# Investigating adakitic volcanism and subduction initiation at Solander Island and the adjacent seafloor


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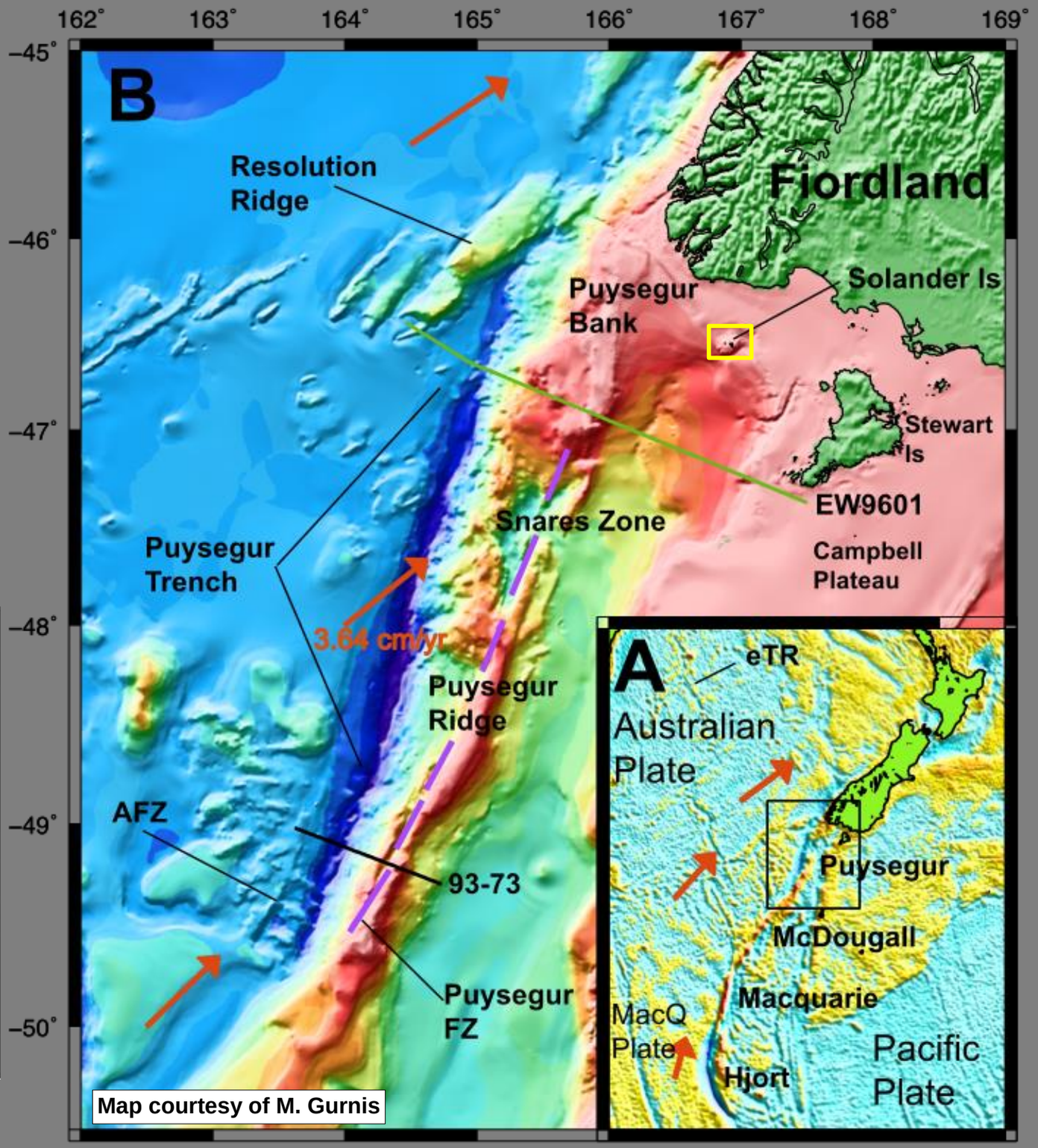
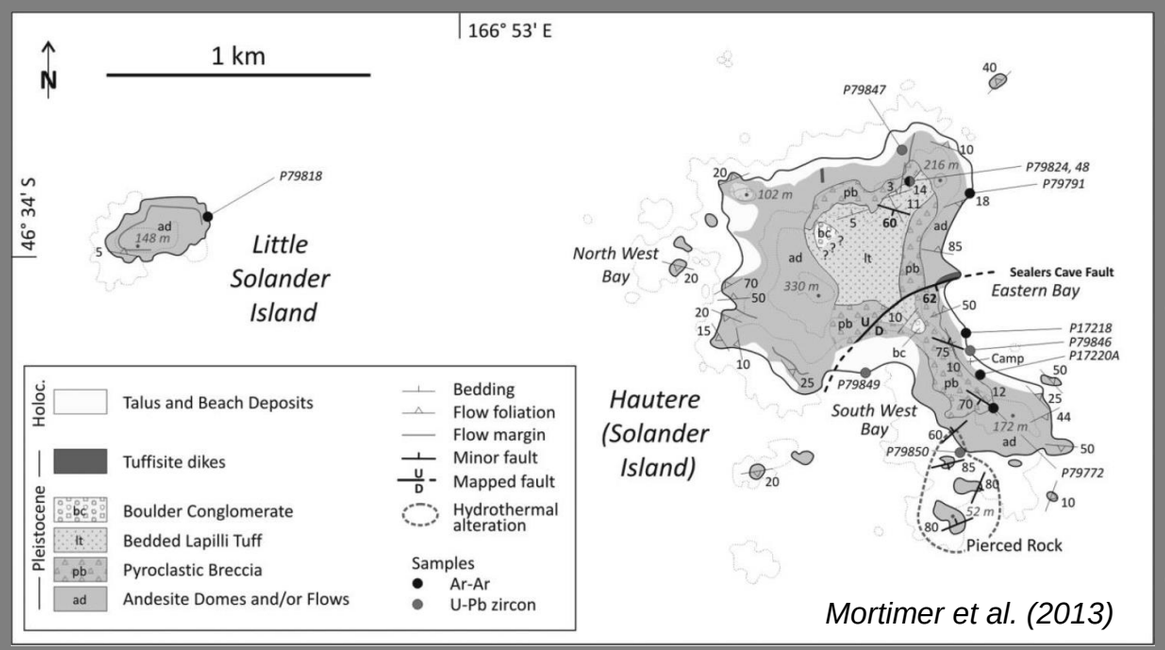
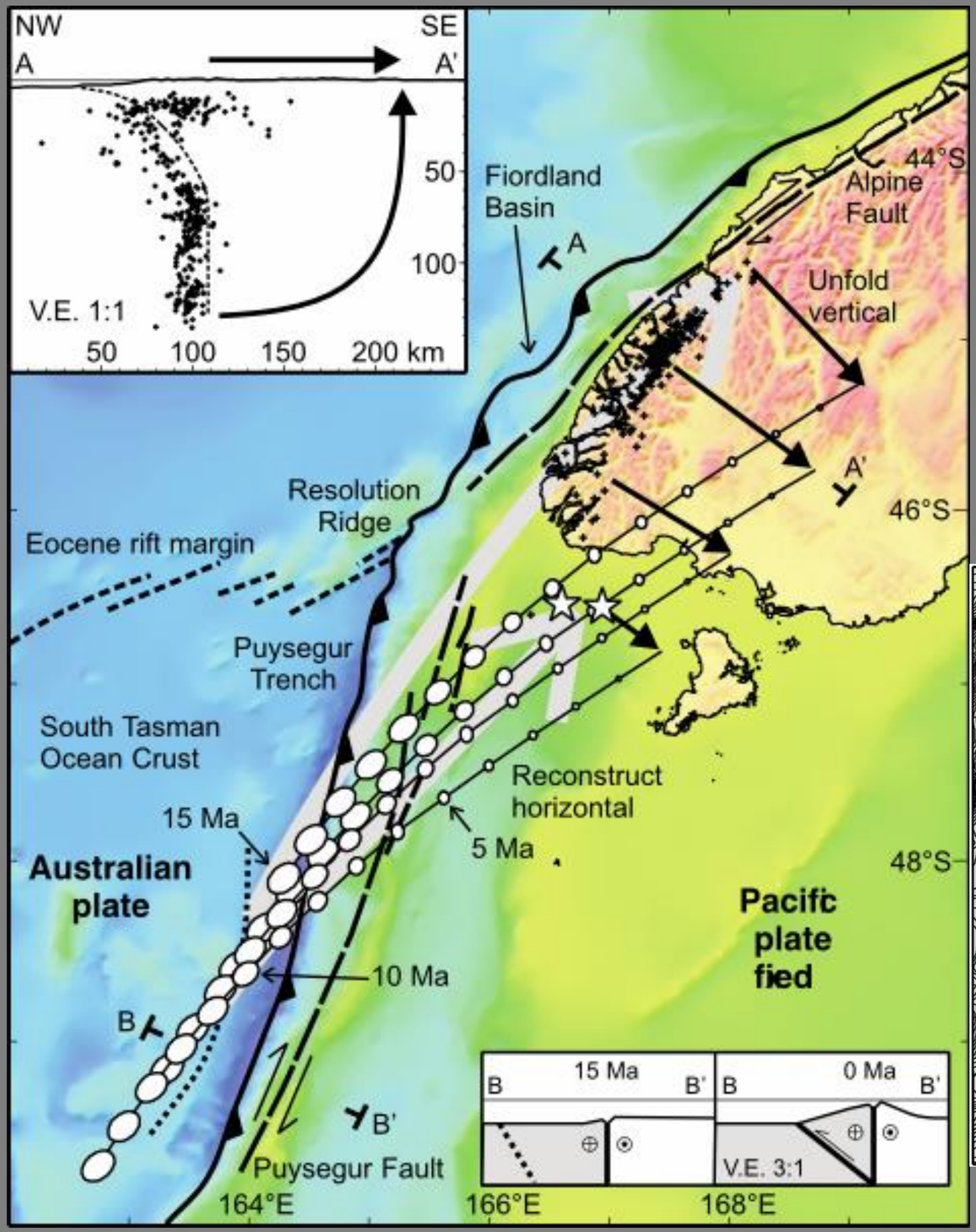


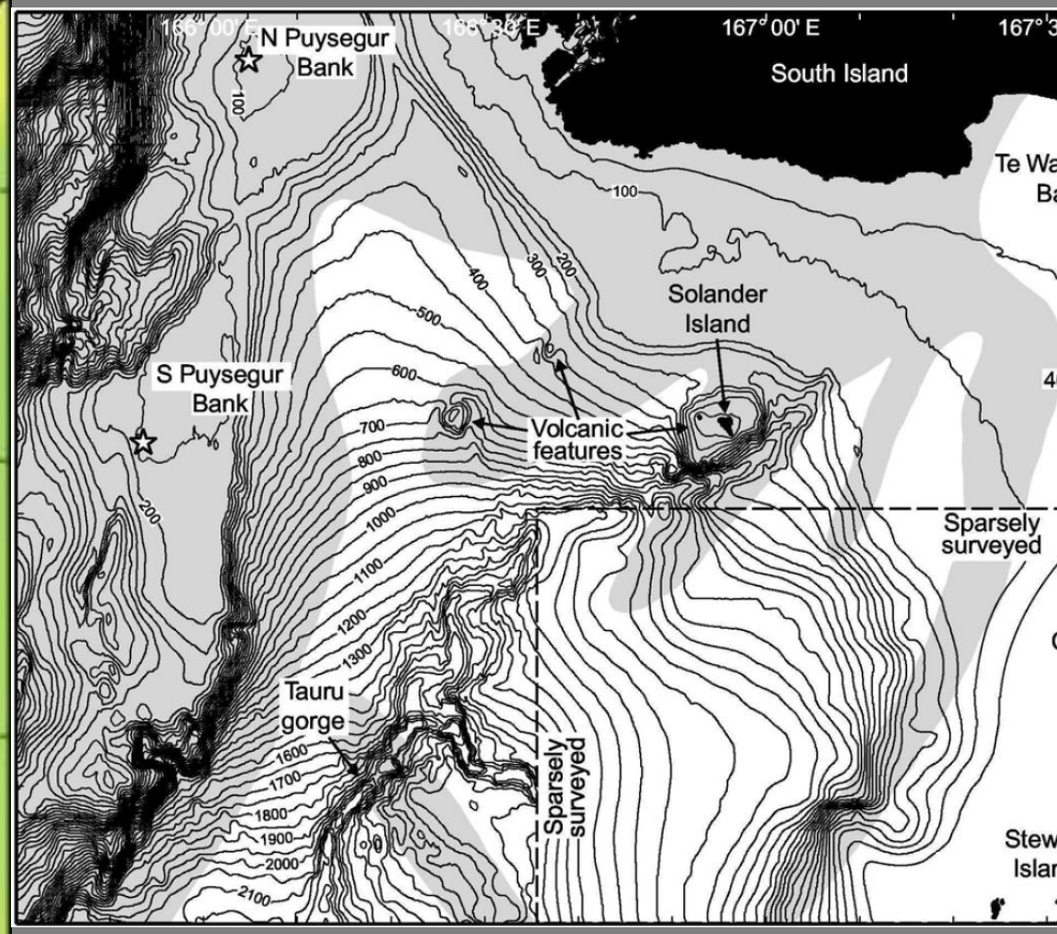




*Mortimer et al. (2013)*

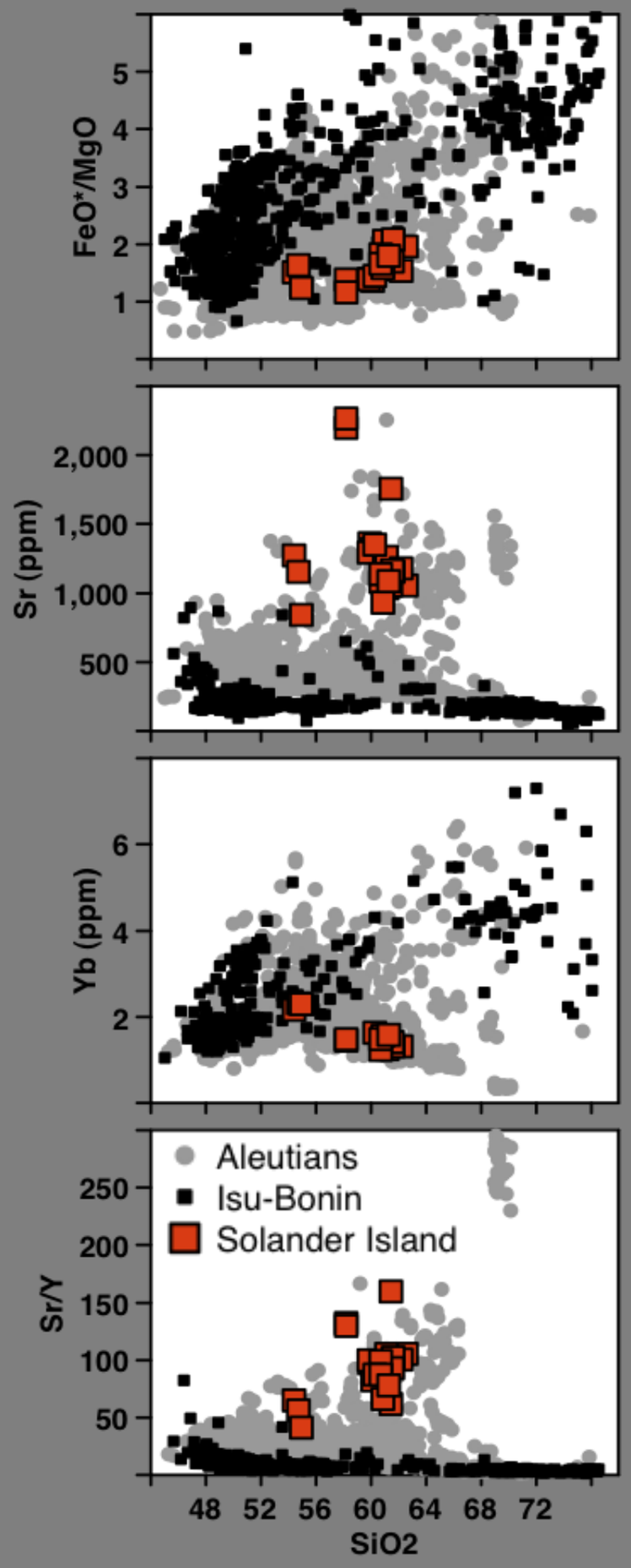
# Why study Solander?

- **Subduction initiation =** only expression of young volcanism (< 400 ka) in the region
- **Adakitic** volcanism
- *"Obtaining additional samples of the broad submarine pedestal and relating them to the geology and age of the small eroded remnants of Solander ….would be worthwhile."….Mortimer et al. (2013)*




*Sutherland et al. (2006)*



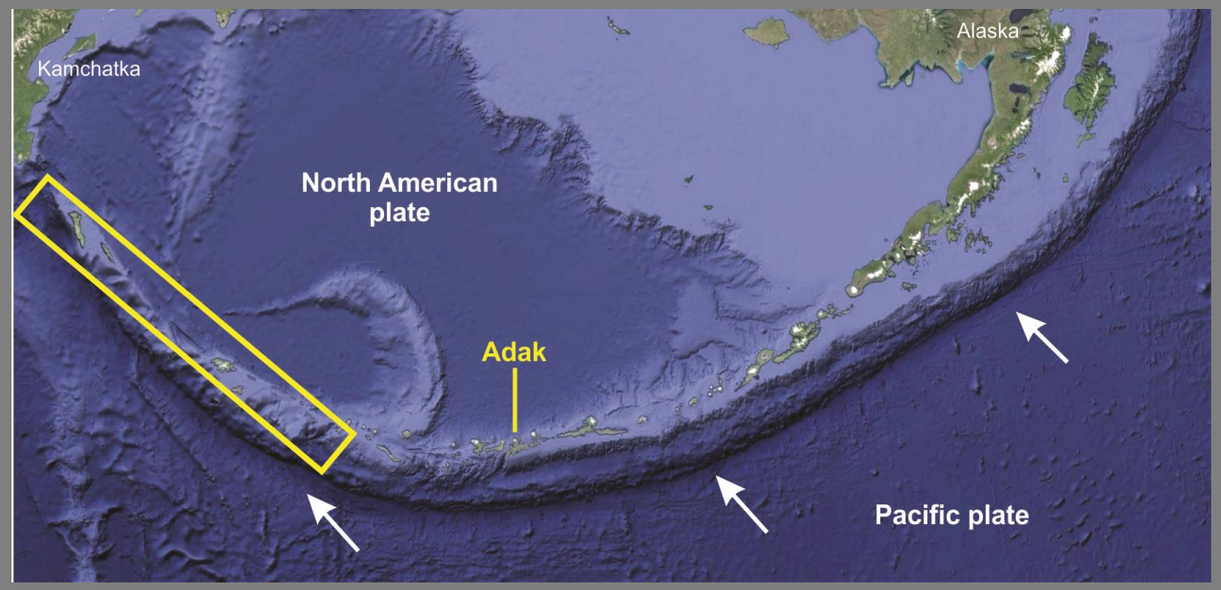

# Significance of Solander Island Andesites

- Characterization of Solander volcanics as **adakites**
  *(Reay & Parkinson, 1997; Foley et al. 2013)*
- Distinctive compositions
  - Sr > 700 ppm
  - Yb < 2.0 ppm
  - MORB-like $^{87}Sr/^{86}Sr$ and $^{143}Nd/^{144}Nd$

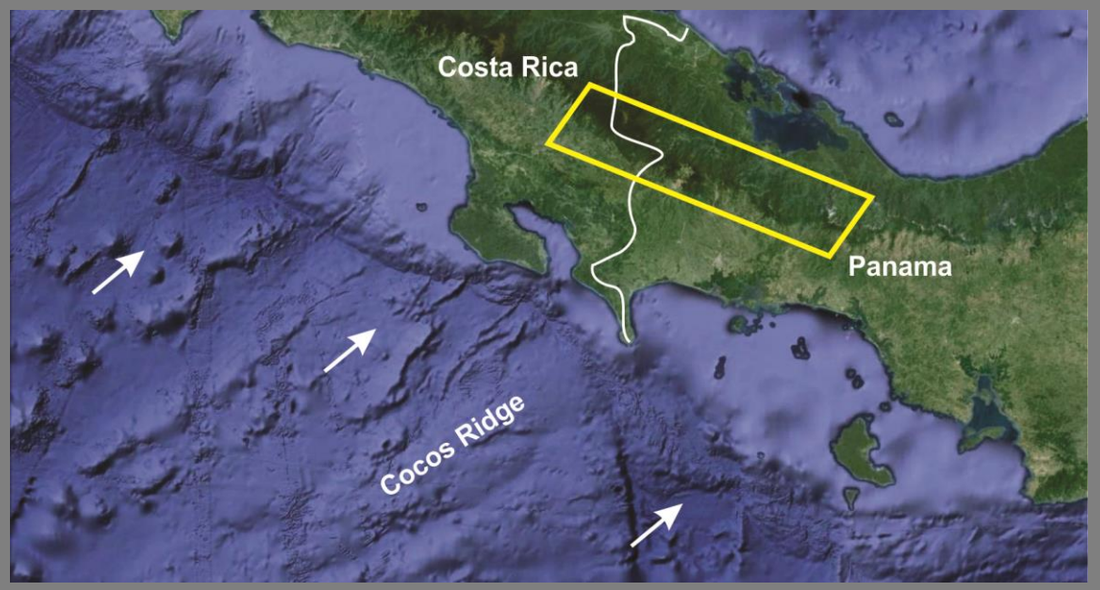
# Tectonic setting of adakites

- Young, ocean crust is subducted
- Slab tearing/slab window
- Oblique or slow subduction leads to high slab temps
- Subducted ridges or hotspot tracks
- **Melting of MORB eclogite in the subducting oceanic crust**

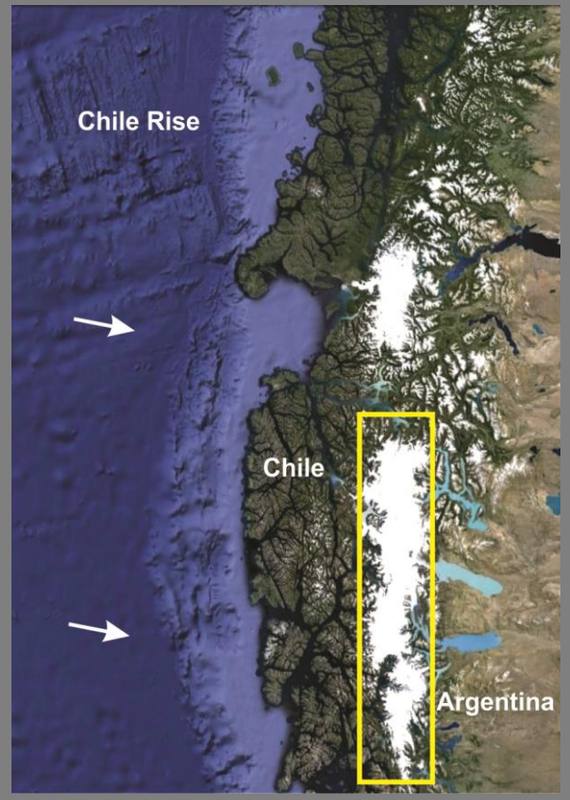
# Well known Cenozoic adakite localities



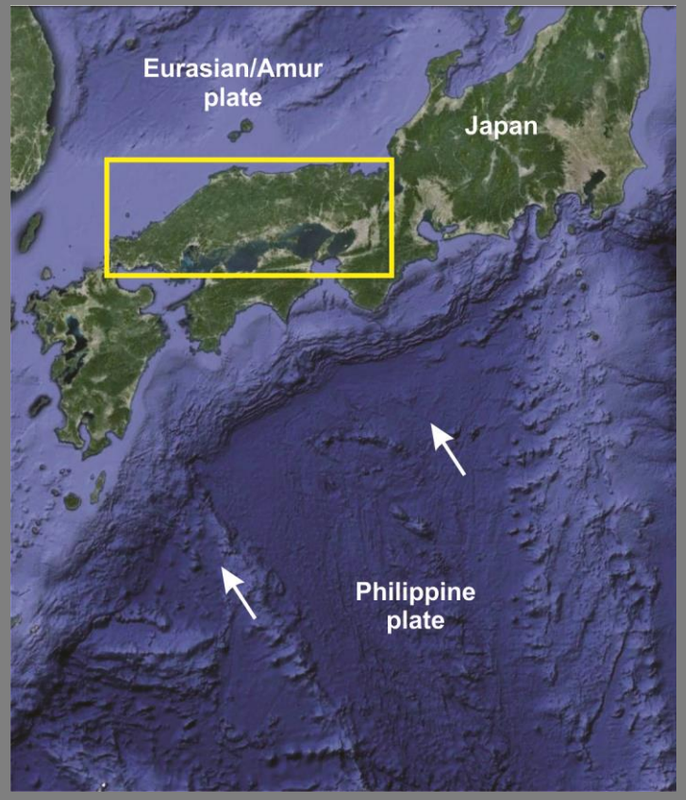

**Western Aleutians:** *Yogodzinski et al. (1995, 2014)*




**Costa Rica/Panama:** *Gazel et al. (2009), Abratis & Wörner (2001)*




**Austral volcanic zone:** *Stern et al. (1984, 1996)*




**SW Japan:** *Feineman et al. (2013)*


**Trans-Mexican volcanic belt:** *Cai et al. (2014); Gomez-Tuena et al. (2006); Mori et al. (2007)*

# Significance of Solander Island Andesites


*Ishizuka et al. (2014)*

- Most models of subduction initiation in active arcs are based on studies of the western Pacific (IBM, Tonga, etc)
- The oldest volcanic products in IBM arc are forearc basalts (Reagan et al., 2010)
- Solander: subduction initiation + adakites
  - Alternative model?
  - Compare/contrast modern vs. Eocene tectonic regimes
- Making a young continent?

# Wish list for study of Solander and adjacent seafloor

- Piggy back off of ship working in the area
- 7-10 days of mapping and dredging the seafloor
- Expand temporal/compositional range in volcanism to aid in interpretation
- Evaluate role of reverse faulting on young volcanism