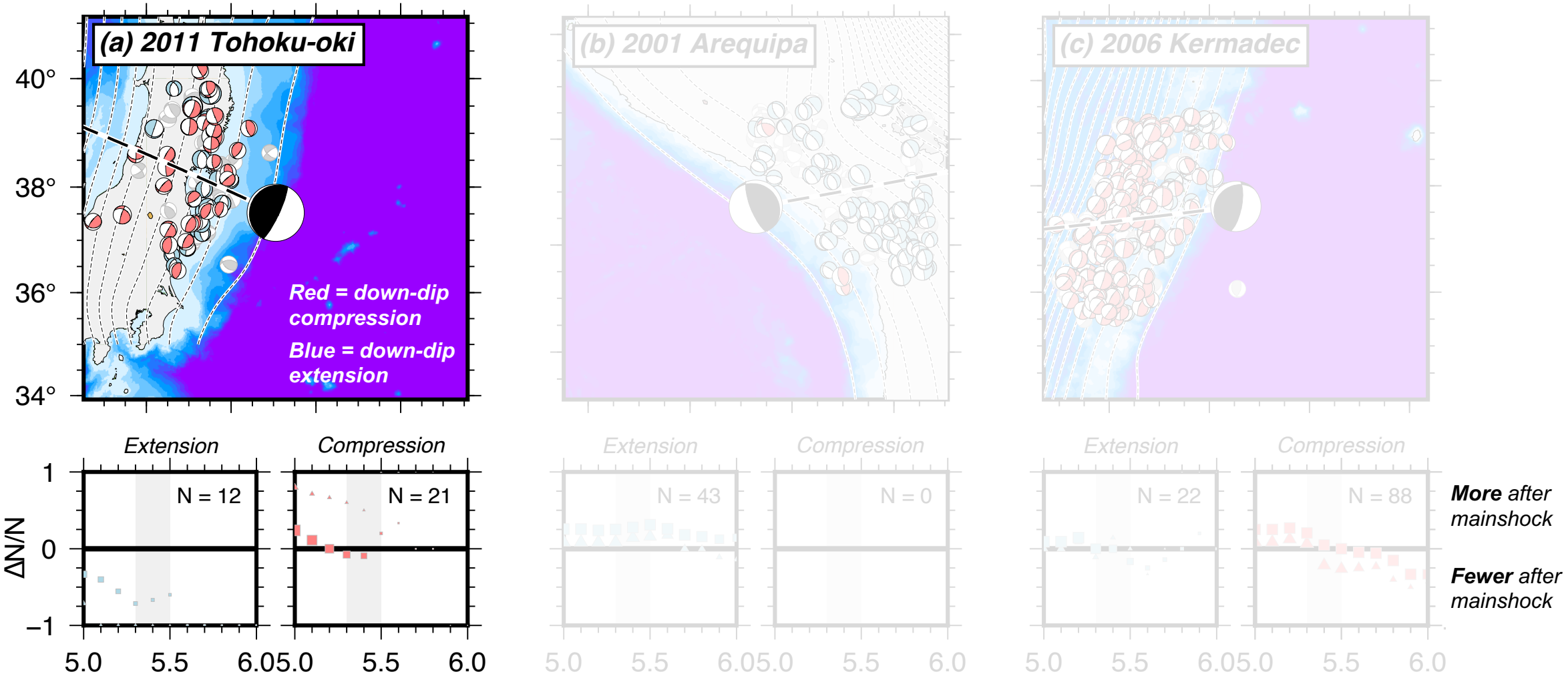
Stress changes within slabs due to megathrust slip



1. ***Megathrust slip should promote down-dip compression and inhibit down-dip tension.***

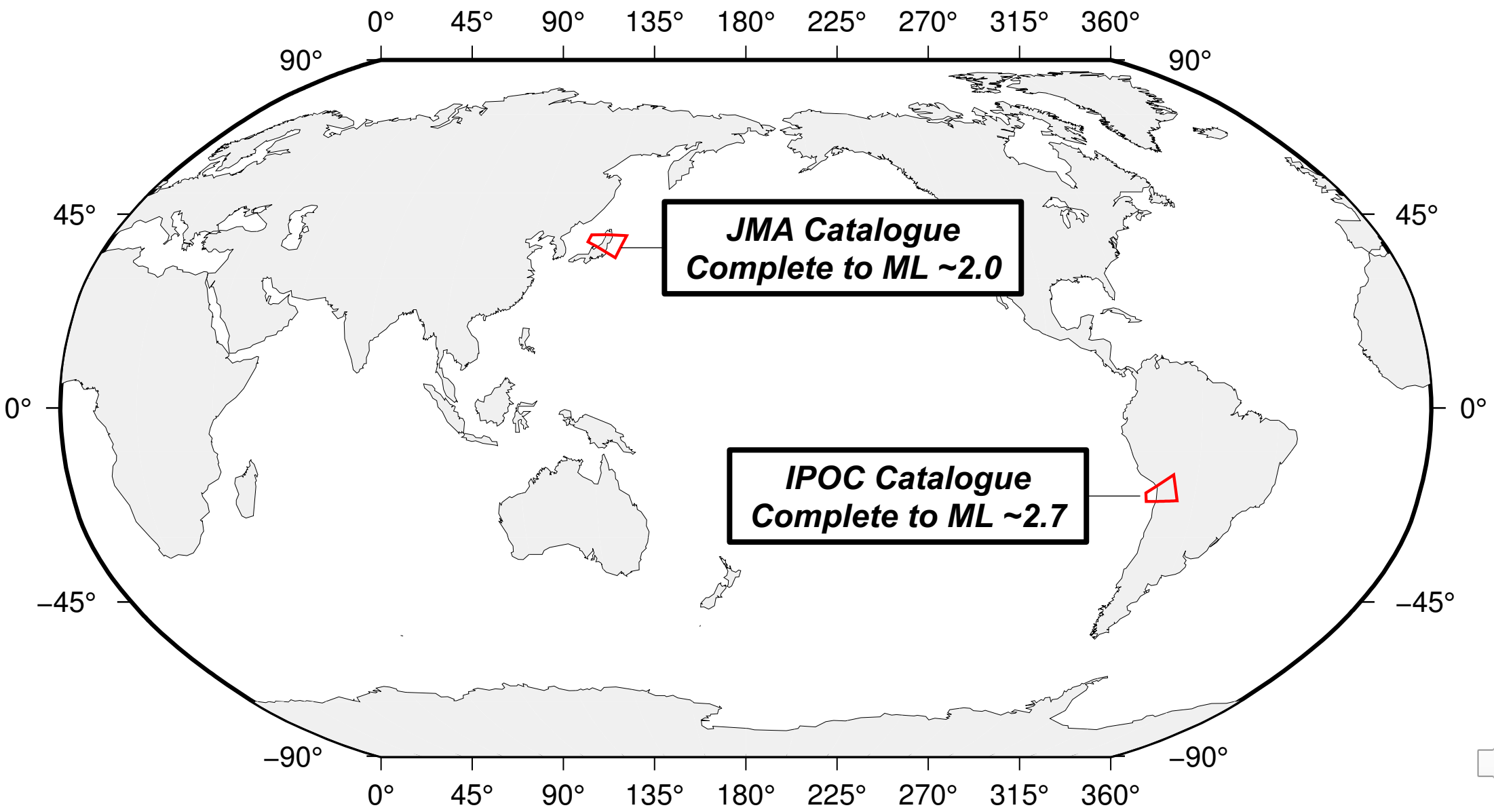
2. ***Larger earthquakes should change the stress within a larger volume of slab and have a stronger signal of triggering/inhibiting seismicity within the slab.***

Data Analysis: Global Study of Intraslab Seismicity



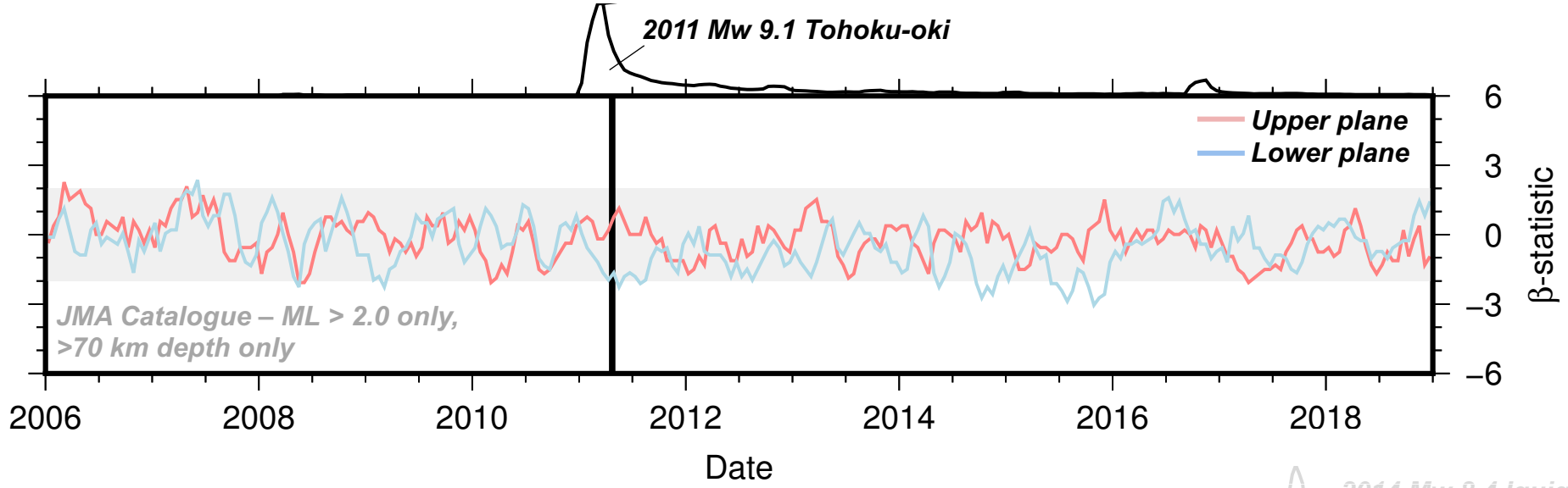
No consistent change in the earthquakes accommodating down-dip deformation.

Data Analysis: Regional Studies of Intraslab Seismicity

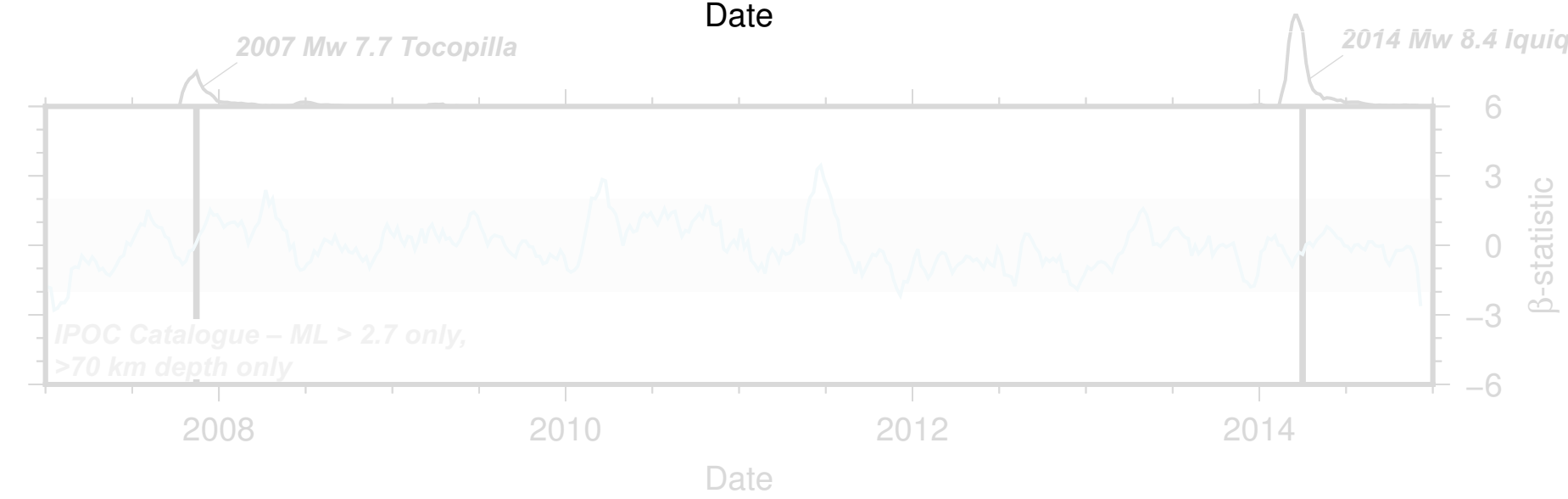


Data Analysis: Regional Studies of Intraslab Seismicity

Intermediate-depth seismicity beneath Japan



Intermediate-depth seismicity beneath northern Chile

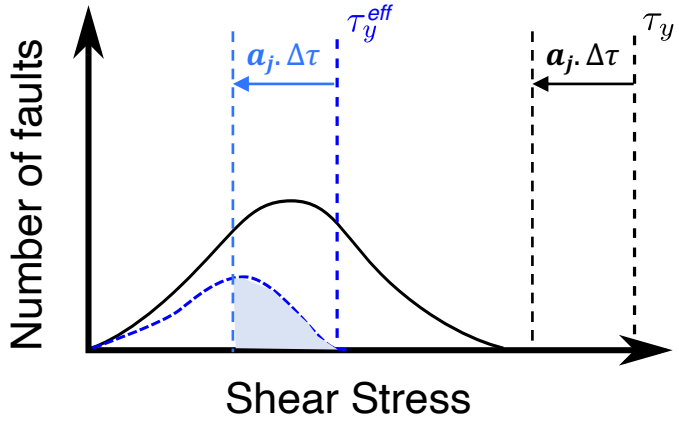


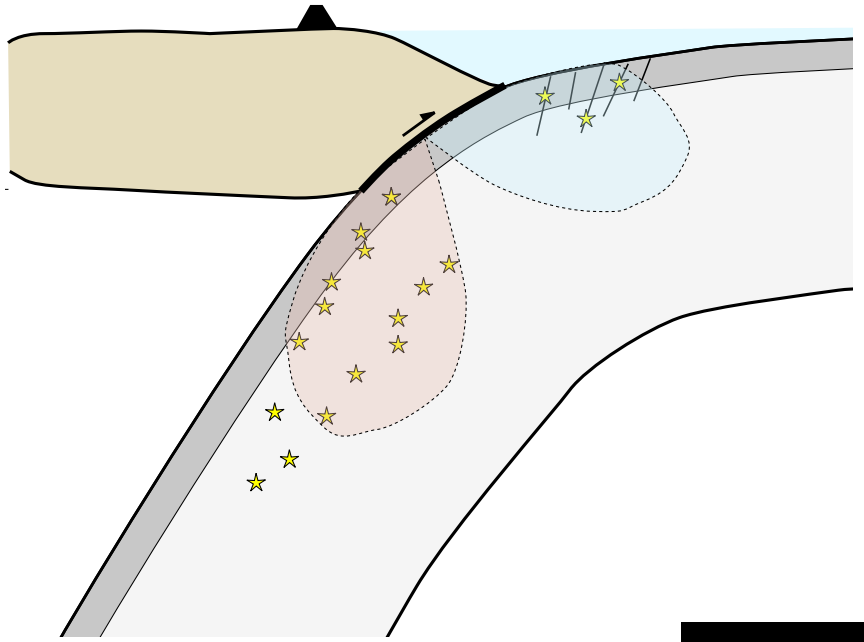
No statistically significant change in earthquakes frequency at intermediate depths.

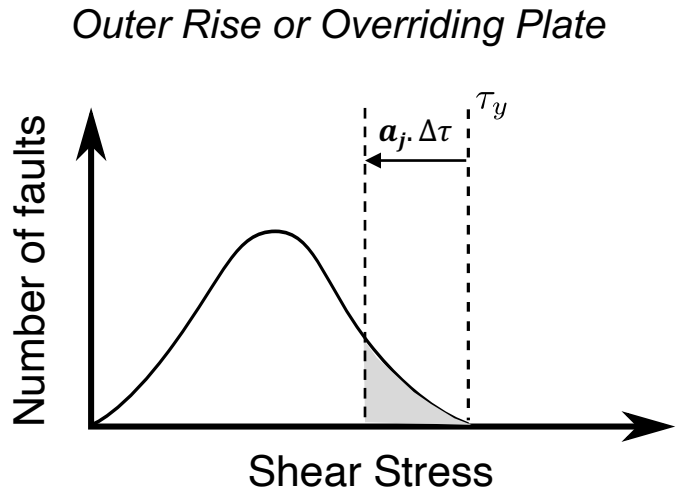
Summary and Interpretation of the Results

1. ***Faults within slabs are relatively insensitive to the stress transfer from megathrust earthquakes compared to faults within the outer rise and overriding plate.***

2. ***Faults within slabs are also relatively insensitive to stress transfer from large intraslab earthquakes given they have low aftershock productivity [e.g. Ye et al., 2020].***







Unlikely to be pervasive fluid-related weakening of faults within slabs.