Late-Quaternary slip rates along the plate boundary Magallanes Fault System, Patagonia

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Magallanes Fault System (MFS)
The megathrust plate boundary in Chile (responsible for the 1960 Mw 9.5 Valdivia Earthquake) dominates the seismic hazard discussion, strike slip faults play a major role in the neotectonic framework in Central-Southern Chile (including Patagonia) and associated seismic hazard. Two main strike slip fault systems, the Plate Boundary Left lateral offsets. Timing was constrasted from local dating of glacial deposits along the Plate Late-Quaternary geomorphic left-lateral offsets. Using remote mapping including structure from motion (SfM) methods

Methods
Using remote mapping including structure from motion (SfM) DEMs from drone photography & fieldwork we found & measured Late-Quaternary geomorphic left-lateral offsets. Timing was constrained from local dating of glacial deposits along the Plate boundary MFS in Chile and Argentina for slip rates (Sandoval and De Pascale, 2020).

MFS Results
By combining displacements observed in SfM models with Late-Quaternary glacial records here, we obtain sinistral MFS system slip-rates of at least 10.5 ± 1.5 mm/yr and 7.8 ± 1.3 in Chile and Argentina respectively.

The difference here is likely due to unconstrained/mapped faults in Argentina. (Where? How fast?)

Through comparison of regional models with our results contemporary strike slip plate boundary deformation is narrow, approximately ~20–50 km wide from Tierra Del Fuego and east (one of the narrowest on Earth), that widens and becoming more diffuse from Cabo Froward north and west (>100 km wide) – please see top map.

*Ongoing work and Reference*
Submarine investigation along the MFS in Straights of Magallan Onshore and offshore (Hernandez MSc project)
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