Seafloor Geodesy in Alaska

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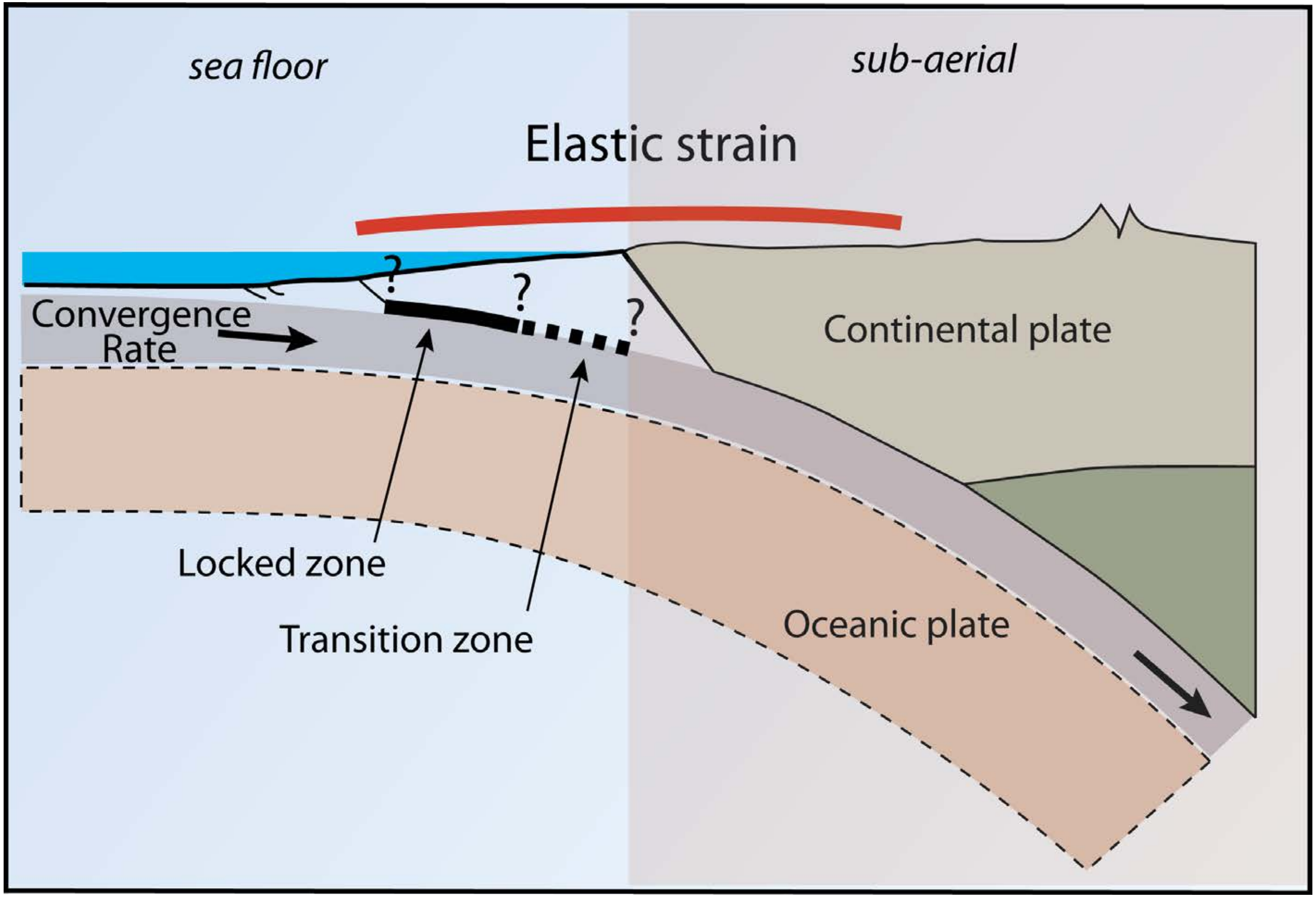
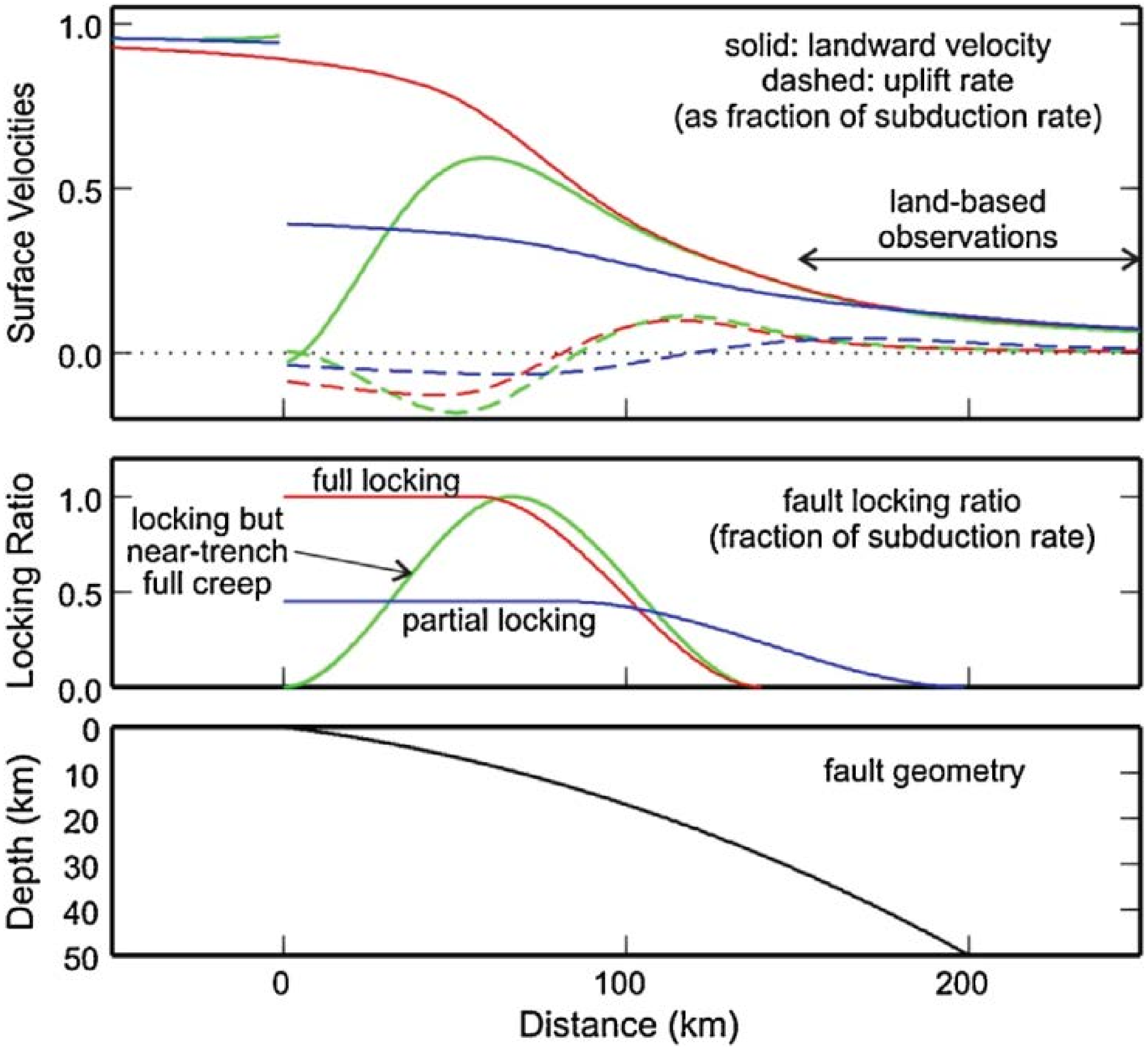
How is strain accumulating offshore?

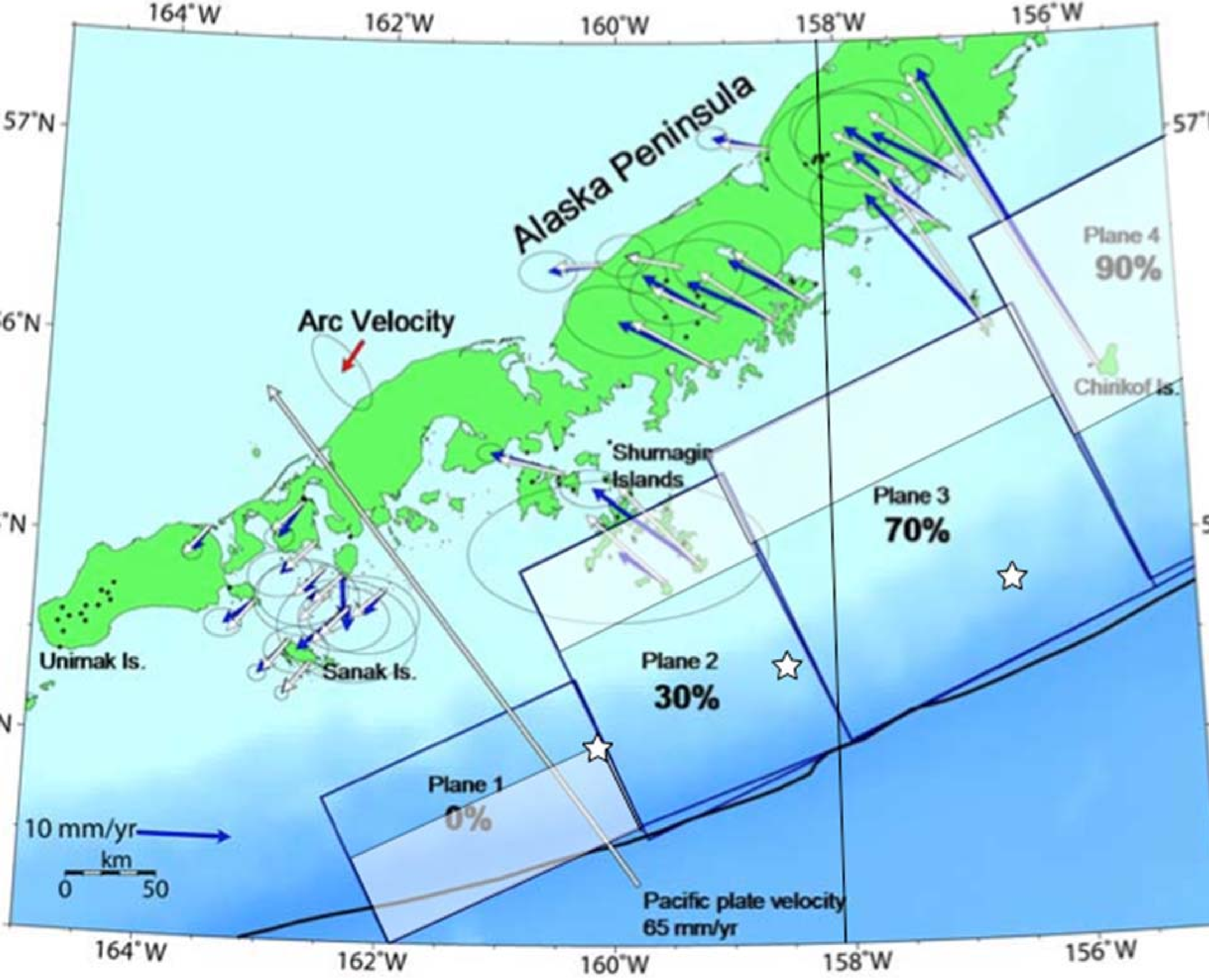


Up-dip locking behavior and offshore surface velocities:



(Wang and Trehu, 2016)

Constraints from models using land GPS data:

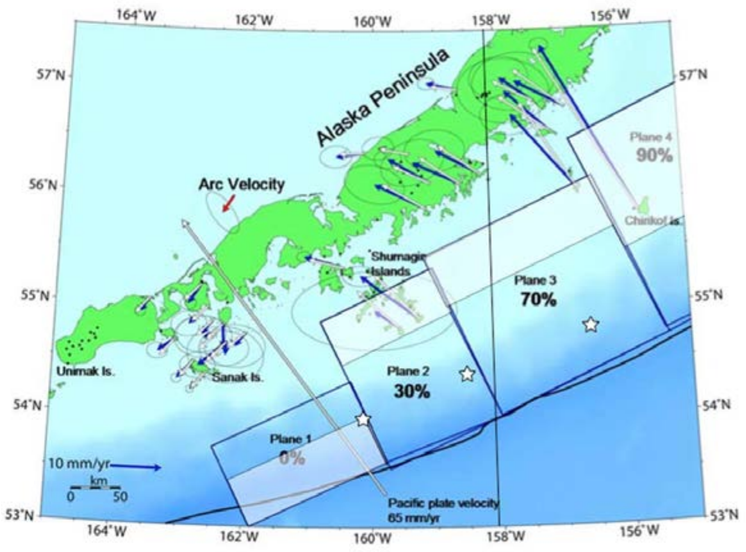


(*Cross and Freymueller*, 2008; *Fournier and Freymueller*, 2007)

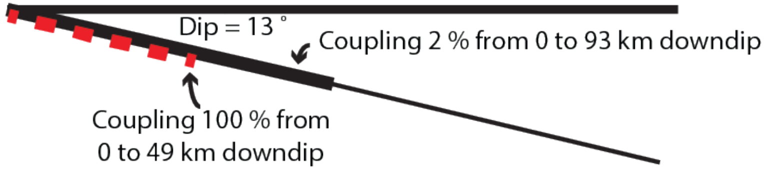
Predicted motion offshore from the models based on land GPS data:

EXPERIMENT:

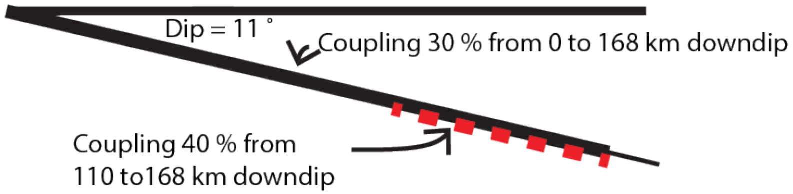
- GPS-A sites ~50 km from the trench at three sites along strike where coupling appears to vary from low to high.
- Positions measured using a Wave Glider in 2018 and 2020.
- Attempt to determine coupling behavior in the near-trench region.



Model: Site 1 / Line 5



Model: Site 2/ Line 4



Model: Site 3 / Line 3

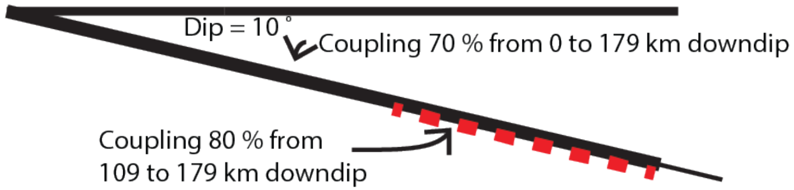


Plate motion:

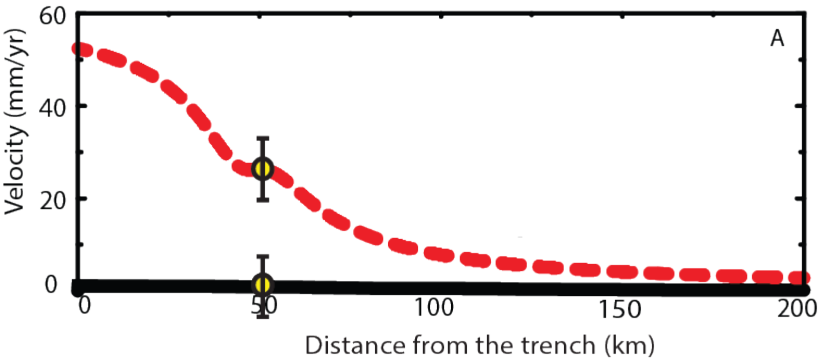


Plate motion:

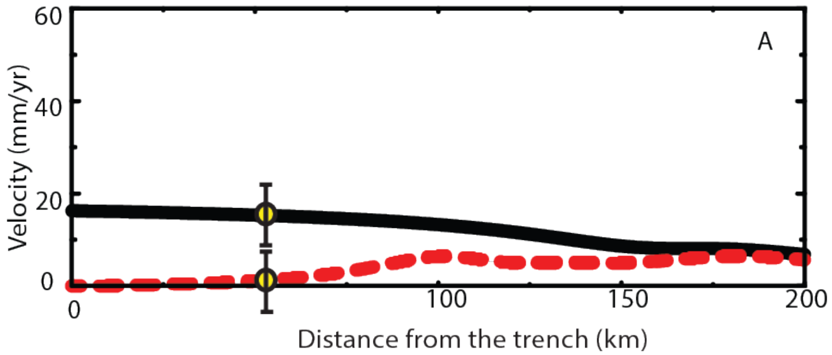
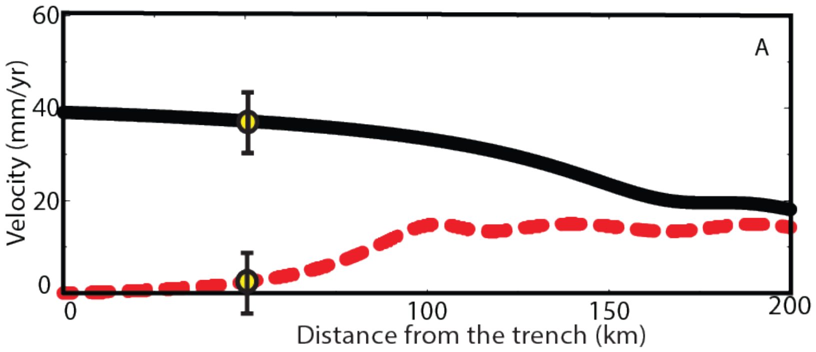
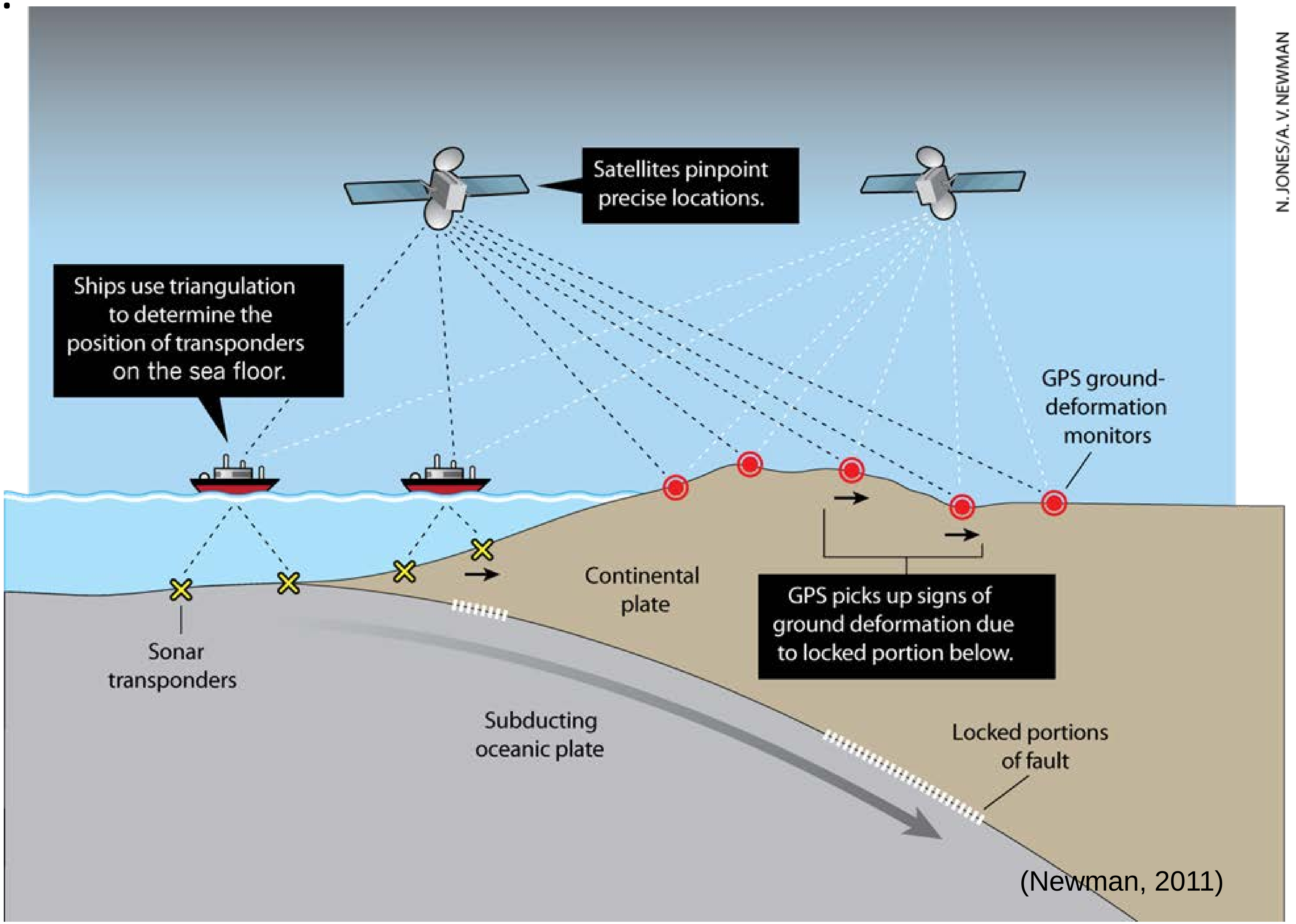


Plate motion:

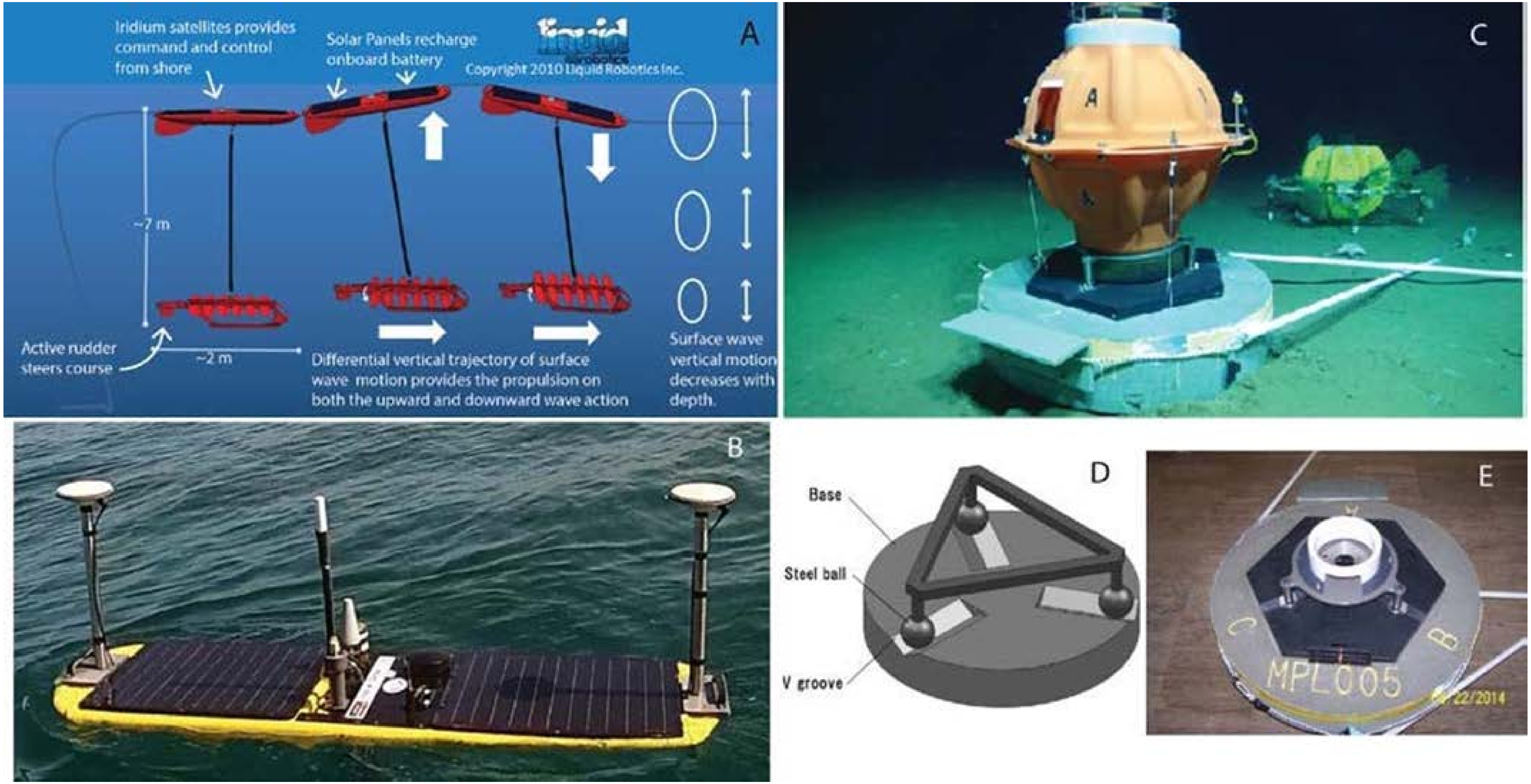


(*Cross and Freymueller*, 2008; *Fournier and Freymueller*, 2007)

GPS-Acoustic approach combines GPS and precision acoustic ranging to measure seafloor motion with centimeter resolution.

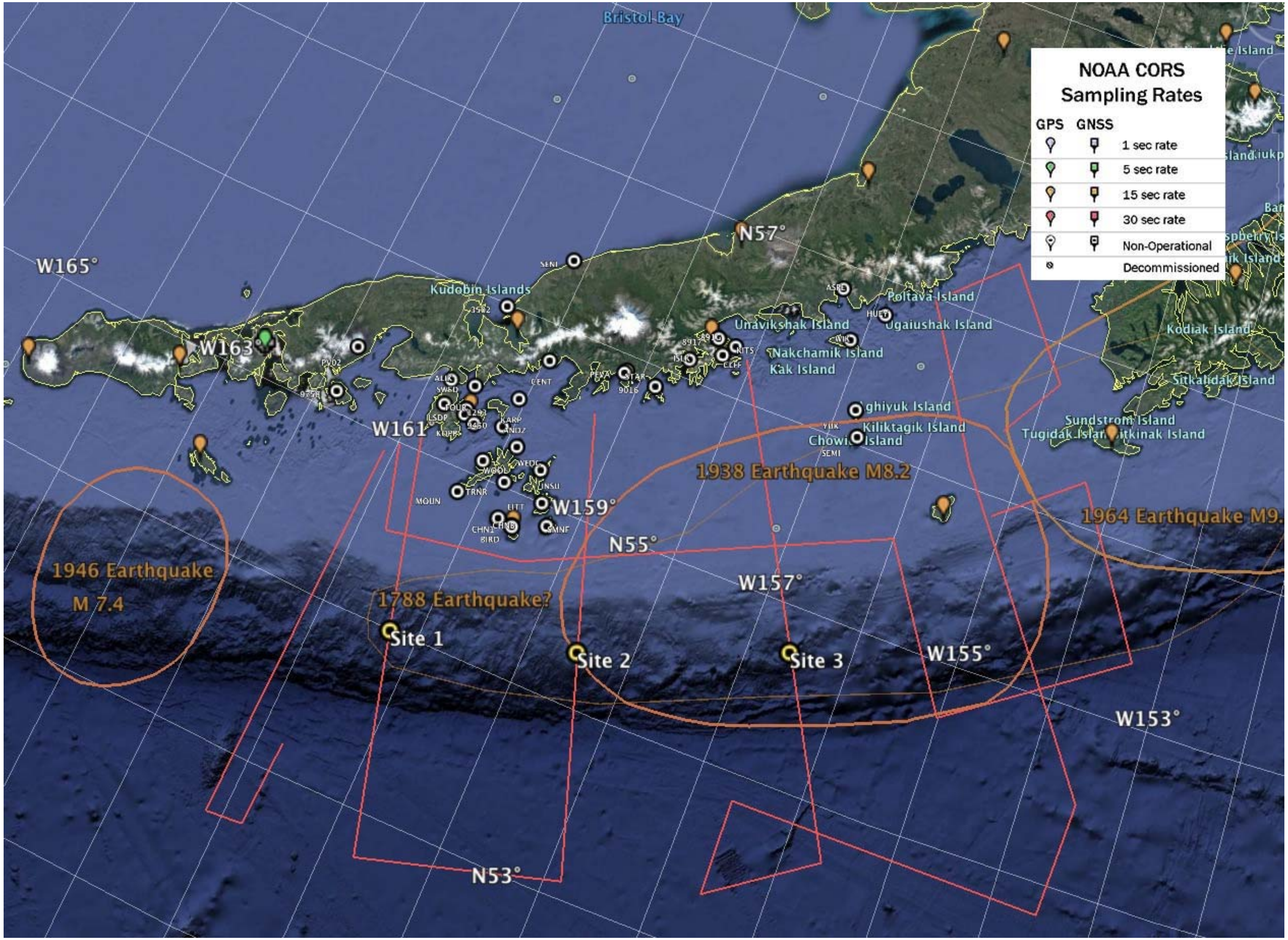


Wave Glider-based GPS-A and permanent benchmarks that can be re-occupied:

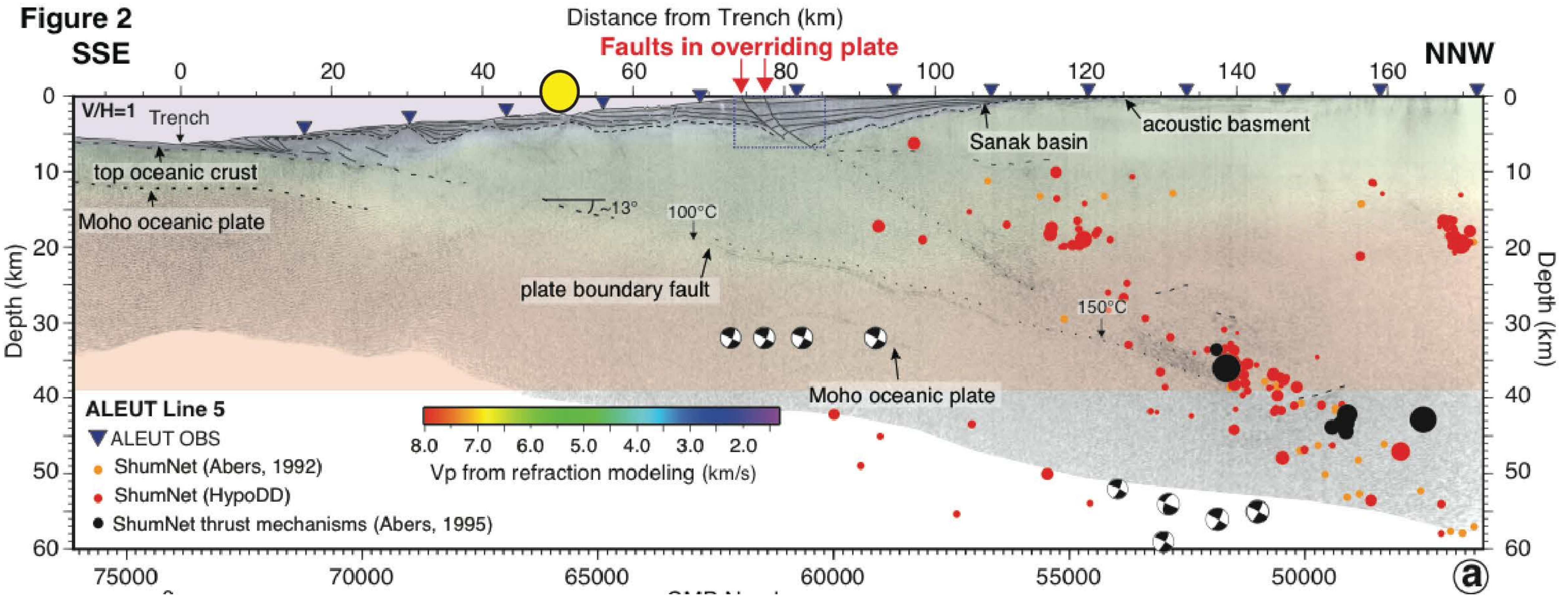


(e.g., see Poster T51E-0525 on Friday)

GPS-A sites are to be located on existing MCS lines.



Site 1/Line 5



(Bécel et al., 2017)

GPS-A sites are to be located within the wider OBS array.