Tectonics

Supporting Information for

Strain signals governed by frictional-elastoplastic interaction of the upper plate and shallow subduction megathrust interface over seismic cycles

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Introduction

This supporting information contains additional figures supporting the lines of argumentation in the main manuscript.

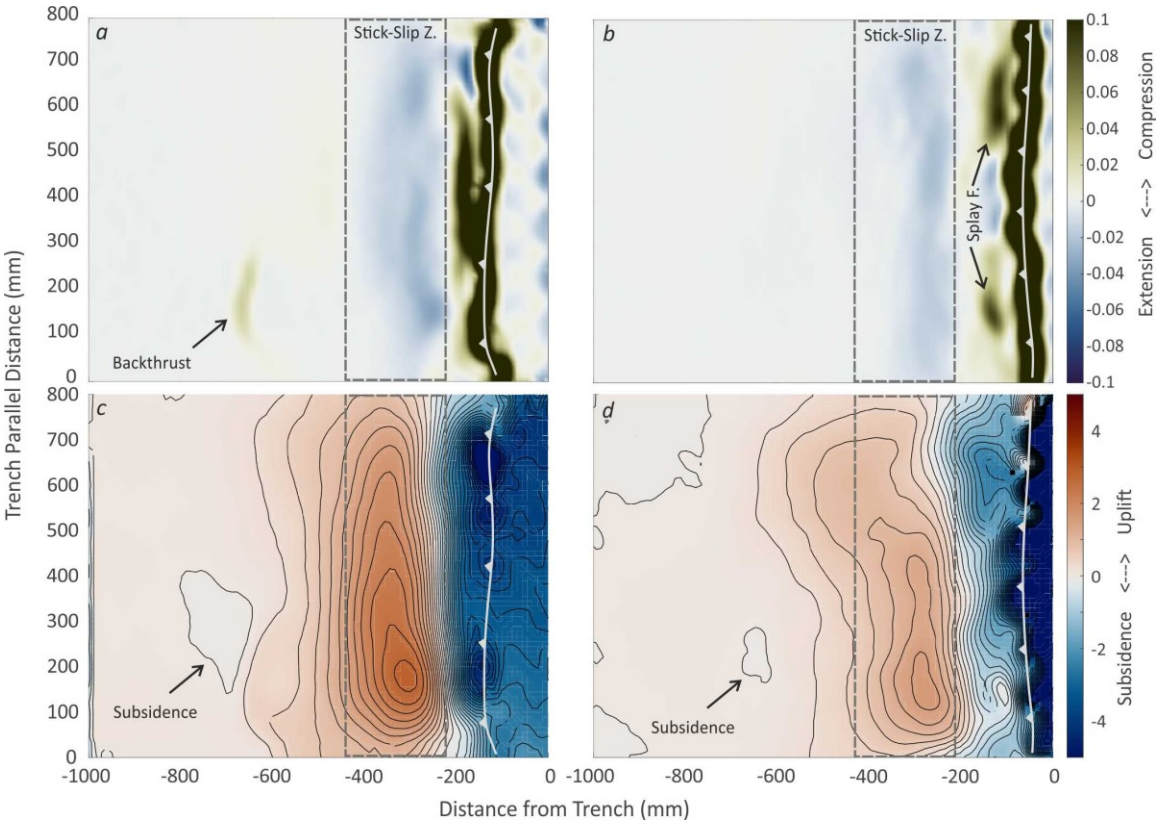

Figure S1. Surface deformation maps from compressional (a and c) and extensional configurations (b and d) over dozens of analog earthquake cycles. The approximate location of the stick-slip zone at depth is projected on the model surface as a dashed rectangle. a and b: Surface strain maps. Green and blue colors represent compression and extensional domains, respectively. The outer-wedge is experienced (splay fault and trench domains) compression. Inner-wedge is recorded permanent extension. The activity of the backthrust is evident in compressional configuration. c and d: permanent vertical deformation in the absence of erosion in the system. The outer- and inner-wedge represent permanent subsidence and uplift, respectively. The slight subsidence zone onshore may represent a forearc basin at the natural scale.

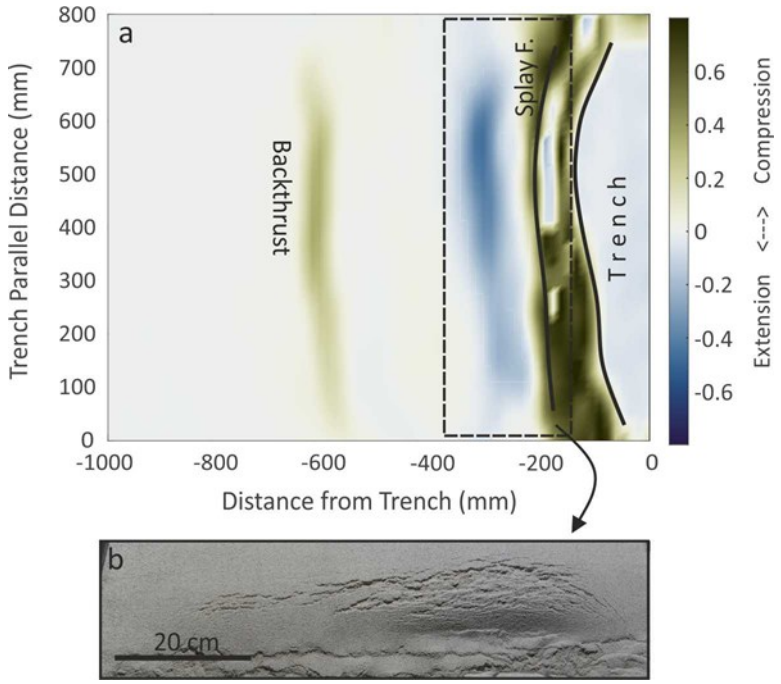

Figure S2. Surface strain map (a) and the laboratory view (b) of the extensional features from a supplemental experiment. Green and blue colors represent compression and extensional strain, respectively. The maximum extensional domain (intense blue zone) correlates with the density of fractures. The extensional structures are formed mainly due to the activity of the splay fault.