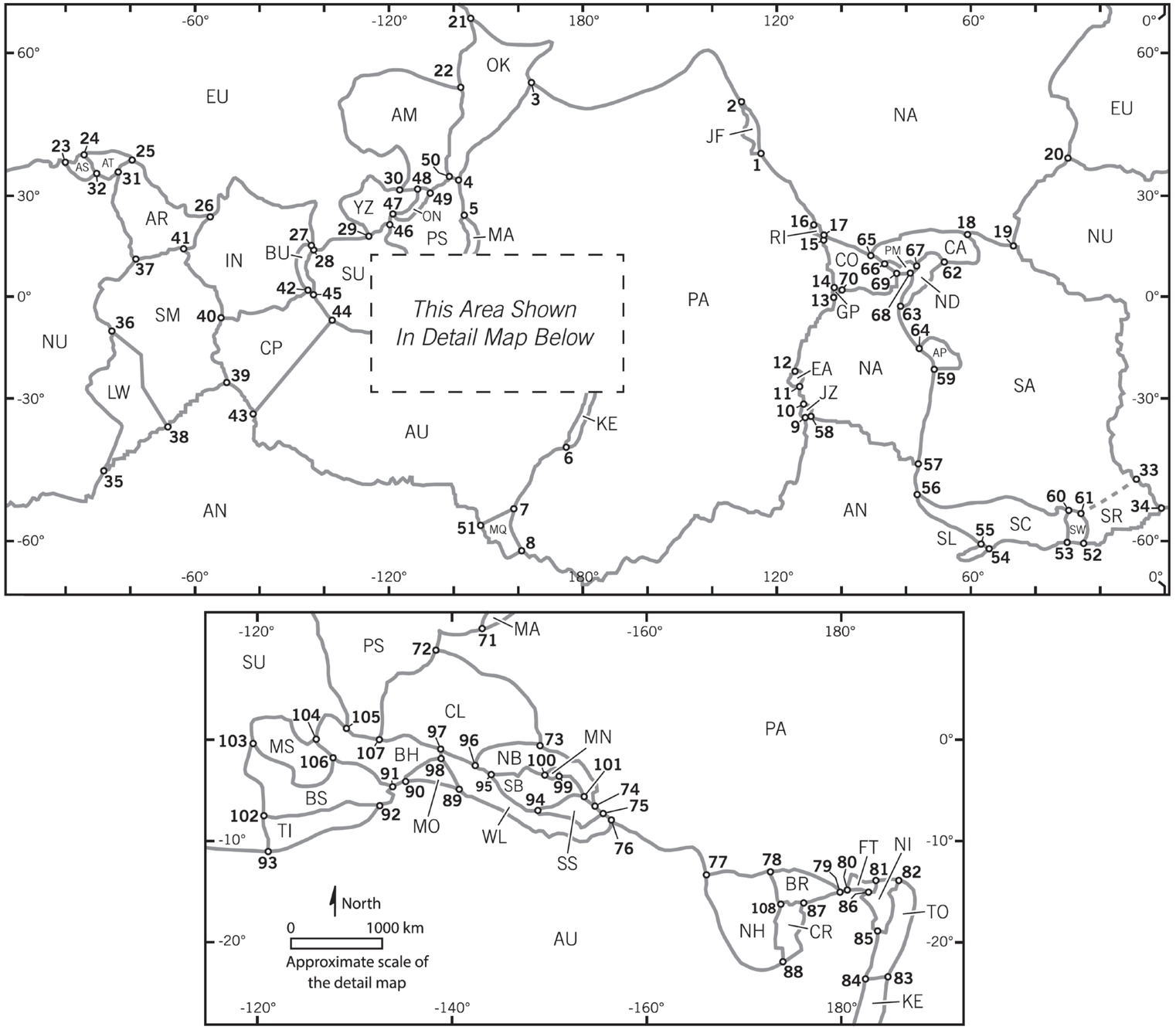
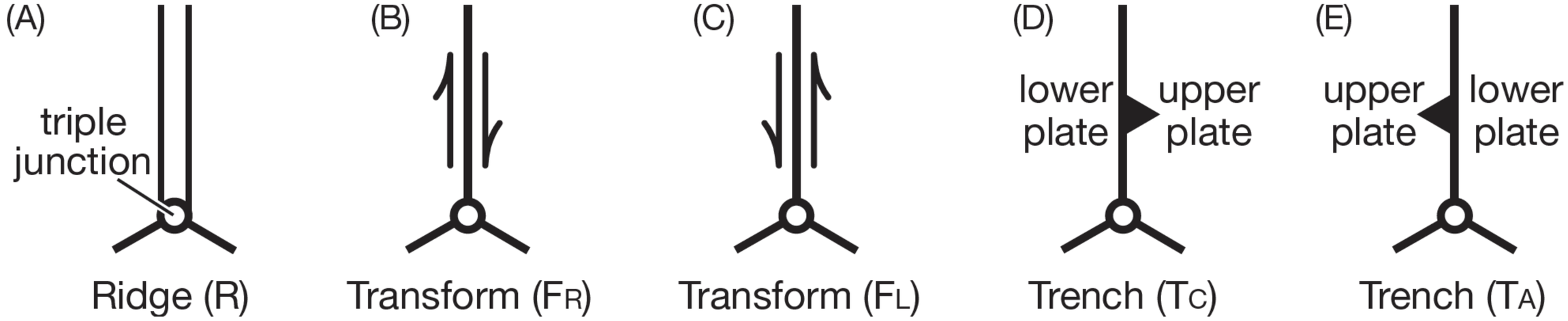
Kinematics of lithospheric triple junctions


This Area Shown
In Detail Map Below
North
0 1000 km
Approximate scale of
the detail map

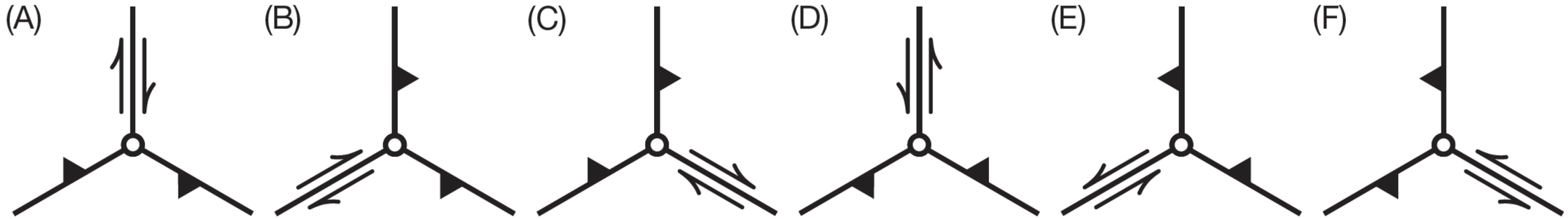
Cronin, 2021

Five Plate Boundaries



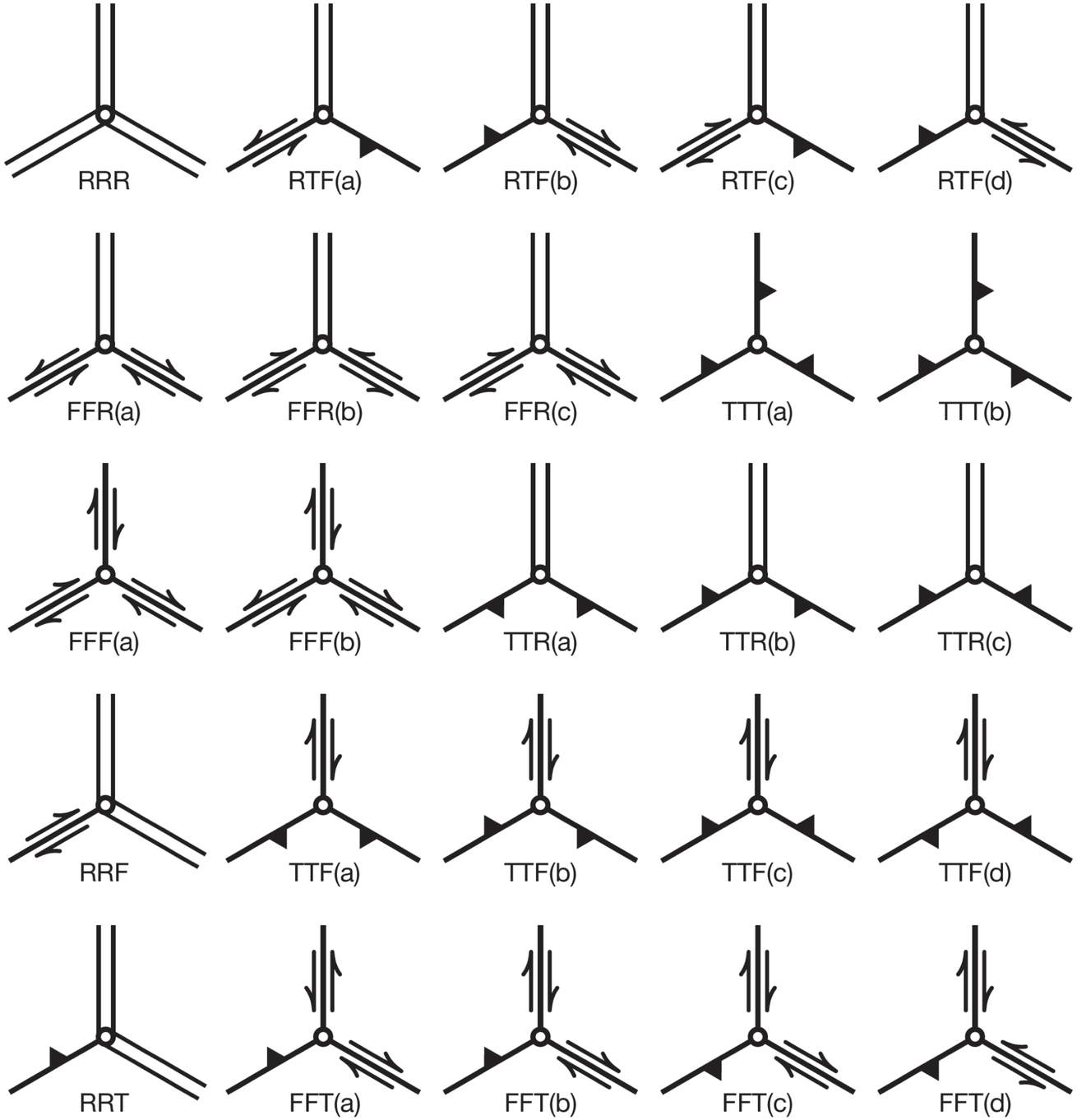
Cronin, 1988, 1992, 2021

The Same Triple Junction Rotated and Reflected



Cronin, 1988, 1992, 2021

The 25 Unique Types of Triple Junction



Cronin, 1988, 1992, 2021

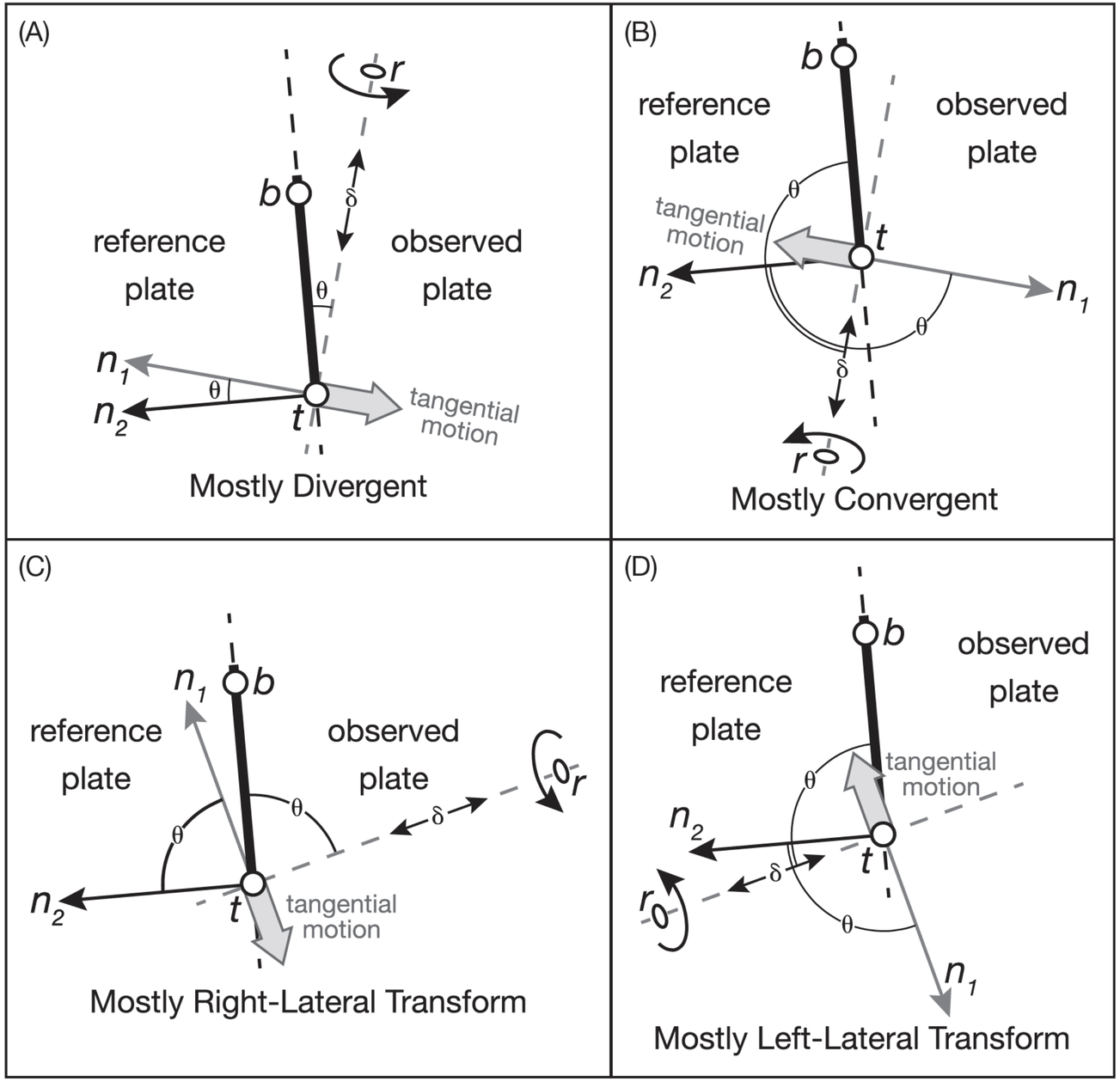
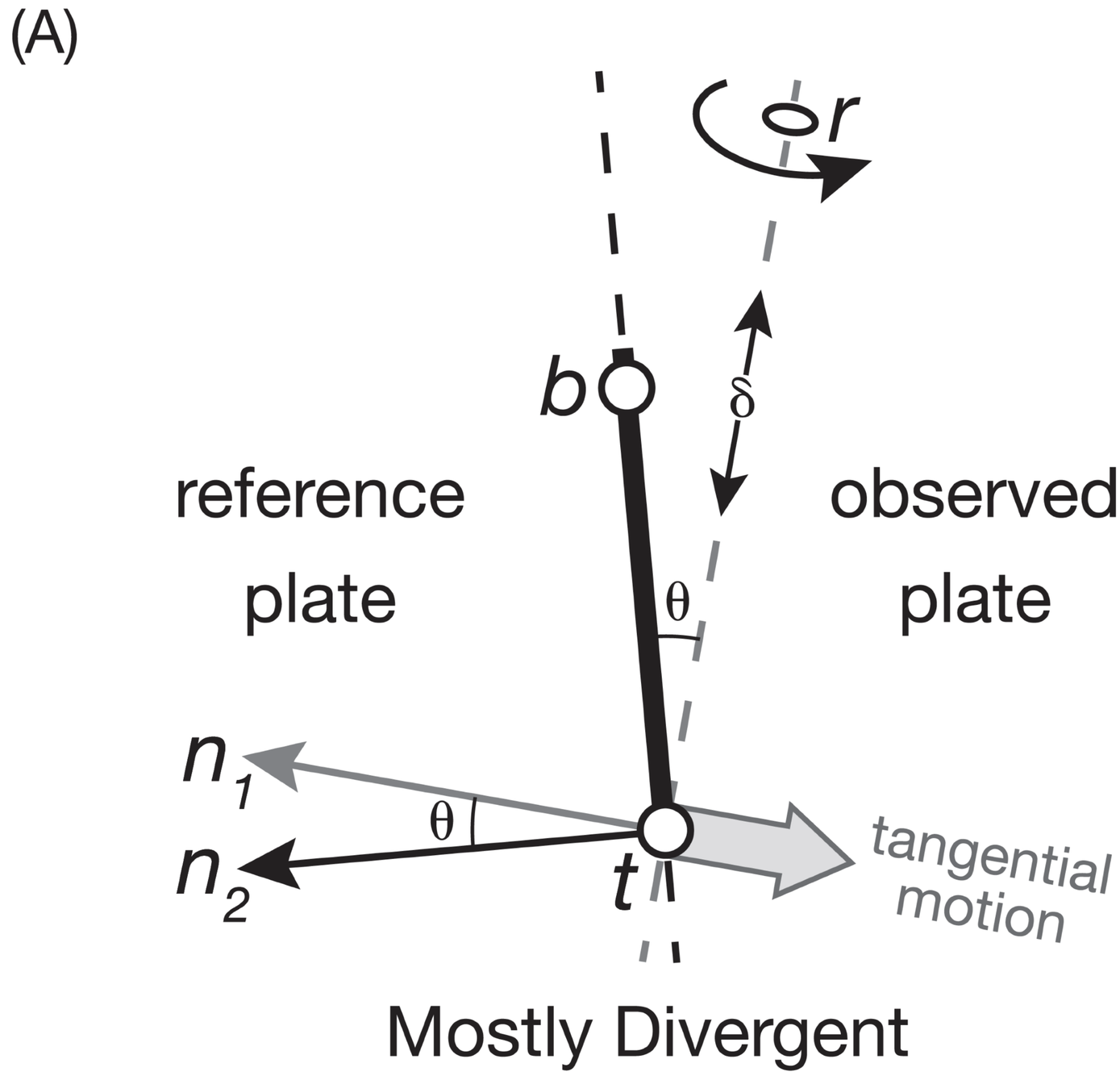
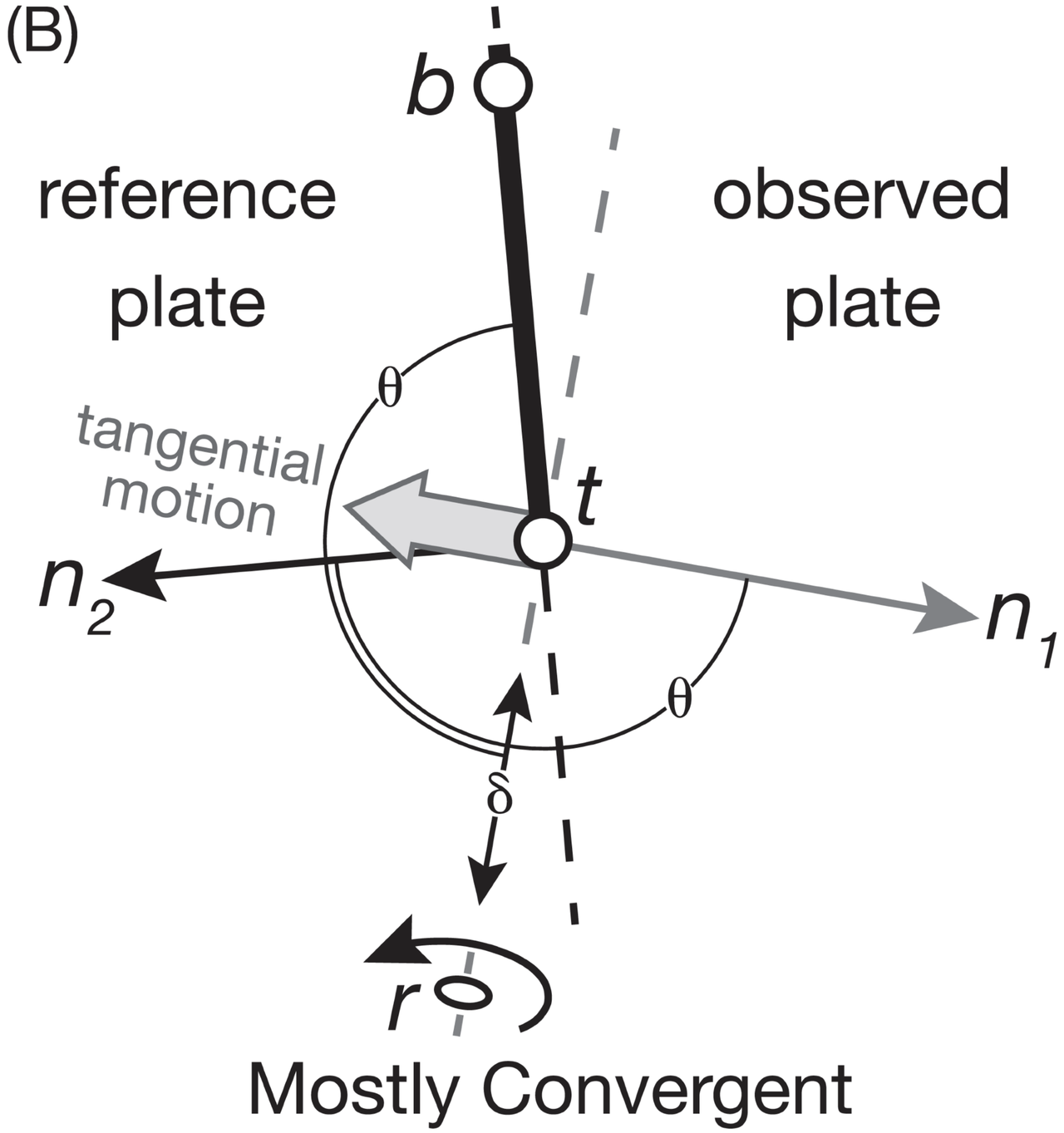


Fig. 5 The location of the triple junction (point ***t***), a point along the plate boundary near the triple junction (point ***b***), and the Euler pole (point ***r***) around which the observed plate rotates anti-clockwise relative to the reference plate. The tangential speed varies with the angular distance (δ) from the triple junction to the Euler pole. (A) Scenario for a divergent boundary. (B) Scenario for a convergent boundary. (C) Scenario for a right-lateral transform fault. (D) Scenario for a left-lateral transform fault.

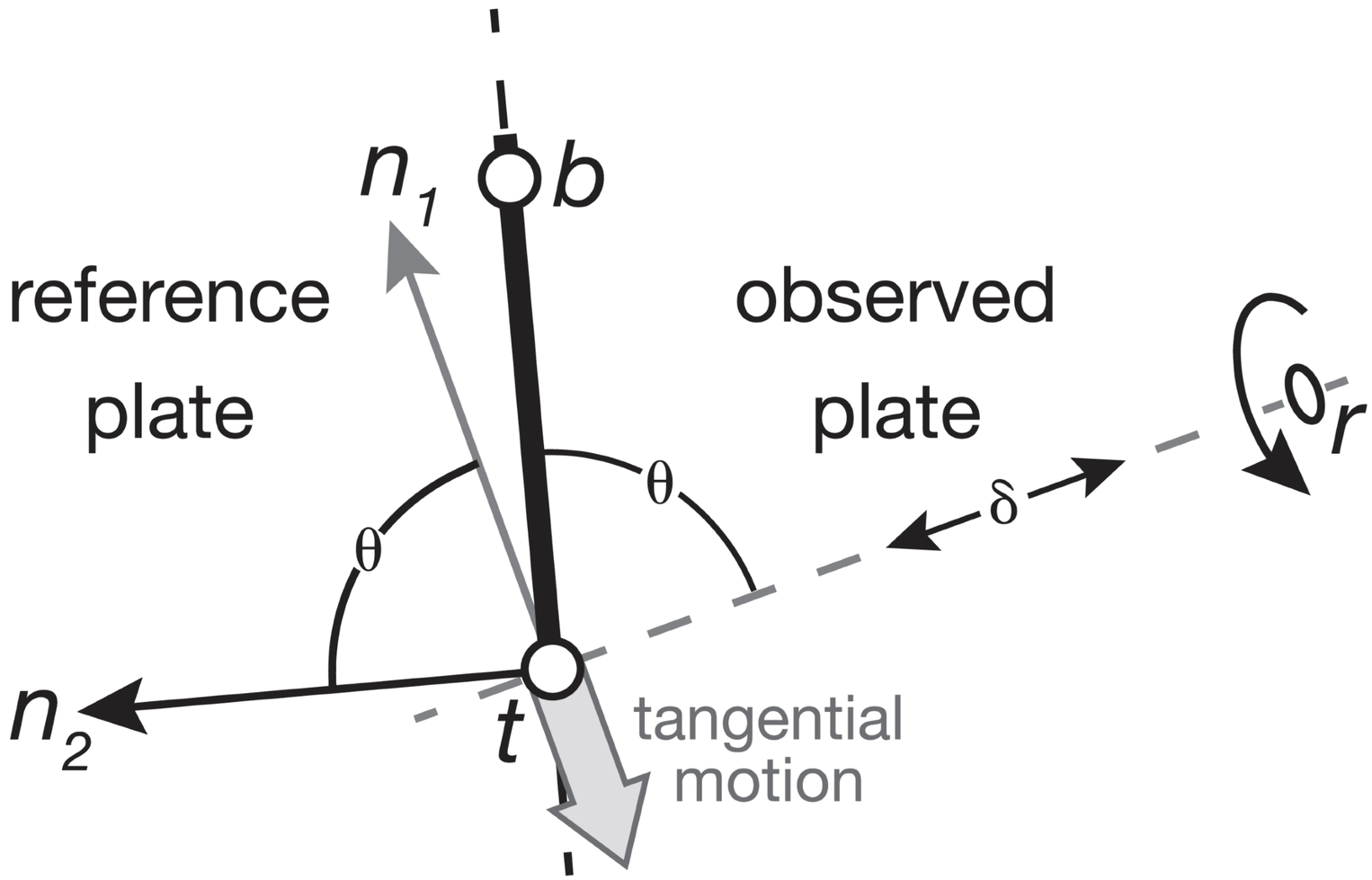

(A)
r
b
δ
reference
plate
observed
plate
θ
n1
θ
n2
t
tangential
motion
Mostly Divergent

Cronin, 2021


(B)
b
reference
plate
observed
plate
θ
tangential
motion
t
n2
n1
θ
δ
r
Mostly Convergent

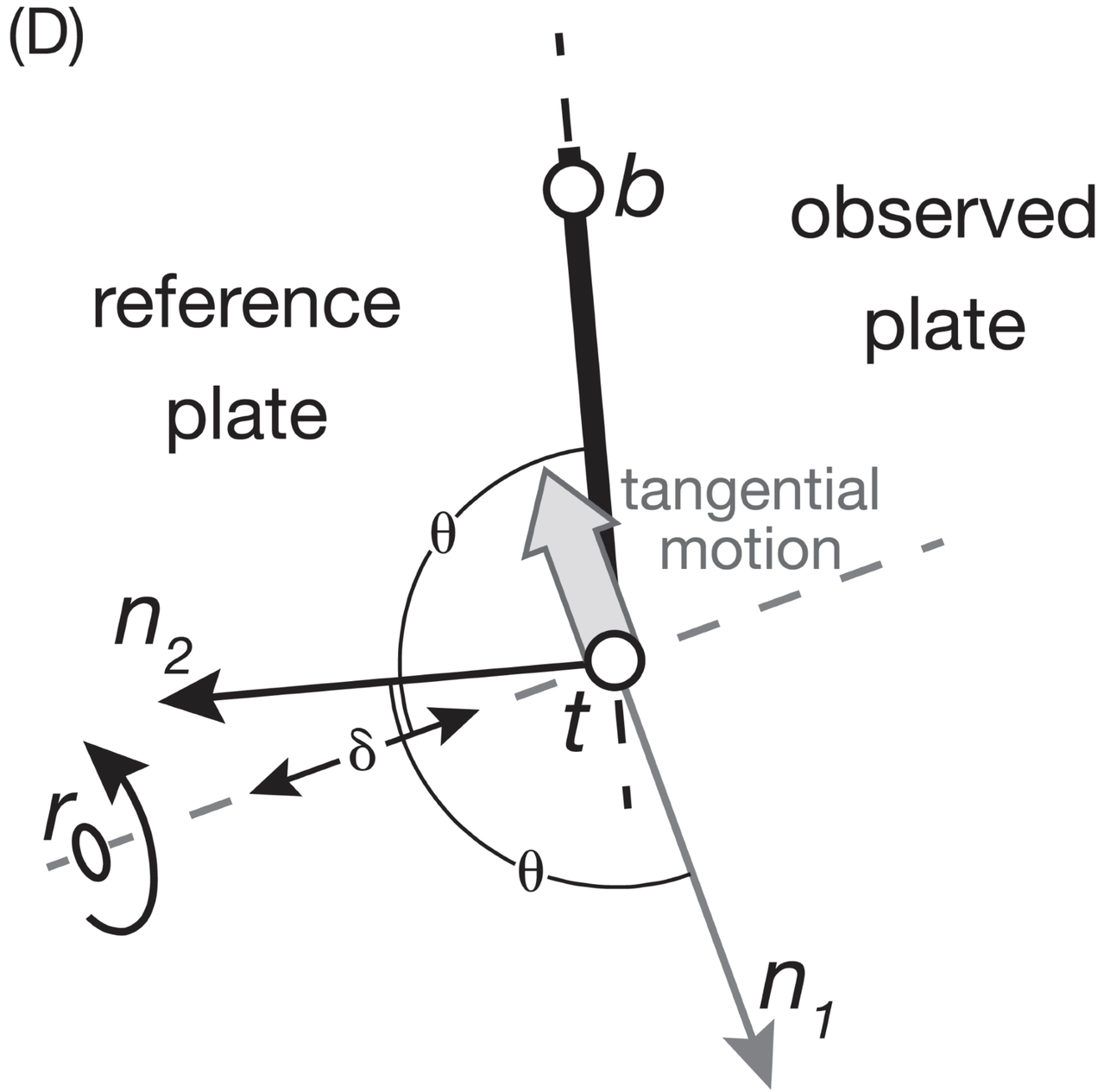
Cronin, 2021

(C)



Mostly Right-Lateral Transform

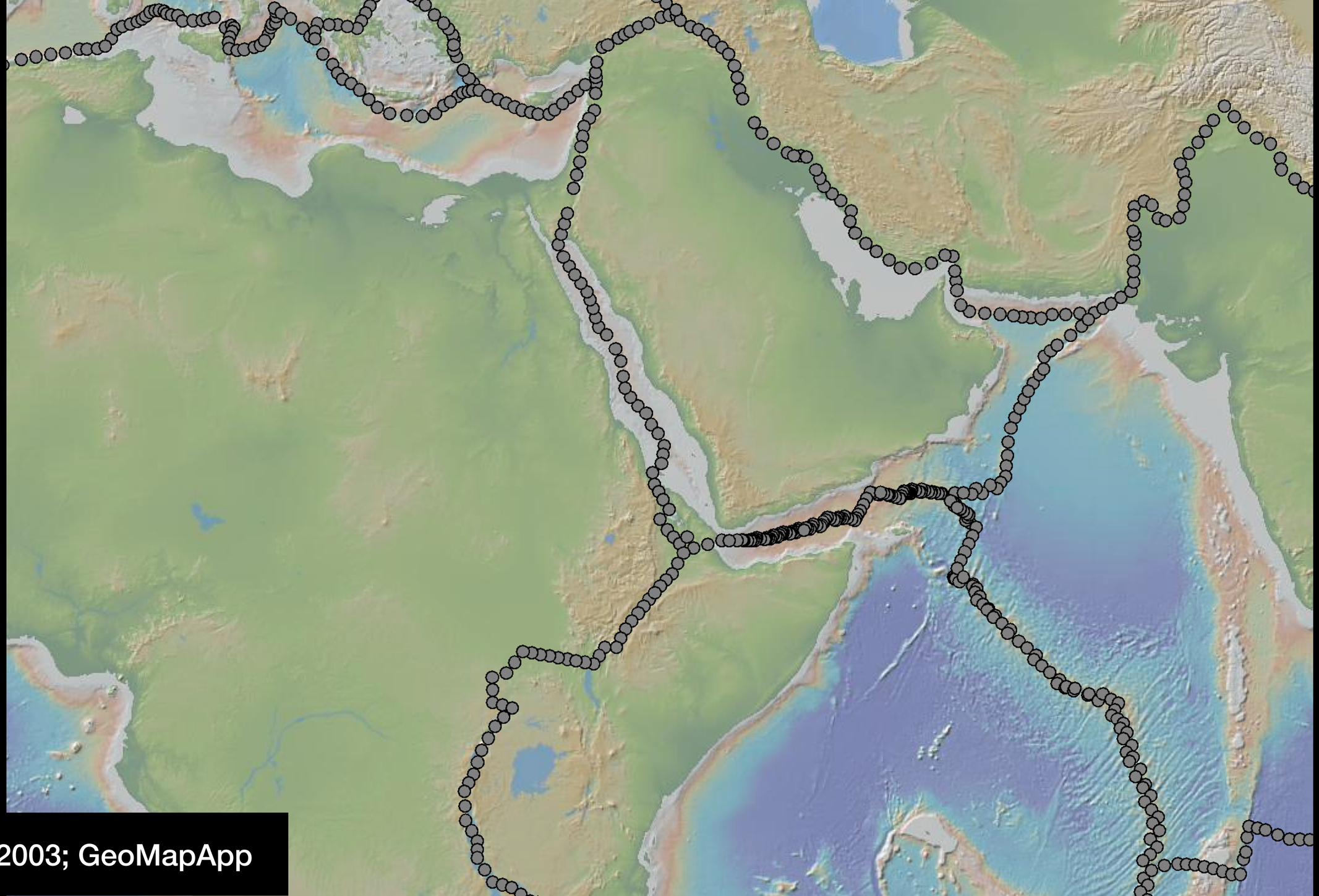
Cronin, 2021



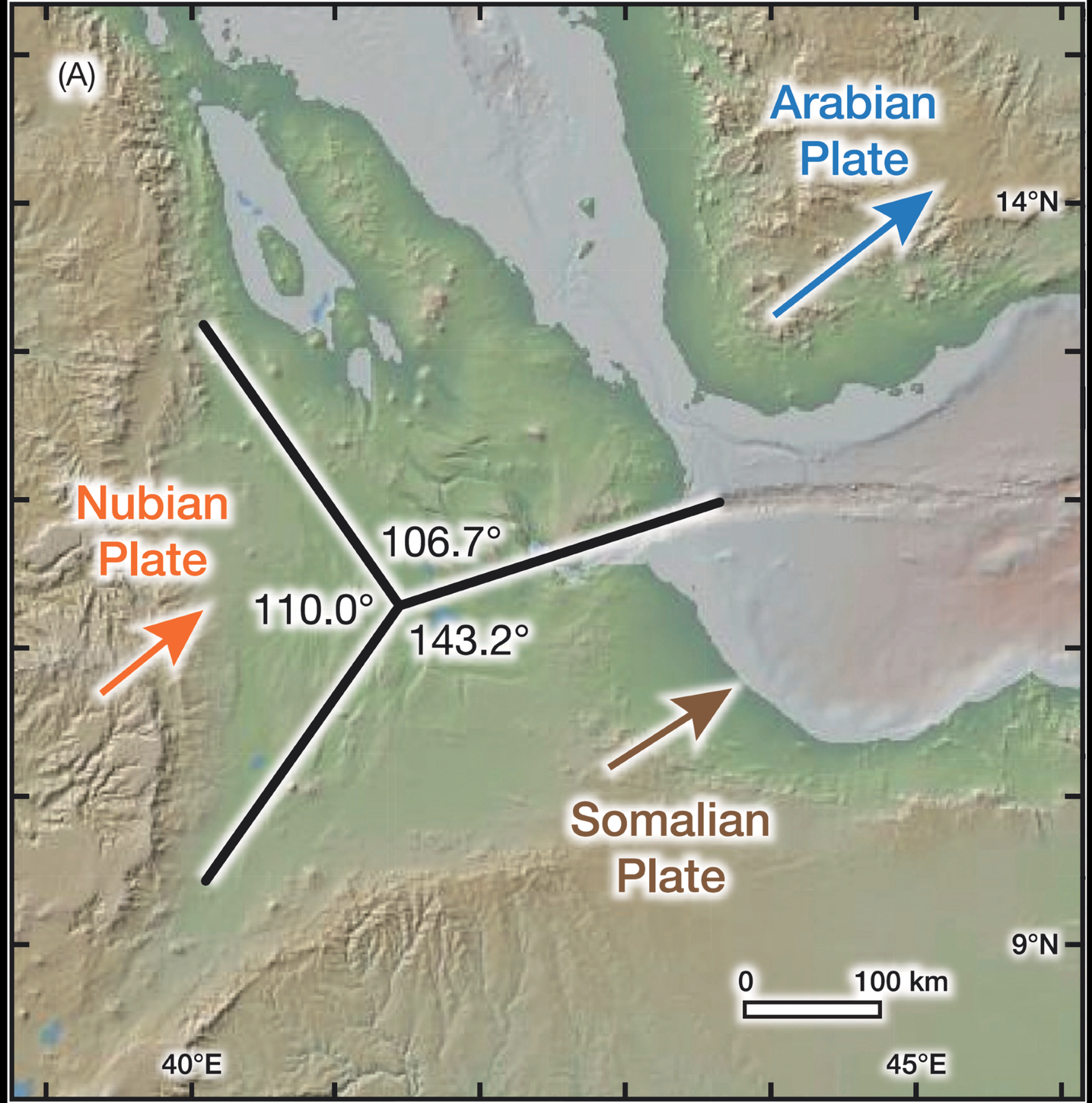
Mostly Left-Lateral Transform

Cronin, 2021


Google Earth

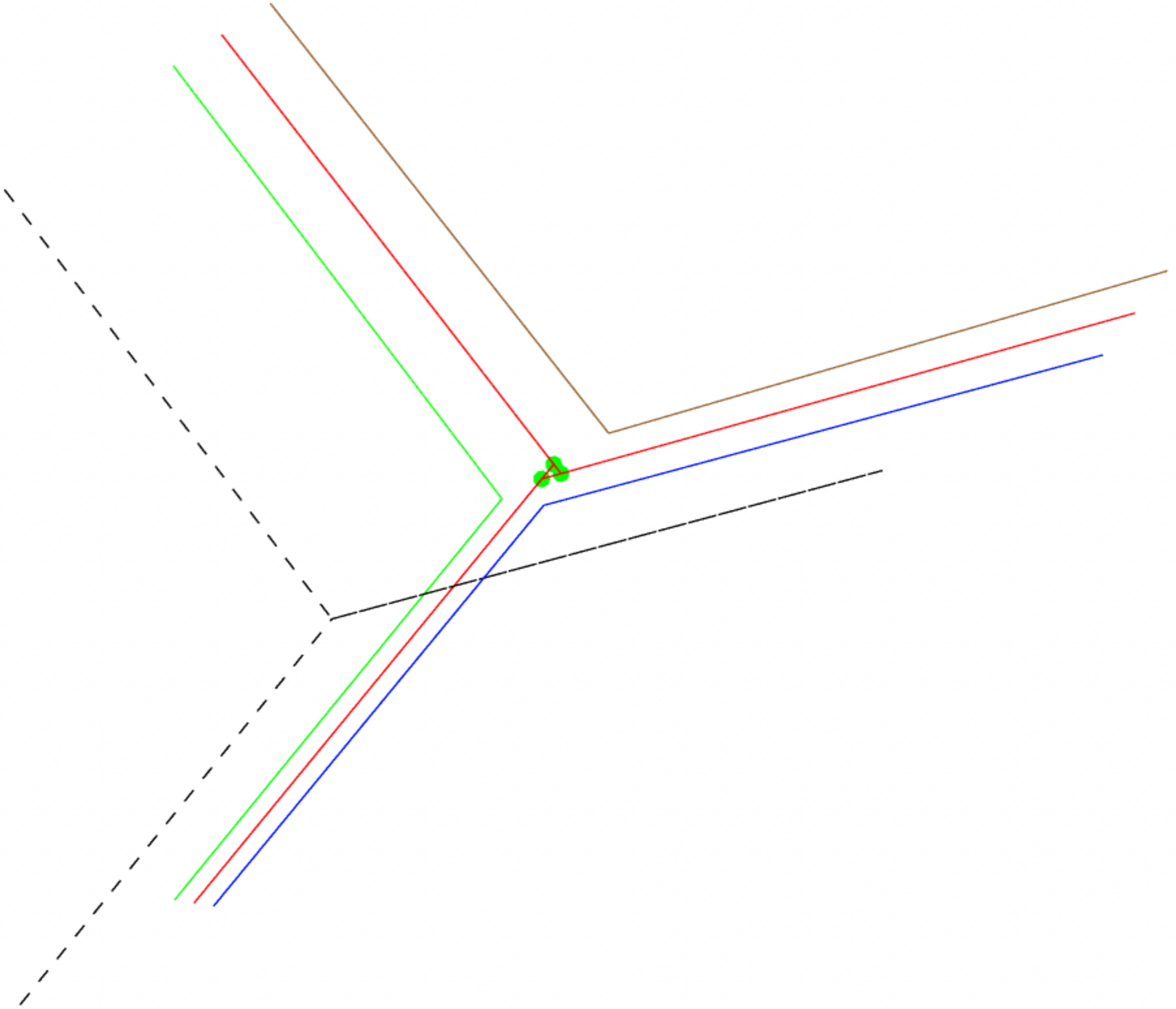


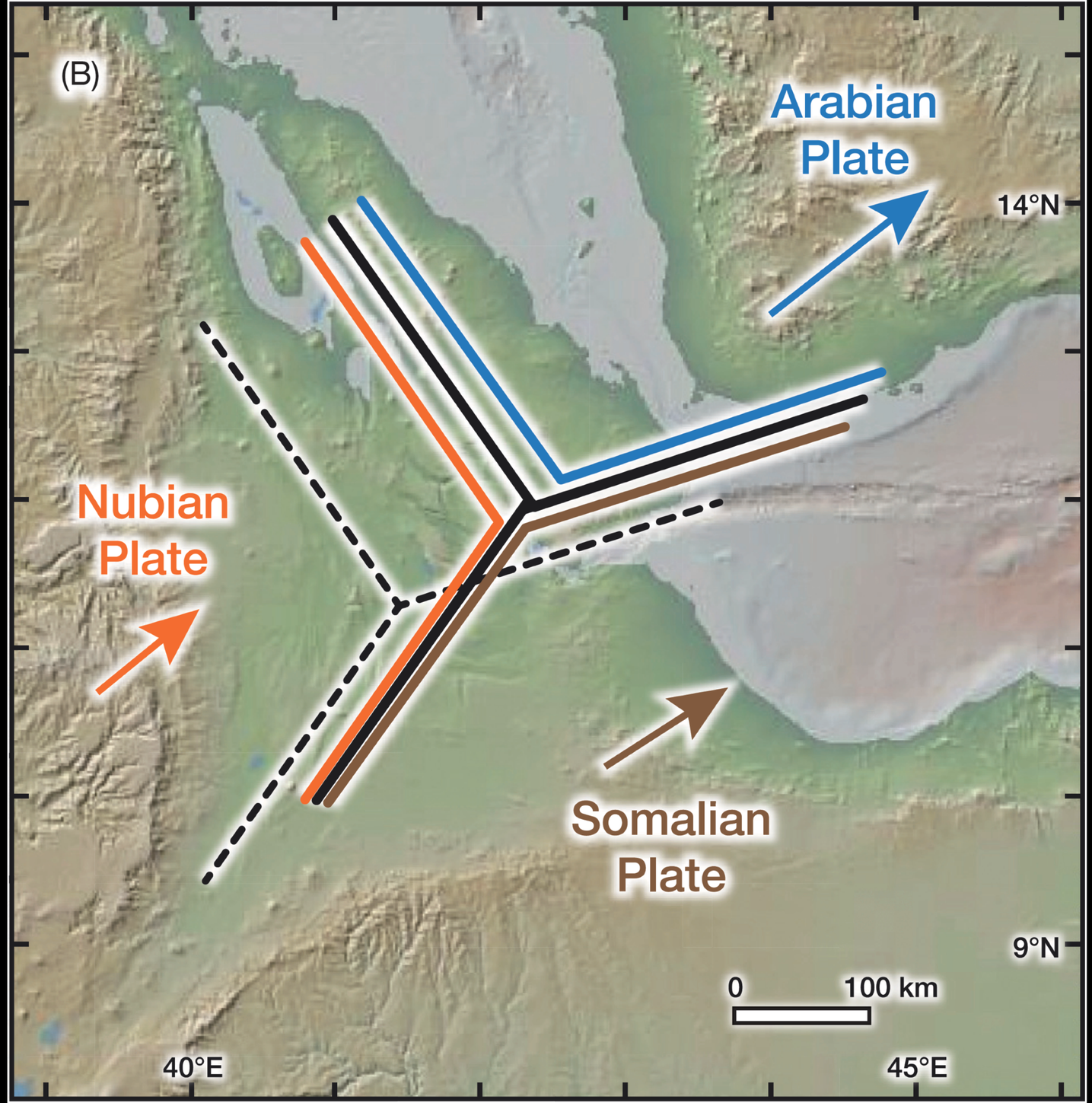
Bird, 2003; GeoMapApp



Cronin, 2021;
GeoMapApp

Out[ ]=





Cronin, 2021;
GeoMapApp

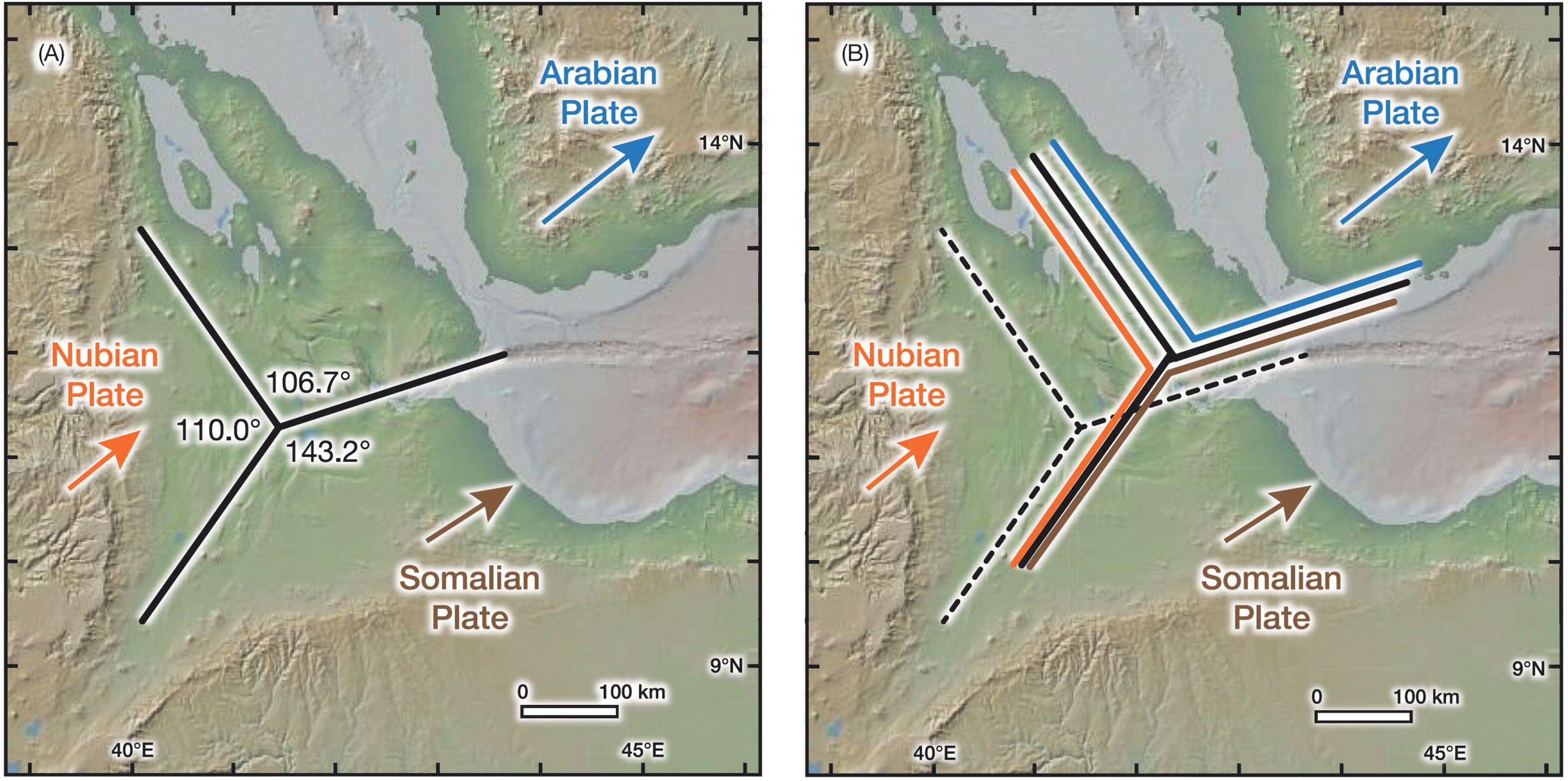
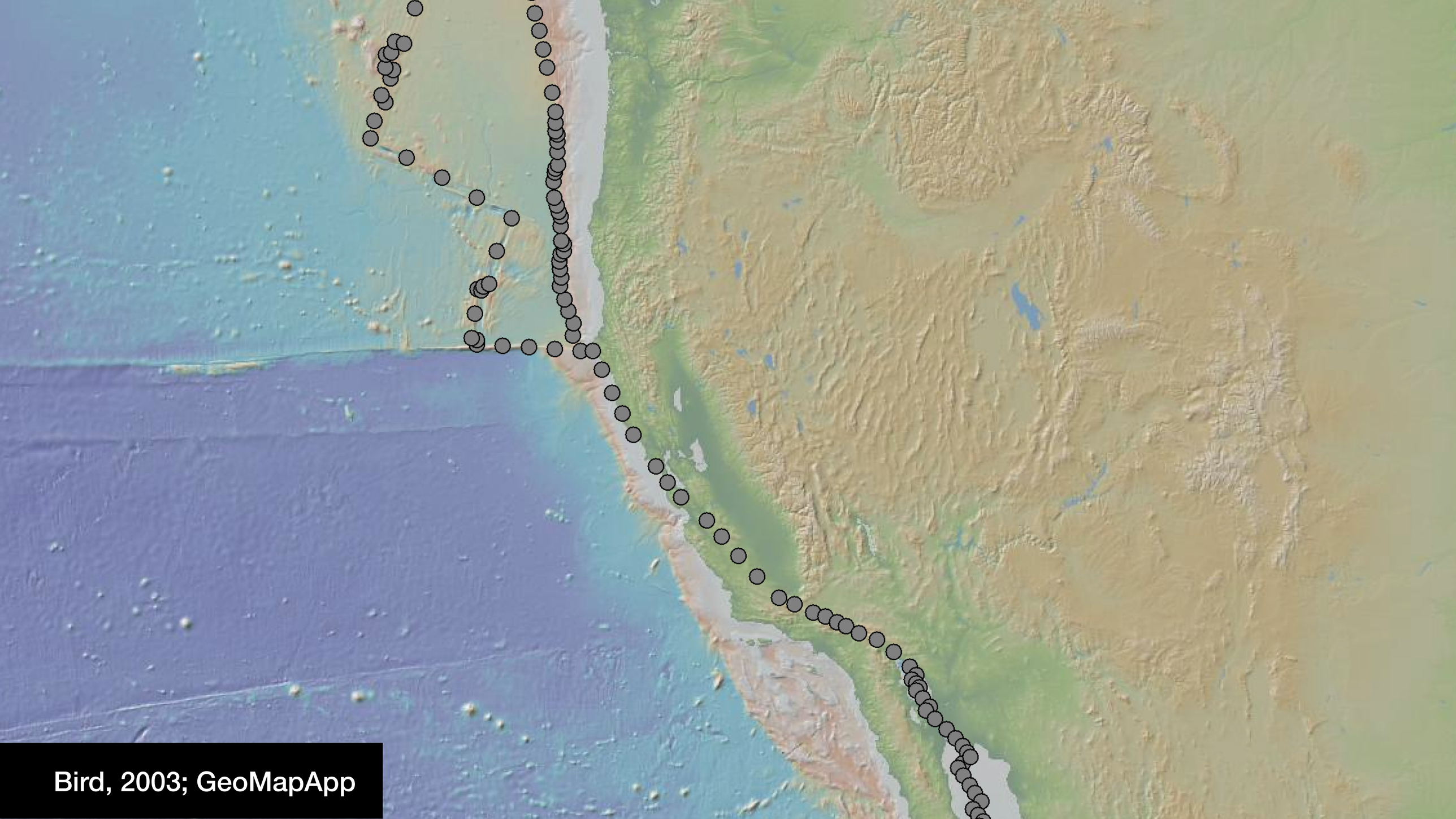
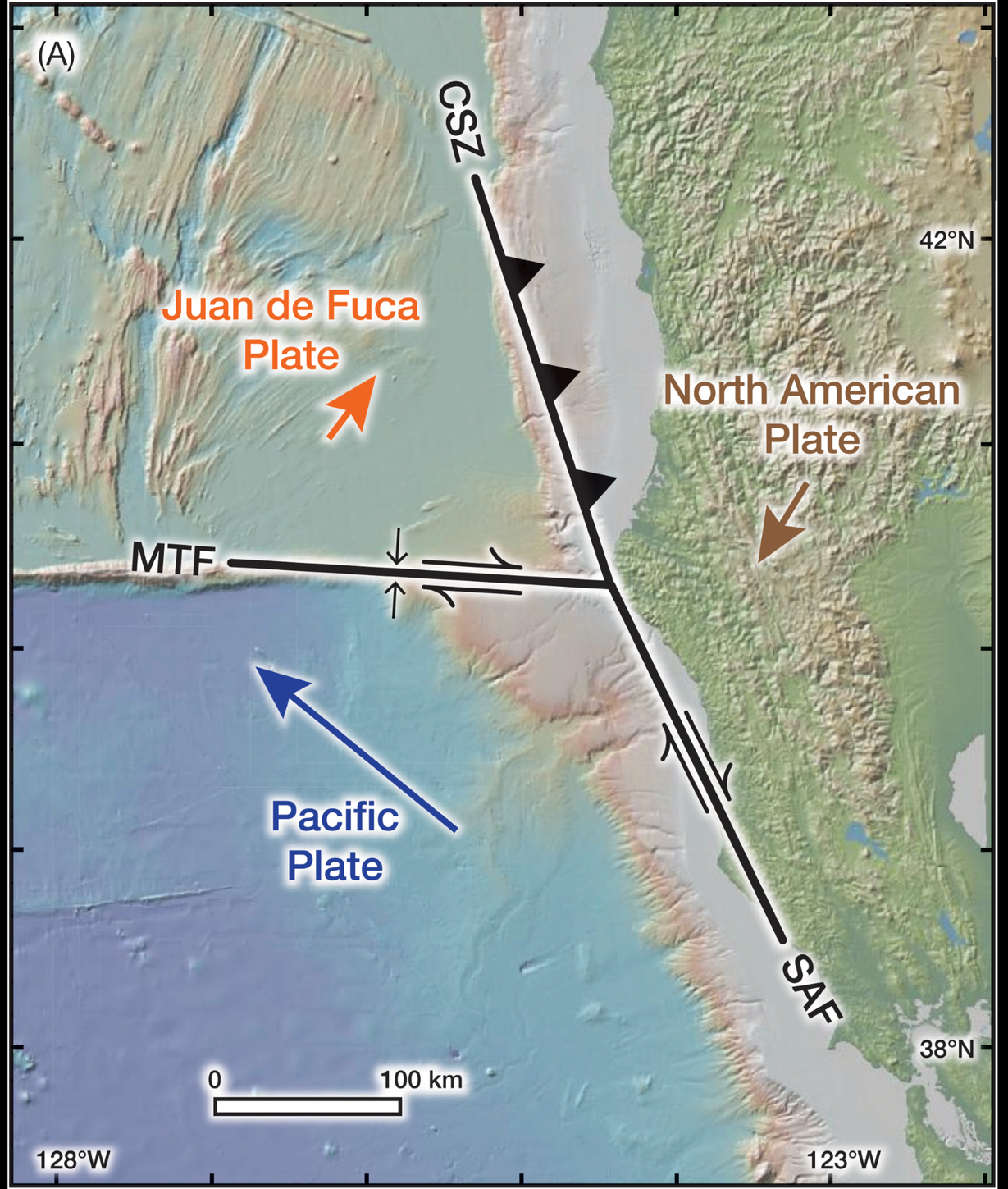


Fig. 6 (A) Three rift boundaries (*black lines*) converge at the Afar (NB-SM-AR) triple junction today, simplified from Bird (2003). *Arrows* indicate direction each plate is moving relative to the NNR reference frame of Argus et al. (2011). (B) Current plate boundaries (*colored lines*) and predicted location of the triple junction (*black lines*) after 3 Myr of displacement. Base maps are from GeoMapApp.org.


Google Earth


Bird, 2003; GeoMapApp



Cronin, 2021; GeoMapApp

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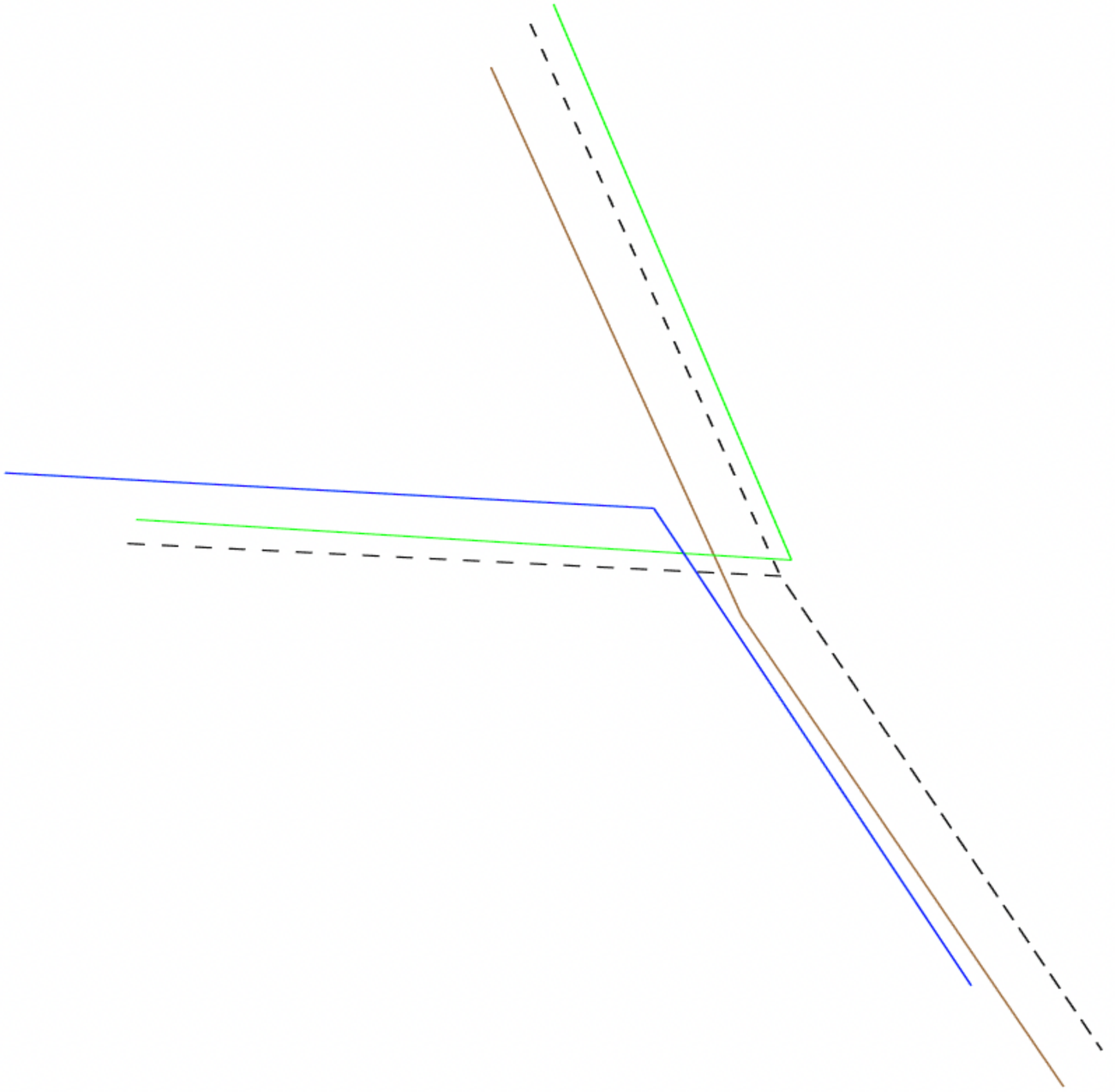
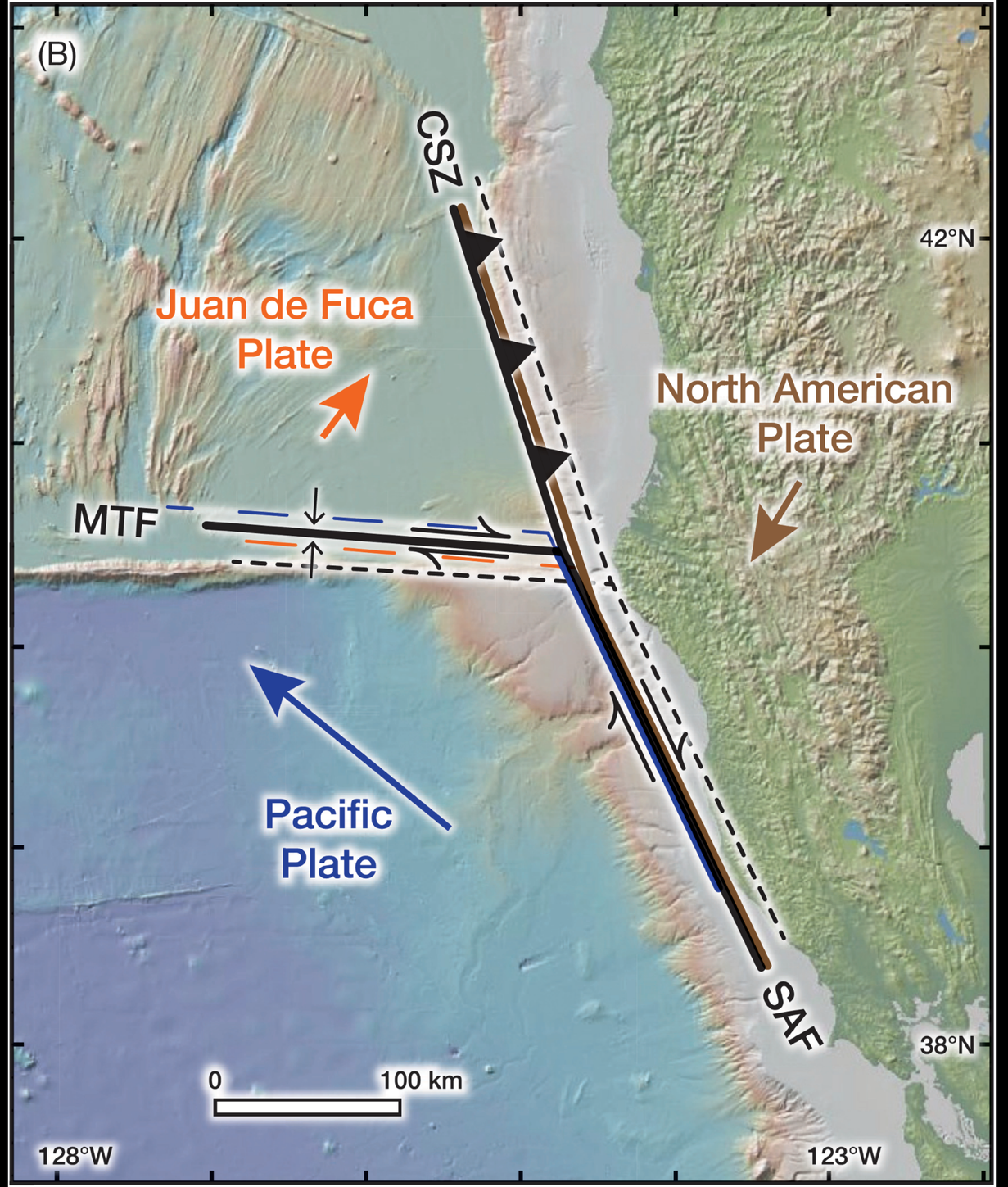
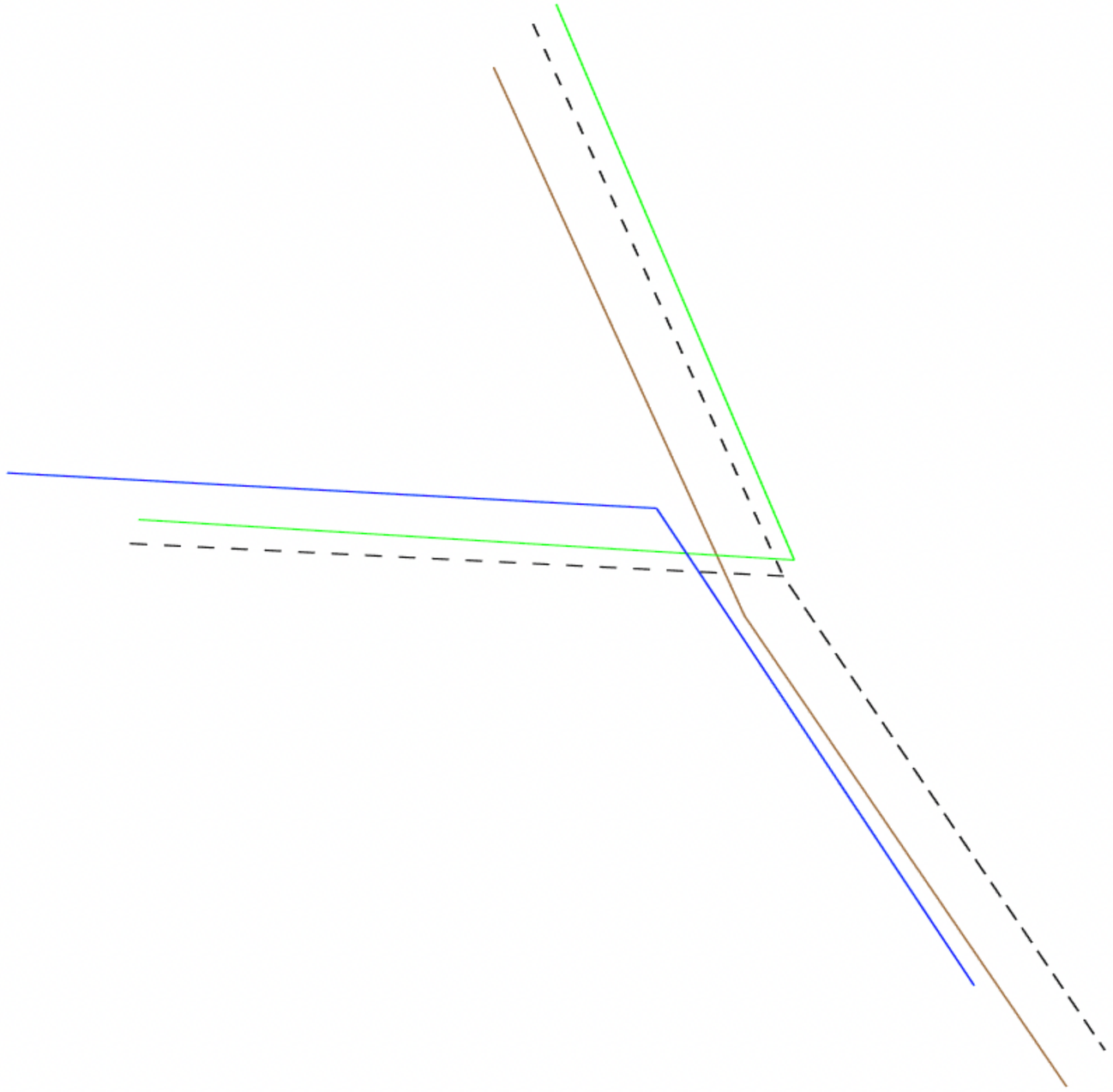




Cronin, 2021; GeoMapApp



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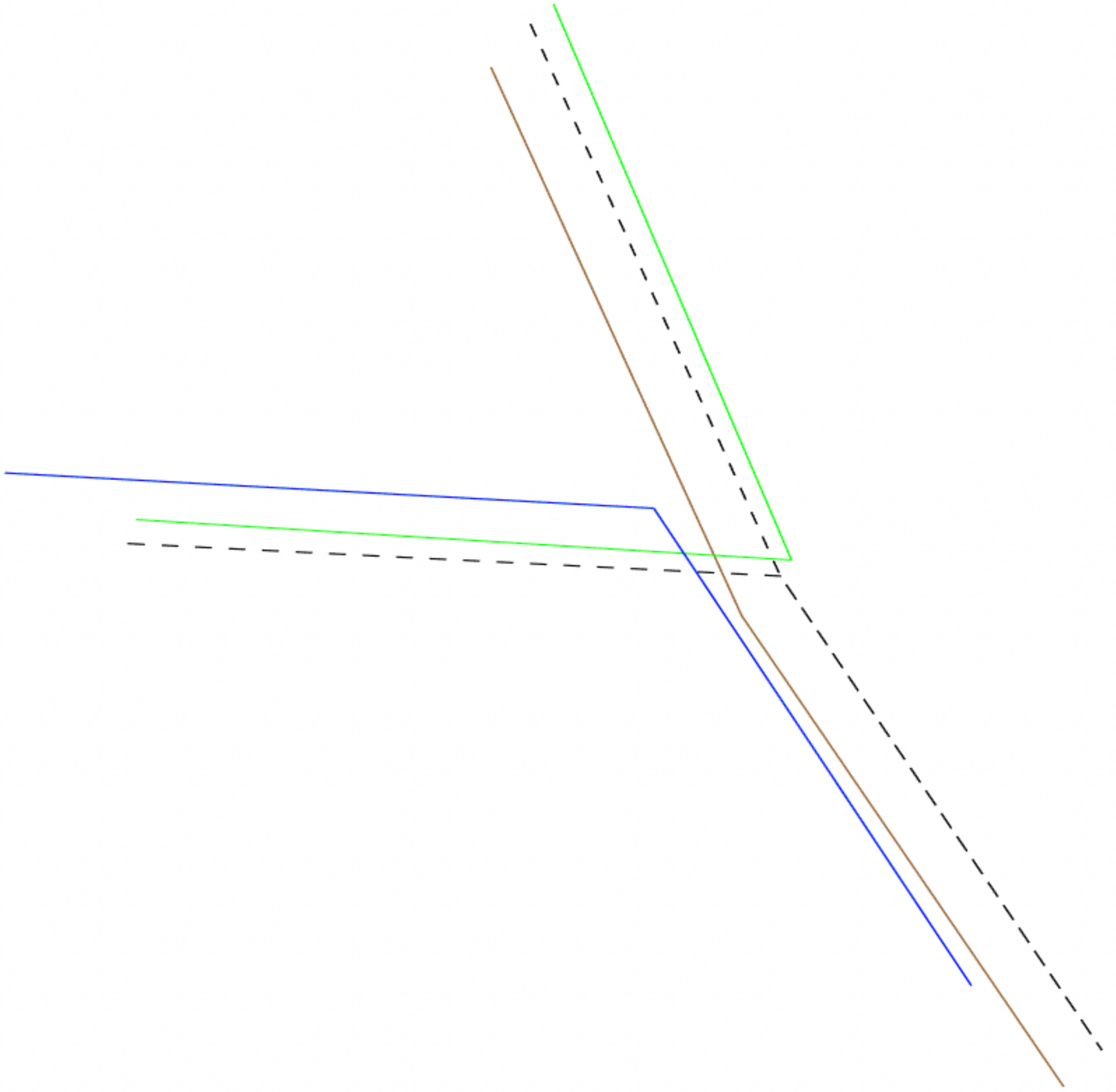

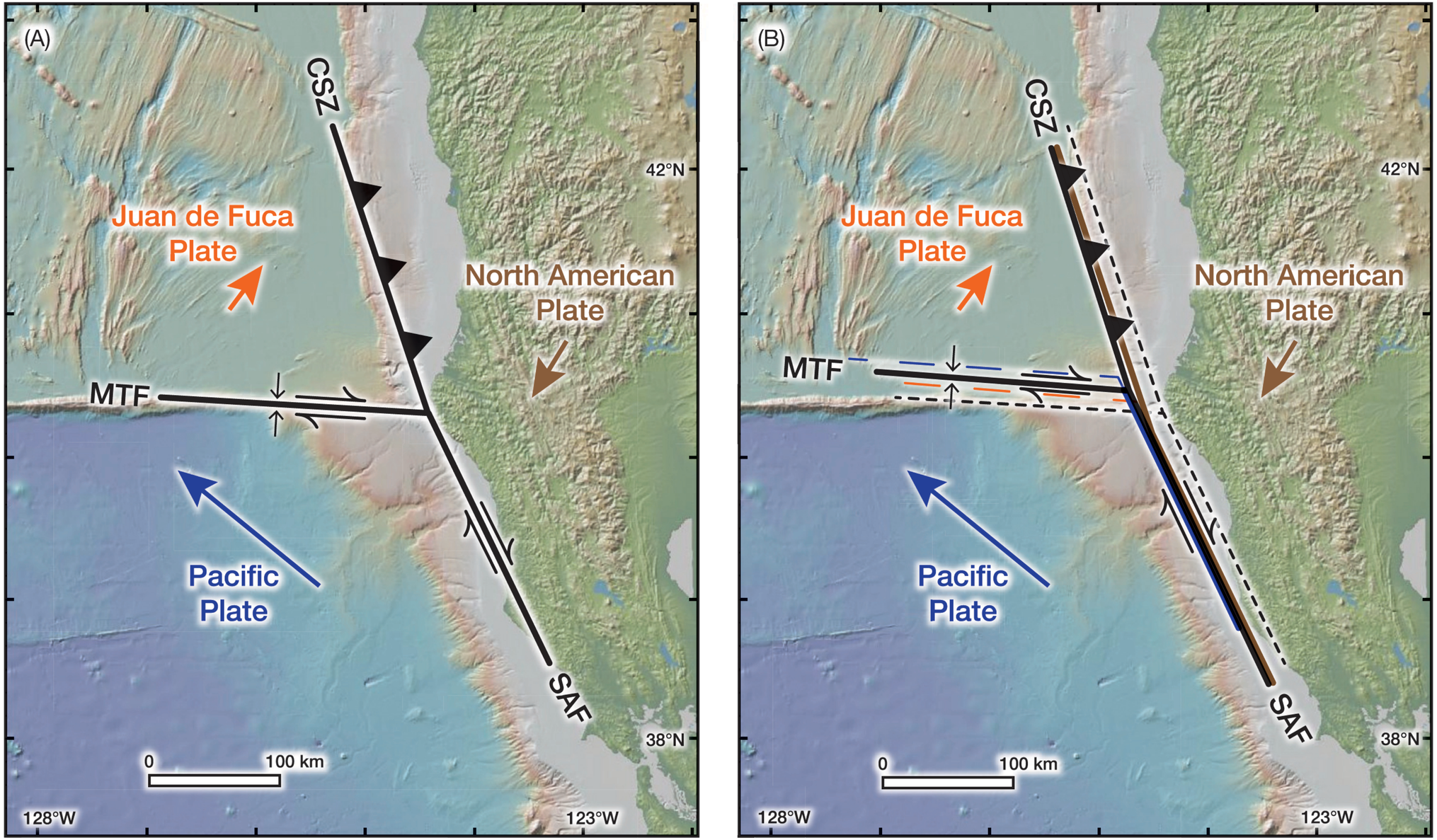

Fig. 7 (A) One trench and two transform boundaries (*black lines*) converge at the Mendocino (PA-NA-JF) triple junction today, simplified from Bird (2003). *Arrows* indicate direction each plate is moving relative to the hotspot reference frame of Wang et al. (2017). *CSZ*, Cascadia Subduction Zone; *MTF*, Mendocino Transform Fault; *SAF*, San Andreas Fault. Both shortening and right-lateral strike slip occur along the MTF. (B) Current plate boundaries (*colored lines*) and predicted location of the triple junction (*black lines*) after 1 Myr of displacement. Base maps are from GeoMapApp.org.