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Stress change and fault interaction from a two century-long earthquake sequence in the central Tell Atlas (Algeria)

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We study the role and distribution of stress transfer that may trigger destructive earthquakes in the Central Tell Atlas (Algeria). A sequence of historical events reaching Ms 7.3 and related stress tensors with thrust faulting mechanisms allows the modeling of the Coulomb Failure Function (deltaCFF). We explore here the physical parameters for a stress transfer along the Tell thrust-and-fold belt taking into account an eastward trending earthquake migration from 1891 to 2003. The Computation integrated the seismicity rate in the deltaCFF computation, which is in good agreement with the migration seismicity. The stress transfer progression and increase of 0.1 to 0.8 bar are obtained on fault planes at 7-km-depth with a friction coefficient μ' 0.4 showing stress loading lobes on targeted coseismic fault zone and location of stress shadow across other thrust-and-fold regions. The Coulomb modeling suggests a distinction in earthquake triggering between zones with moderate-sized and large earthquake ruptures. Recent InSAR and levelling studies and aftershocks that document postseismic deformation of major earthquakes are integrated into the static stress change calculations. The presence of fluid and related poroelastic deformation can be considered as an open question with regards to their contribution to major earthquakes and their implications in the seismic hazard assessment of northern Algeria.