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The use of Stress Tensor Discriminator Faults in separating heterogeneous fault-slip data with best-fit stress inversion methods. II. Compressional stress regimes

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Abstract: Synthetic heterogeneous fault-slip data as driven by Andersonian compressional stress tensors were used to examine the efficiency of best-fit stress inversion methods in separating them. Heterogeneous fault-slip data are separated only if (a) they have been driven by stress tensors defining 'hybrid' compression (R < 0.375), and their σ_1 axes differ in trend more than 30° (R = 0) or 50° (R = 0.25). Separation is not feasible if they have been driven by (b) 'real' (R > 0.375) and 'hybrid' compressional tensors having their σ_1 axes in similar trend, or (c) 'real' compressional tensors. In case (a), the Stress Tensor Discriminator Faults (STDF) exist in more than 50% of the activated fault slip data while in cases (b) and (c), they exist in percentages of much less than 50% or not at all. They constitute a necessary discriminatory tool for the establishment and comparison of two compressional stress tensors determined by a best-fit stress inversion method. The best-fit stress inversion methods are not able to determine more than one 'real' compressional stress tensor, as far as the thrust stacking in an orogeny is concerned. They can only possibly discern stress differences in the late-orogenic faulting processes, but not between the main- and late-orogenic stages.