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The delayed aftershocks of the Illapel Earthquake Mw 8.3, 2015, Chile

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The delayed aftershocks 2018 Mw 6.2 on April 10 and Mw 5.8 on Sept 1 and 2019 Mw 6.7 on January 20, Mw 6.4 on June 14, and Mw 6.2 on November 4, associated with the Mw 8.3 2015 Illapel Earthquake occurred in the central Chile. The seismic source of this earthquake has been studied with the GPS, InSAR and tide gauge network. Although there are several studies performed to characterize the robust aftershocks and the variations in the field of deformation induced by the megathrust, but there are still aspects to be elucidated of the relationship between the transfer of stresses from the interface between plates towards delayed aftershocks with the crustal structures with seismogenic potential. Therefore, the principal objective of this study is to understand how the stress transfer induced by the 2015 Illapel earthquake of the heterogeneous rupture mechanism to intermediate-deep or crustal earthquakes. For this, coulomb stress changes from finite fault model of the Illapel earthquake and with the biggest aftershocks in year 2015 are used. These cumulative stress pattern provides substantial evidences for the delayed aftershocks in this region. The subducting Challenger Fault Zone and Juan Fernandez Ridge heterogeneity are existing feature, which releases the accumulated coulomb stress changes and provide delayed aftershocks. Therefore along with stress induced by a large earthquake such as Mw 8.3 from Illapel 2015 along with biggest aftershocks, have a direct mechanism that may activate the delayed aftershocks. Our study suggests the activation of crustal faults in this research as a risk assessment factor for the evaluating in the seismic context of the region and useful for another subduction zone.