**Auxiliary Material for**

**Modes of extensional faulting controlled by surface processes**

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**Introduction**

Auxiliary Material contents:

Supplementary text

Supplementary Figure fs01

Supplementary Table ts01

Content description:

In the supplementary text we describe the simple, semi-analytical model for fault rotation, which enters the force balance calculation. This new model is briefly discussed and compared to the model presented in *Olive and Behn* [2014]. This comparison is illustrated by Supplementary Figure fs01. Supplementary Table ts01 summarizes the parameters and results of our numerical simulations.