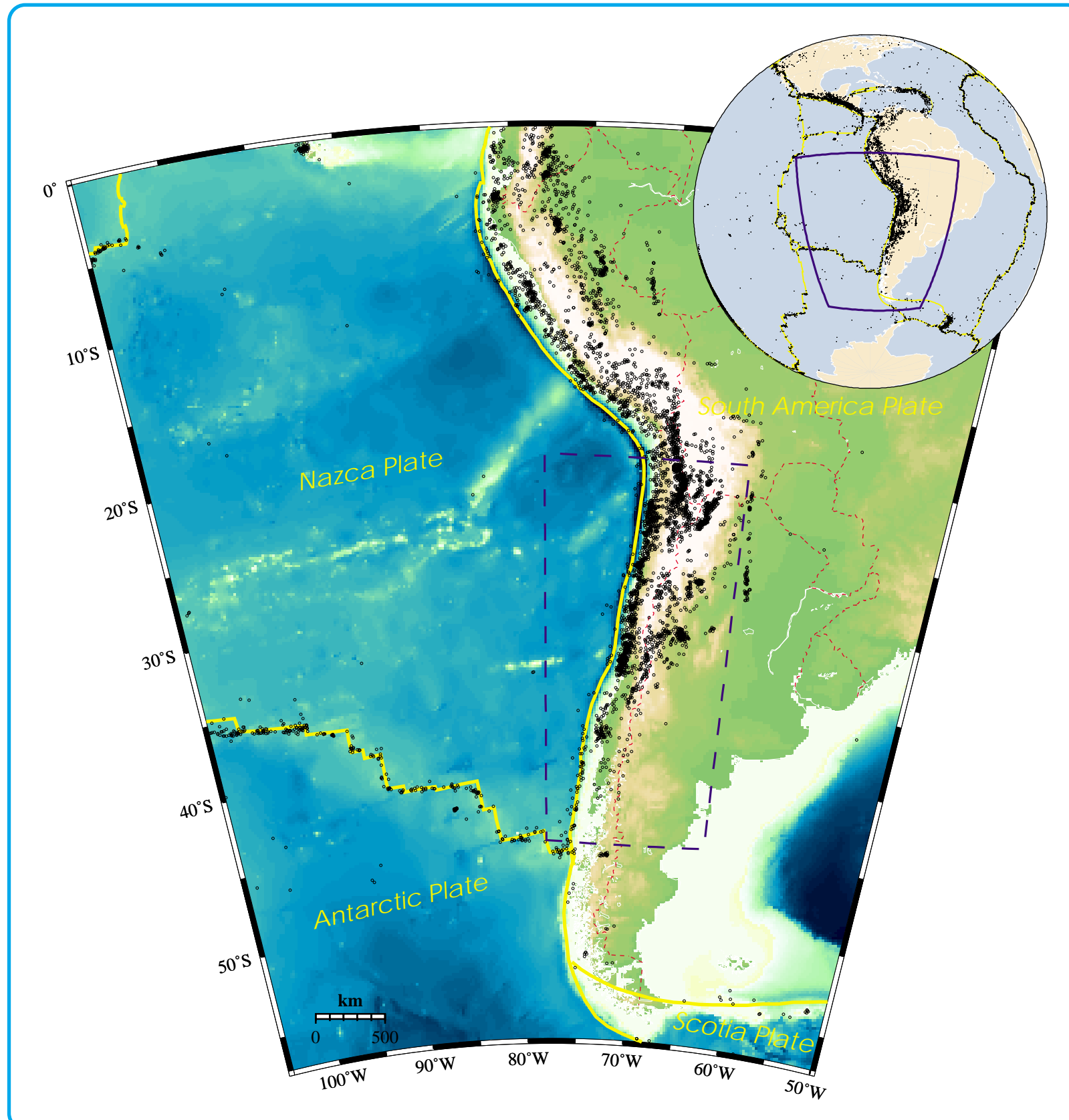


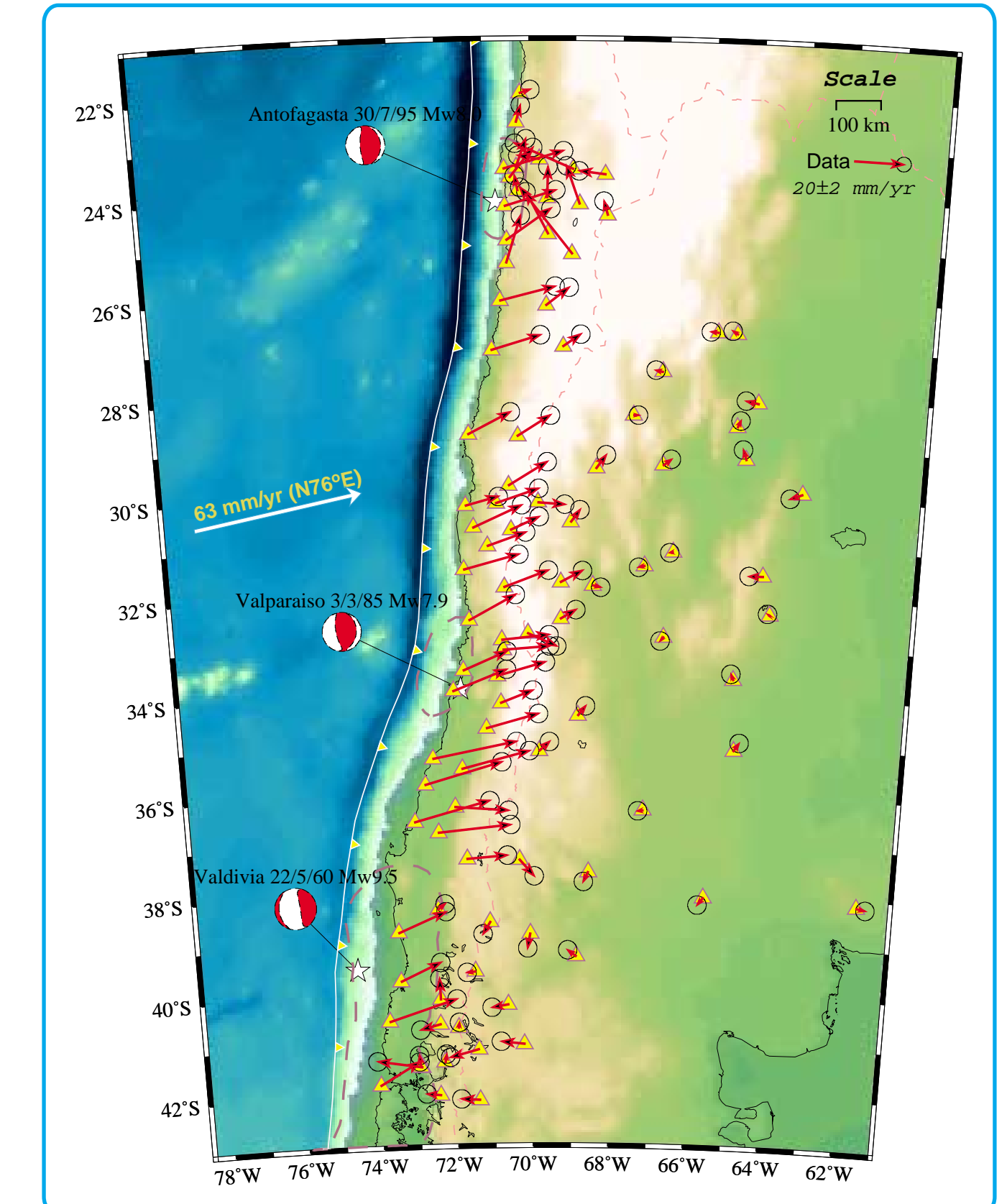
Plate Tectonic Setting



Summary

The results presented in this study provide first estimates of present-day crustal deformation rates in the central and southern sections of the Andes, between latitudes 22°S and 42°S. We find that the measured crustal deformation rates in the central section of our study area are dominated by the interseismic phase of an earthquake deformation cycle, caused by 100% locking of the thrust interface between the subducting Nazca and the overriding South America plates. The estimated depth of locking is not uniform along the strike of subduction: north of 30°S it is ~33 km deep, while south of 35°S it reaches 50 km depth. In addition to the dominant interseismic signal in the central section of our study area, we observed postseismic relaxation effects in the area of the 1995 Mw8.0 Antofagasta earthquake. In the southern section we have detected a similar deformation pattern as in the Antofagasta area which we attribute to postseismic relaxation effects of the 1960 Mw9.5 Valdivia earthquake.

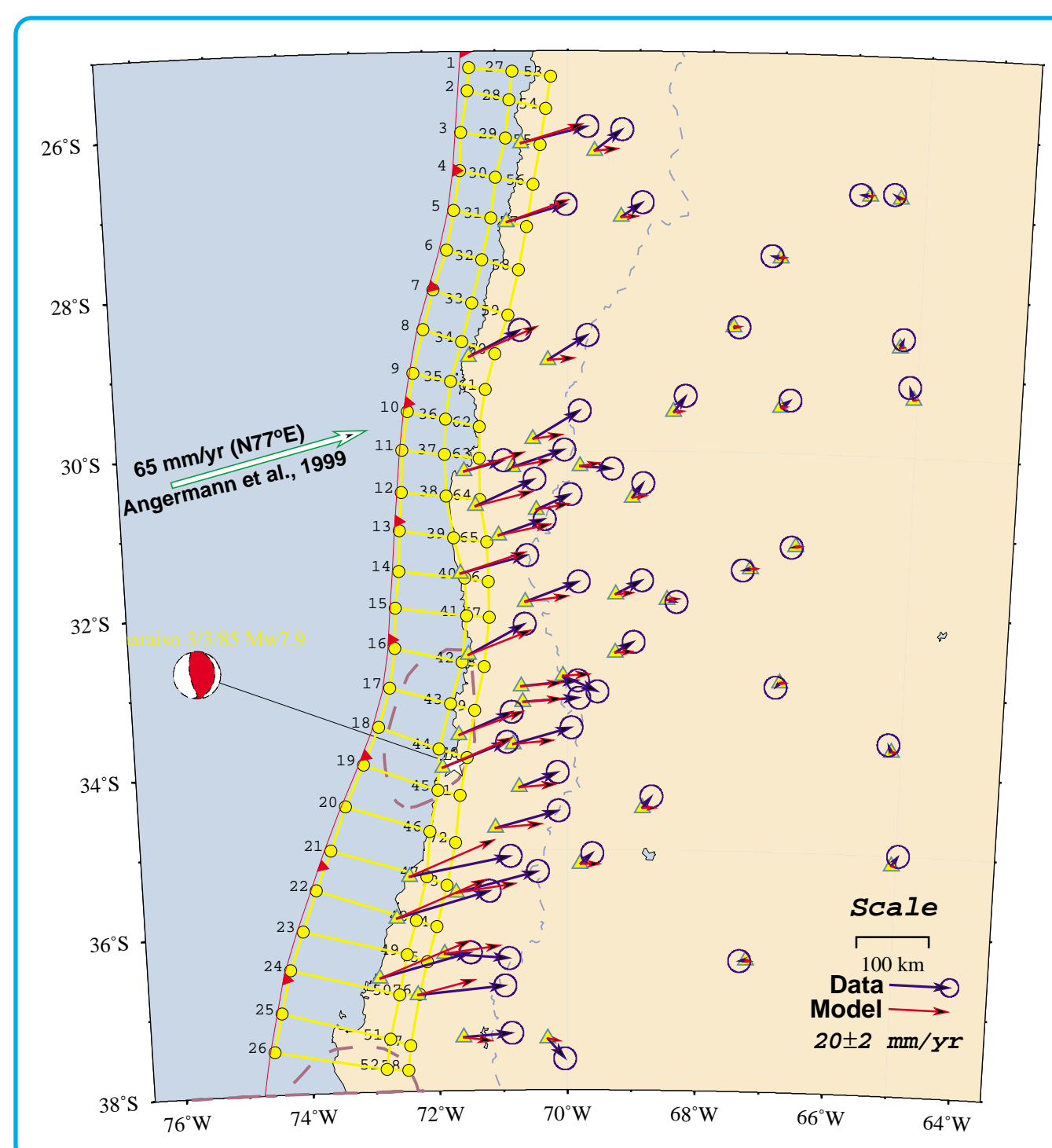
GPS derived velocities



Inter-seismic signal dominates the deformation field in the Central part of the network

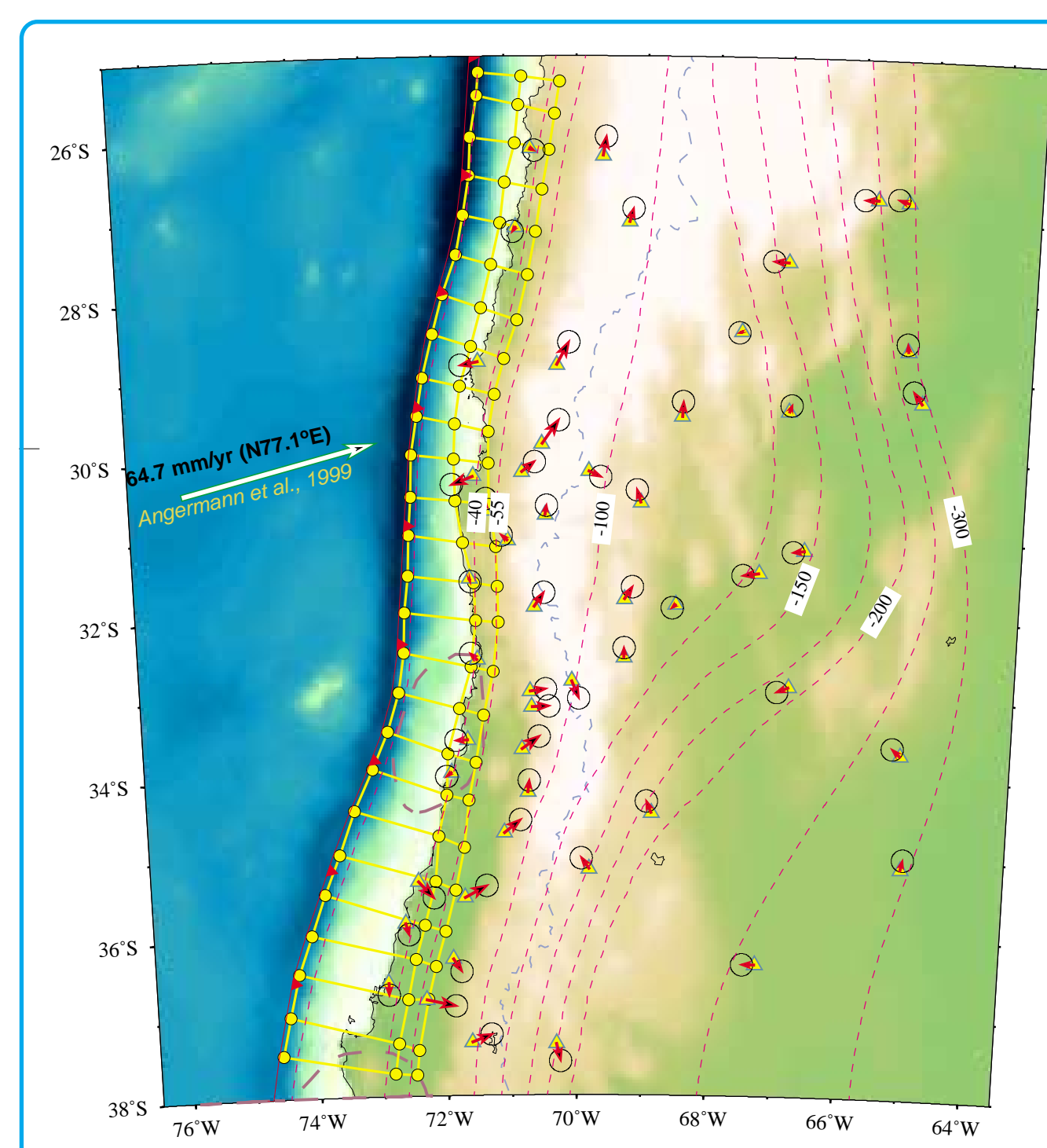
Central Section
Effects of 1985 Mw7.9 Valparaiso EQ are not observed

Observed and Modeled Velocities
Yellow grid with nodal points depicts the geometry of Locked and Transition zones.



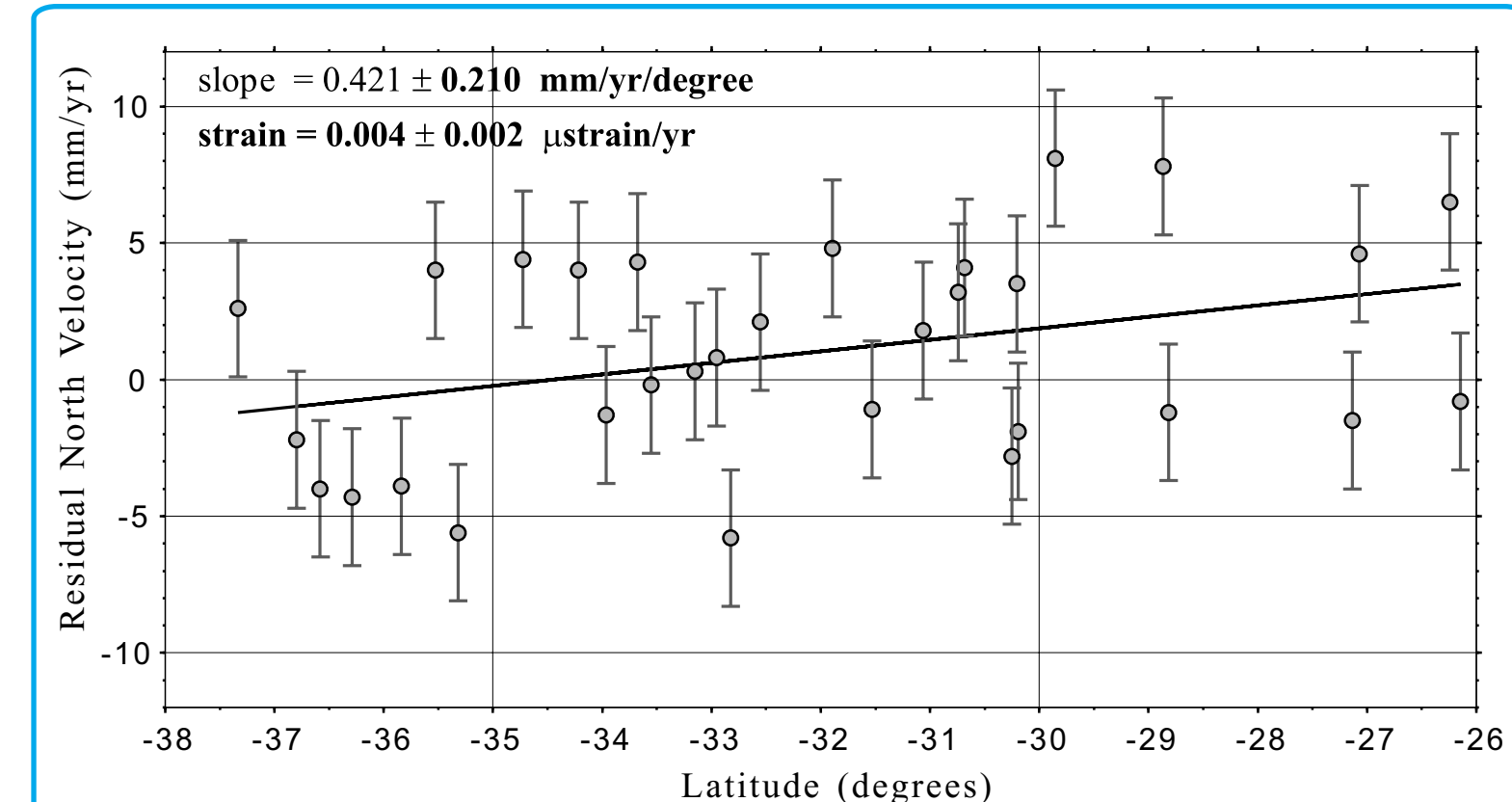
Residual Velocities

Red dashed lines show the slab depth from Cahill and Isacks (1992) and Creager et al. (1995).

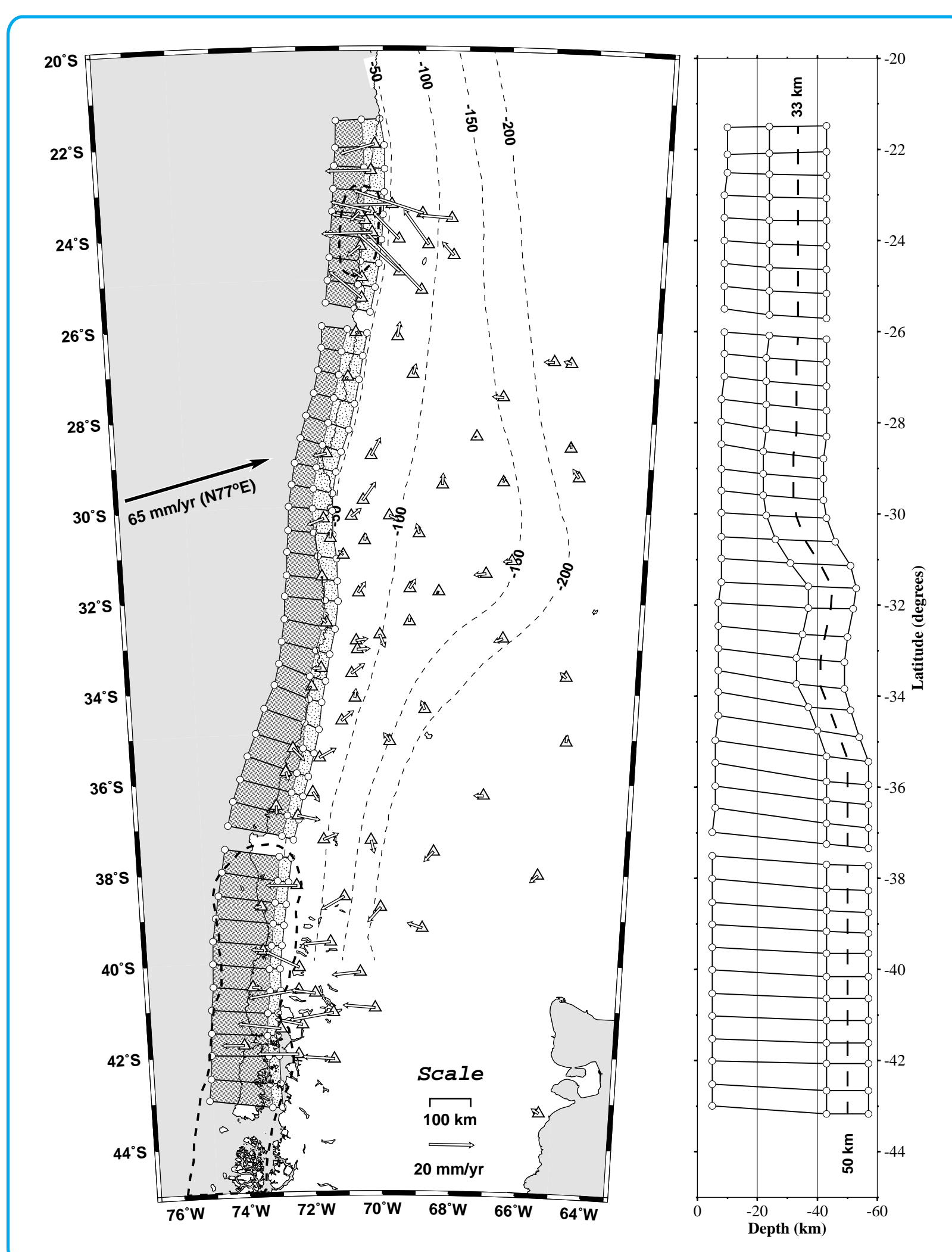


Long-term deformation within the fore-arc?

The slope observed in the plot of Northern component of residual velocity vs. Latitude can be indicative of possible north-south extension. However, at 95% confidence level the result becomes statistically not significant.

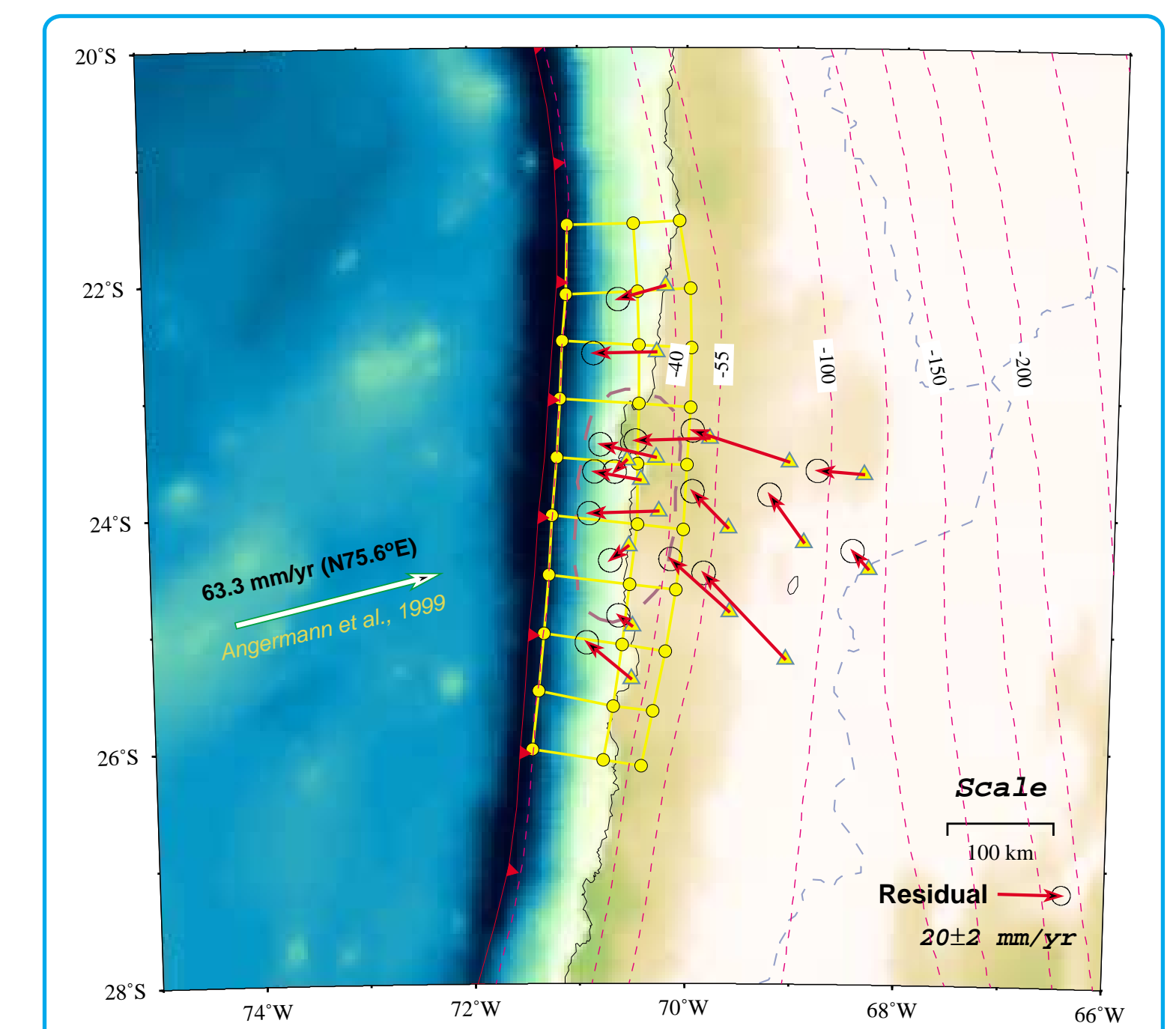
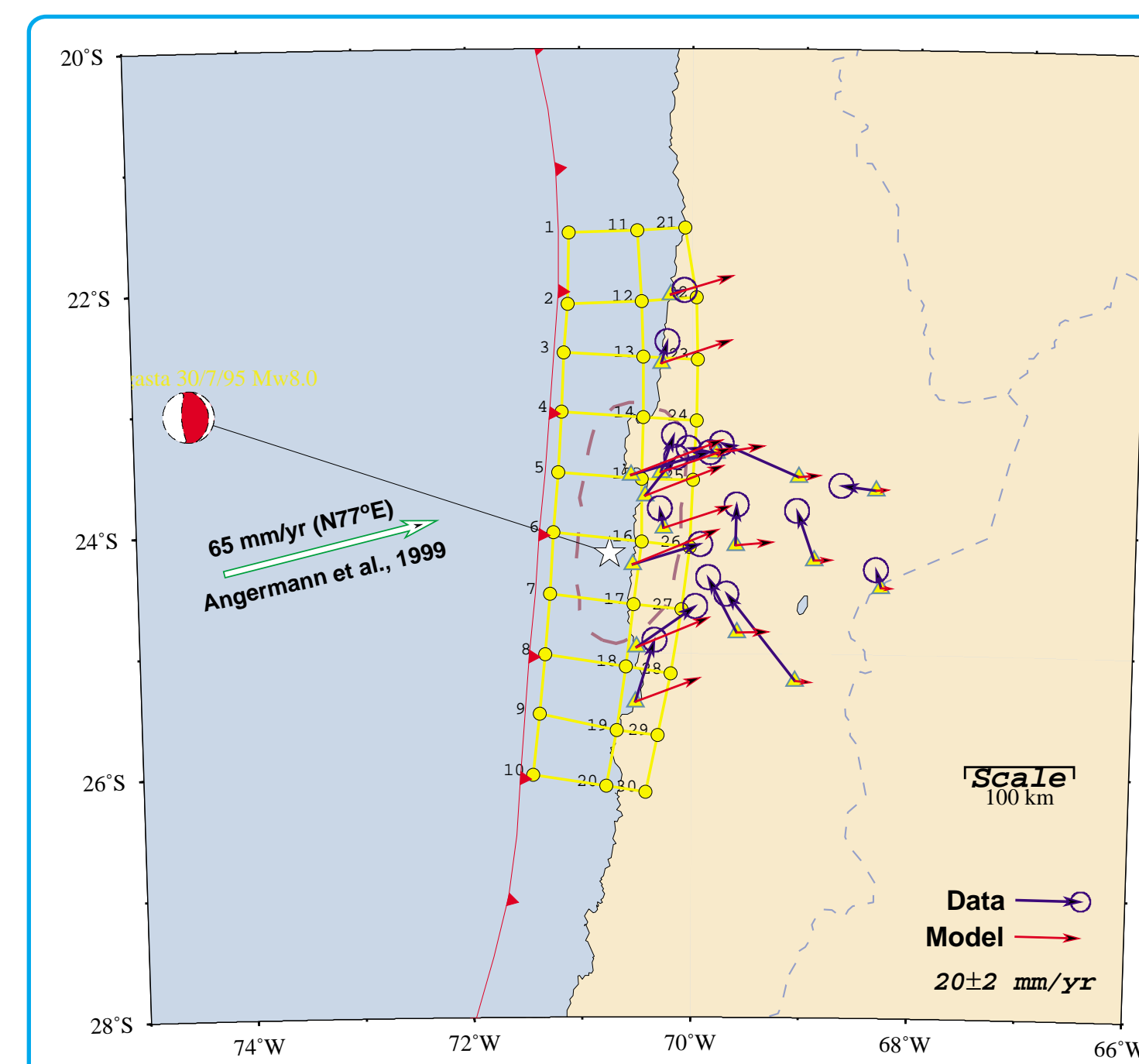


Geometry of the seismogenic zone

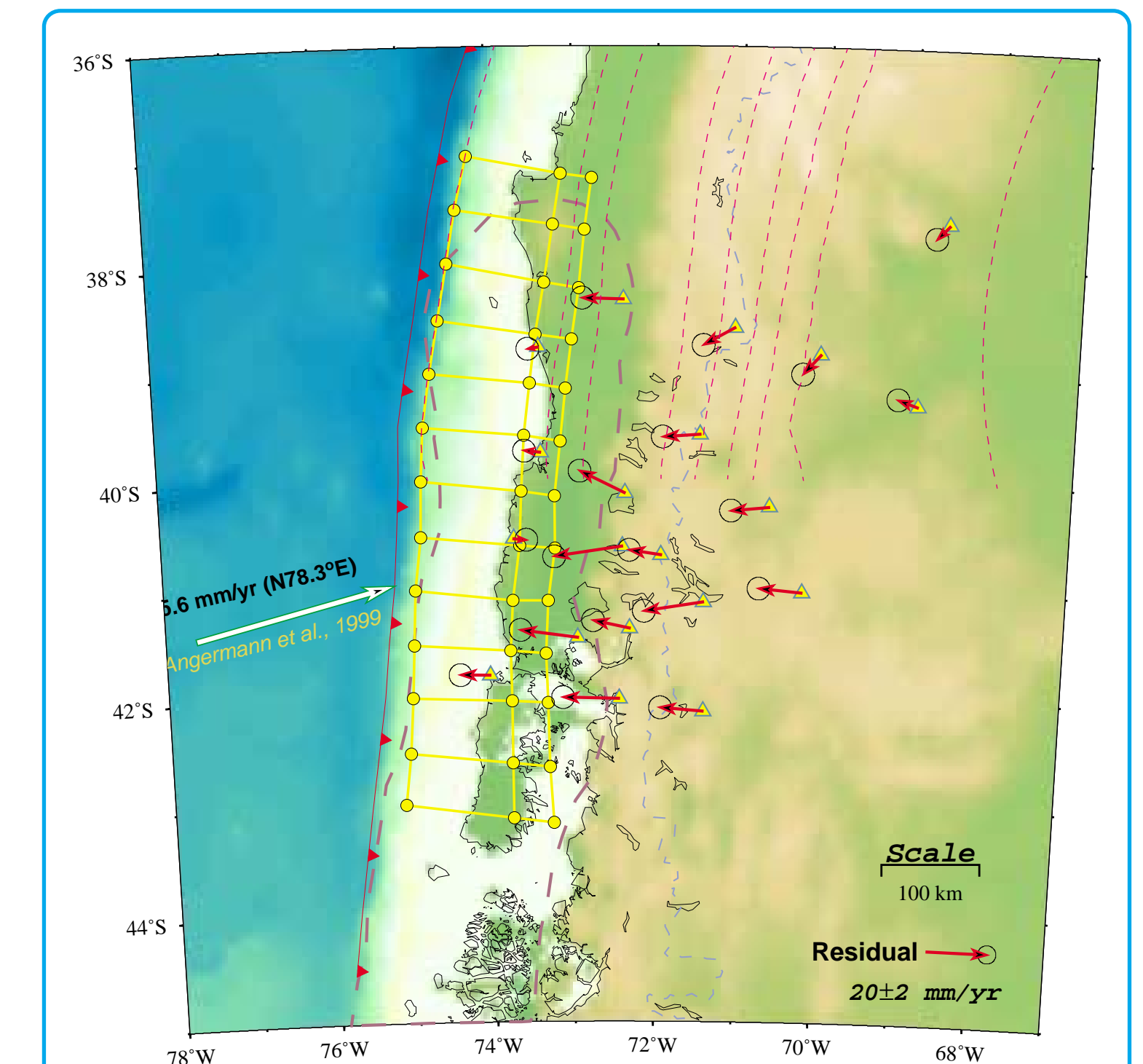
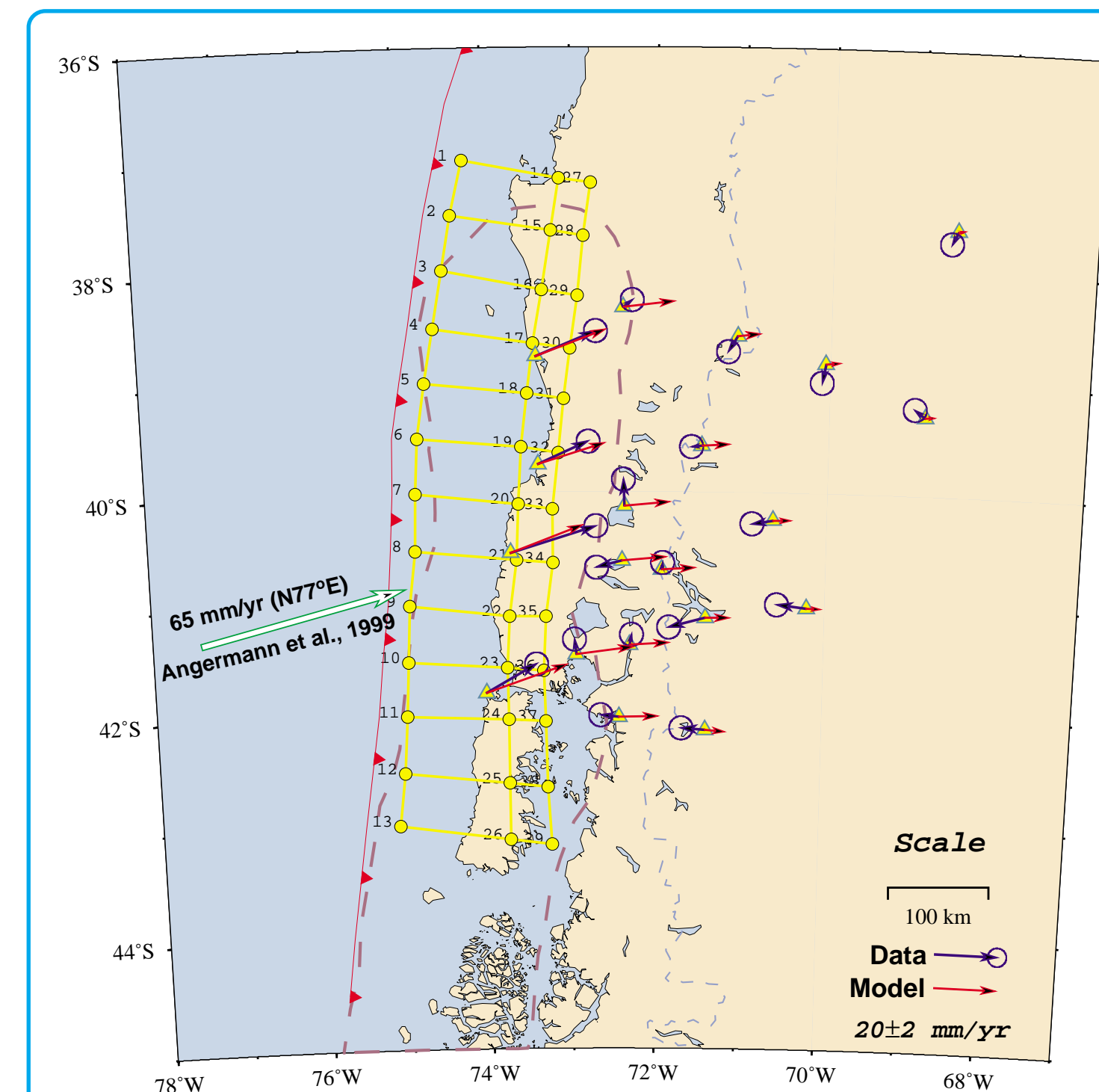


Post-seismic effects are clearly visible in the Northern and Southern parts of the network

Northern Section
1995 Mw8.0 Antofagasta EQ postseismic effects are clear



Southern Section
1960 Mw9.5 Chile EQ postseismic effects are clear



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