

## 11.17: Self-generating faults in an extensional system

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### ABSTRACT

We successfully simulate the opening and propagation of shear (Mode II) faults in extensional basins (Fig.1). Faults form when the effective plastic strain of the sediment exceeds a threshold of 30% over a distance of at least 1km. Faults prevent the formation of sediment rollover and localize stress changes (Fig.1). Because faults have lower frictional strength than the intact sediment, faults can only support a lower differential stress. We find that this lower fault strength leads to stress re-distribution and a decrease of the differential stress not only on the faults, but also in intact sediments across the basin (Fig.2).

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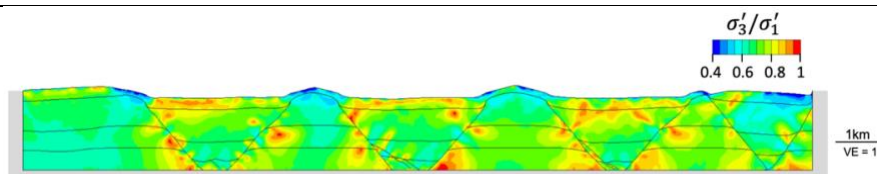


Figure 1: Faults forming in an extensional basin. Contours illustrate the ratio of minimum to maximum principal stress.

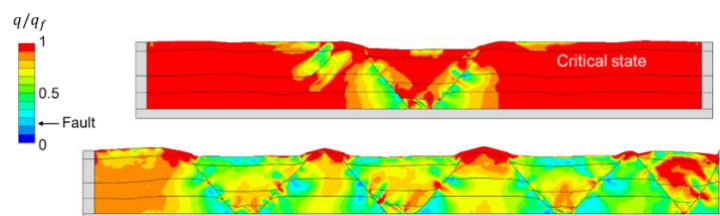


Figure 2: Ratio of shear stress to shear strength of intact sediment. After faults form, the relative shear in the basin decreases.

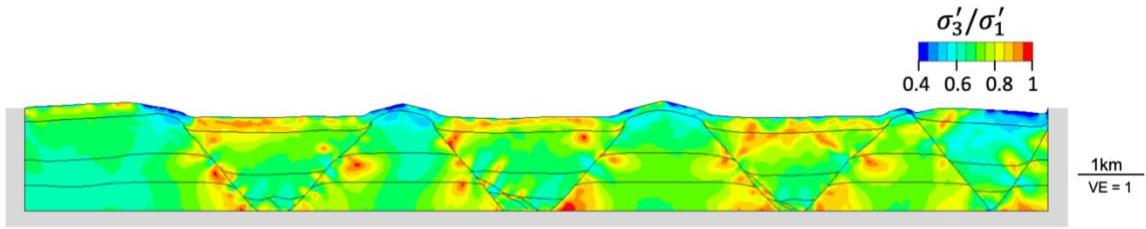


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[Back](#)

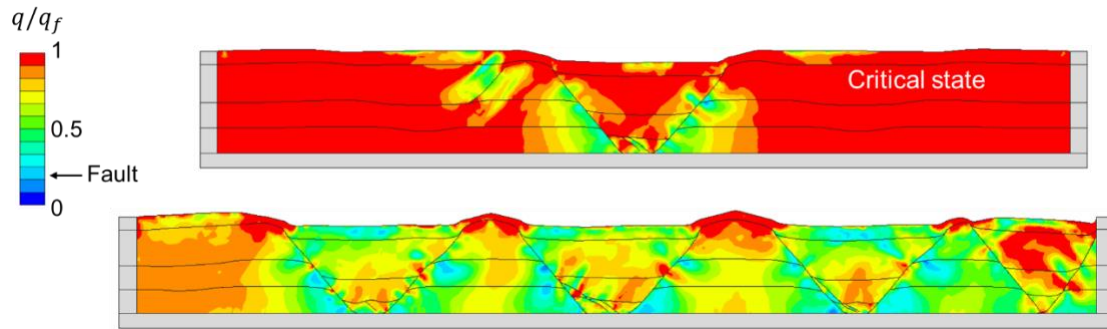


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[Back](#)