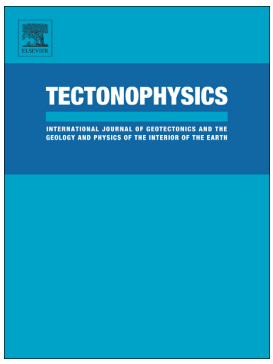

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Imaging *b*-value depth variations within the Cocos and Rivera plates at the Mexican subduction zone

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ABSTRACT

By a systematic mapping of the *b*-value along profiles perpendicular to the Mexican Wadati-Benioff zone, we obtained important characteristics pertaining the stress state and faulting style related to the subduction process. To this purpose, we used data from the earthquake catalog reported by the Servicio Sismologico Nacional (1988-2016). We investigate depth variations of the *b*-value for the Cocos and Rivera under North American plates interface, by a detailed analysis of 15 cross-sections. The obtained *b*-value profiles varies from 0.50 to 2.50, which nevertheless appear related to the faulting style and stress state. By comparing the locations and focal mechanism of the largest events with the *b*-values of the surrounding regions, our analysis corroborates the dependence of the *b*-value on the faulting style. Thrust events occur in regions of low and high *b*-value at depths less than 50 km. Normal-faulting events occur mainly in high *b*-value regions at all shallow (Z < 30 km) and intermediate depths (Z > 30 km), in agreement with global studies. These results support the hypothesis that differential stress processes may be behind the occurrence of the different faulting style. On the contrary, by analyzing the mean *b*-values for both types of faulting mechanism at each of the cross-sections, we found a significantly lower mean *b*-value related to normal faulting for those regions where the 8 (M_w 8.2) and 19 (M_w 7.1) September 2017 earthquakes occur. These results lead us to conclude that those regions