Seminario
Departamento de Geofísica

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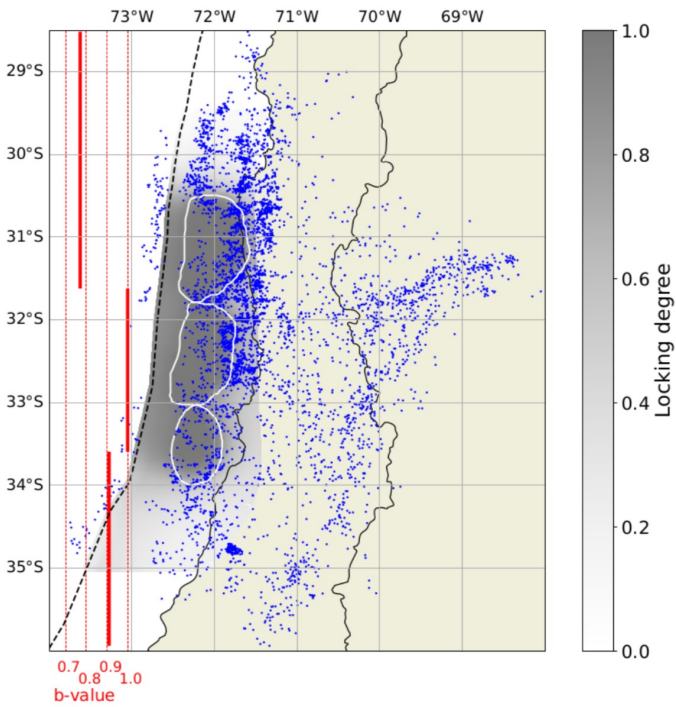
"B-value variations in the Central Chile seismic gap assessed by a Bayesian transdimensional approach"

The b-value can be used to characterize the seismic activity for a given earthquake catalog and provide information on the stress level accumulated at active faults. Here we develop an algorithm to objectively estimate variations of b-value along one arbitrary dimension. To this end, we employ a Bayesian transdimensional approach where the seismic domains will be self-defined according to information in the seismic catalog. This makes it unnecessary to prescribe the location and extent of domains, as it is commonly done. We first show the algorithm's robustness by performing regressions from synthetic catalogs, recovering the target models with great accuracy. We also apply the algorithm to a microseismicity catalog for the Central Chile region. This segment is considered a seismic gap where the last major earthquake with shallow slip was in 1730. Our results illuminate the downdip limit of the seismogenic zone and the transition to intraslab seismicity. In the along-strike direction, low b-value coincides with the extent of locked asperities, suggesting a high-stress loading at the Central Chile seismic gap. Our results indicate the reliability of the Bayesian transdimensional method for capturing robust b-value variations, allowing us to characterize the mechanical behavior on the plate interface of subduction zones.



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