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Low angle normal faults and there “non-Coulombian conjugate” fault: a concept of anti-localization

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Low angle normal faults remains a mystery from a mechanical view point. One of the proposed explanation is that the stresses principal orientation rotates from the vertical by 30° in order to allows those band to play. Nevertheless, Melh 2006 has shown clear evidences for the neoformation of non Coulombian conjugates to those longer lived normal low angle faults together with the formation of vertical veins of fluids so that the stress rotation hypothesis must somehow be rejected because stresses cannot rotate once to allows one of the low angle fault to play and then on the opposite direction to allow the conjugate to play. Here, we proposed a Morh Coulomb based explanation for those “non Coulombian” conjugates and there associated veins to form in a stress field that is not rotating outside the shear bands. Our explanation is in fact a concept of “anti-localization”. Low angle normal faults are indeed not supposed to exist because they should increase the deviatoric stresses around them. We use this simple concept and studied parametrically with the help of analytical and semi analytical solution what would be the stress field outside the faults and hence what kind of structures should form. We found that imposing the shear strain on a badly oriented fault produce indeed veining and formation of normal anti-conjugate.