

The nature of the subduction wedge in an erosive margin: Insights from the analysis of aftershocks of the 2015 Mw 8.3 Illapel earthquake beneath the Chilean Coastal Range

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© 2019 Elsevier B.V. Aftershocks of the 16 September 2015 M8.3 Illapel earthquake in central Chile were recorded for a period of one year by the Chile-Illapel Aftershock Experiment (CHILLAX) seismic network. An initial catalog of about 100,000 events was generated by a novel automated picking algorithm that combines an auto-regressive detection/onset estimation method with some recently developed windowing techniques. We combine arrival times of P and S waves from about 9,000 of the best recorded of these events with relative arrival times of teleseismic P waves and phase delays of Rayleigh waves recovered from ambient noise to generate a three-dimensional image of P and S wavespeeds in that part of the Andean margin located beneath the network. Hypocenters of aftershocks located in the final model appear to be grouped into four distinct zones: two lower parallel zones that dip about 20° to the east, an upper, highly active zone that dips about 30° to the east, and a diffuse zone of sma