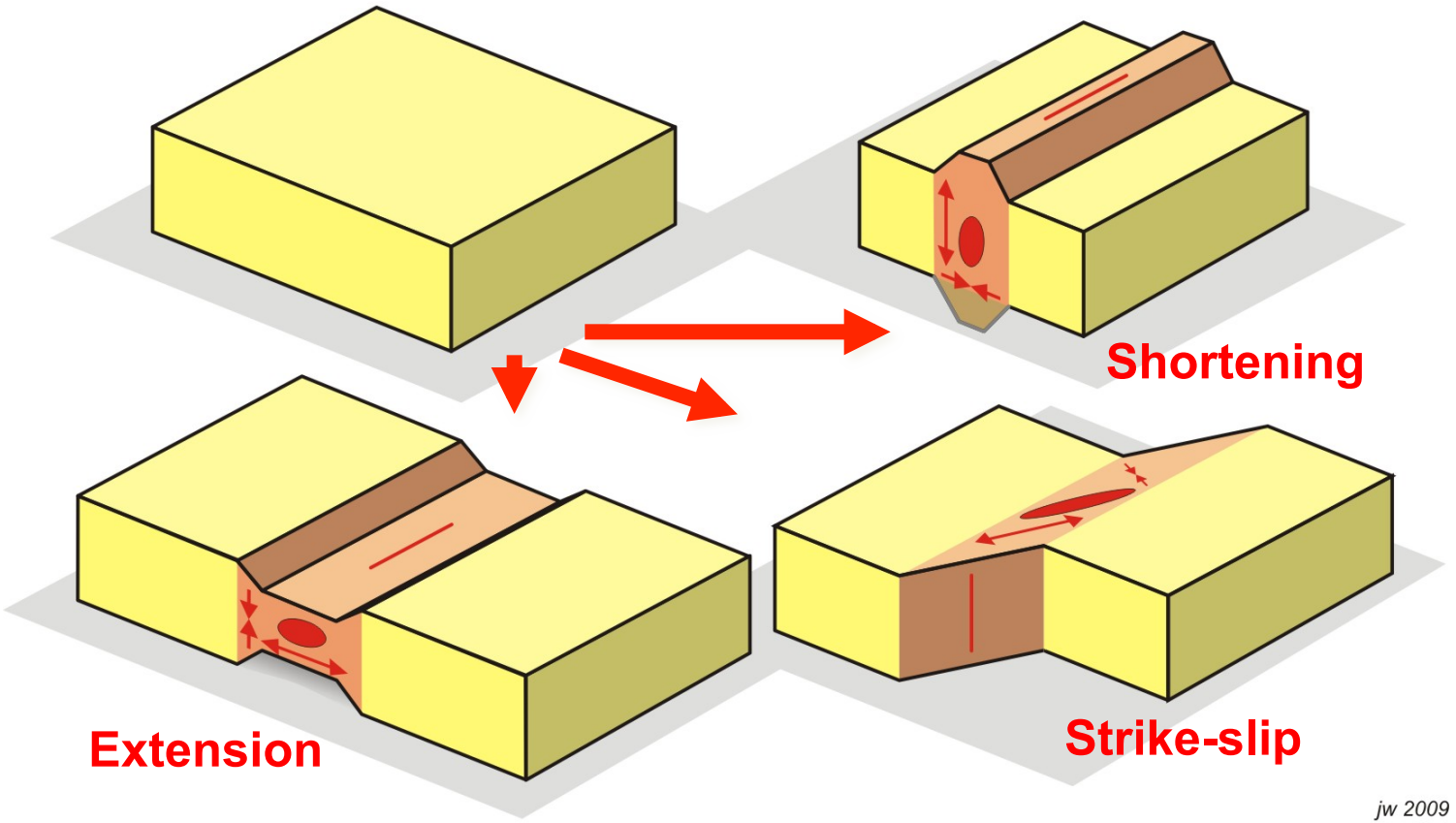
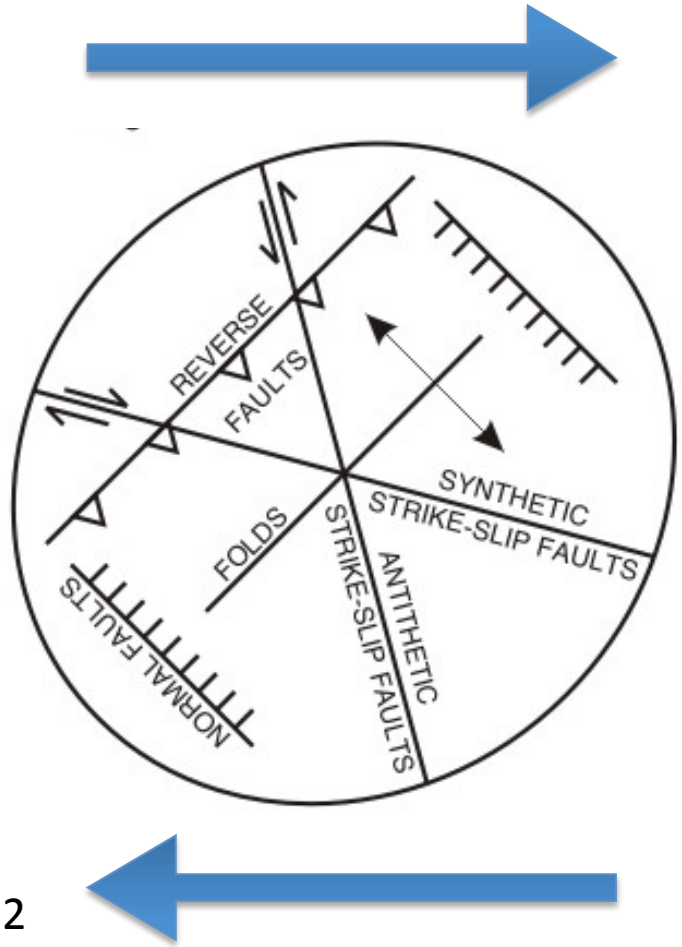
Strain in ideal strike-slip

- In ideal, simple-shear strike-slip, both the instantaneous shortening and extension directions lie in the horizontal plane.
- Cross-sections may give a misleading impression



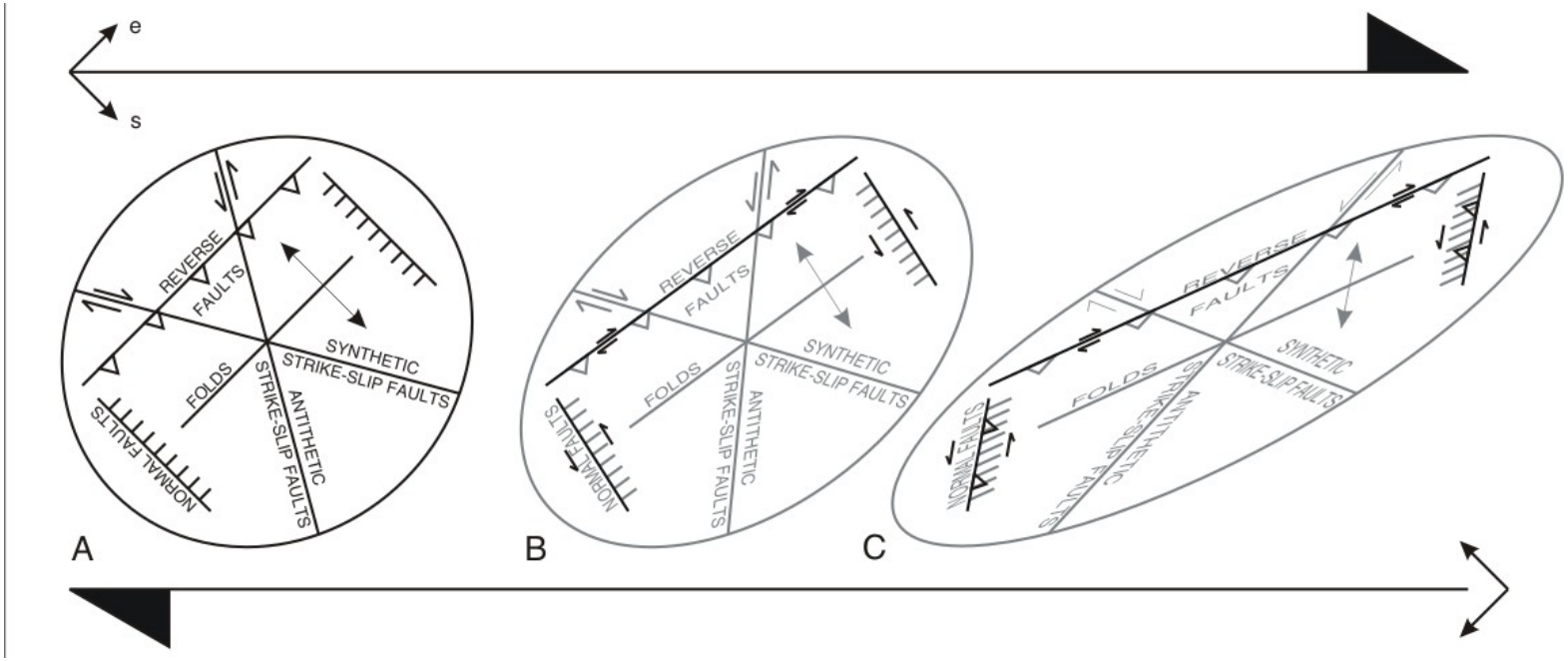
Strain in ideal strike-slip

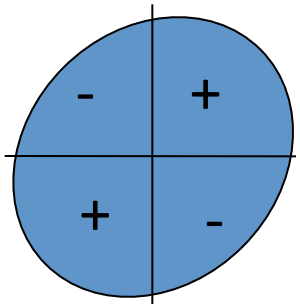
- Instantaneous strain in ideal simple-shear strike-slip
- Simultaneous extensional and contractional structures
- Instantaneous strain axes at 45° to shear zone boundaries



Progressive strain in strike-slip – everything rotates!

- Early-formed structures may be overprinted by later stages of deformation



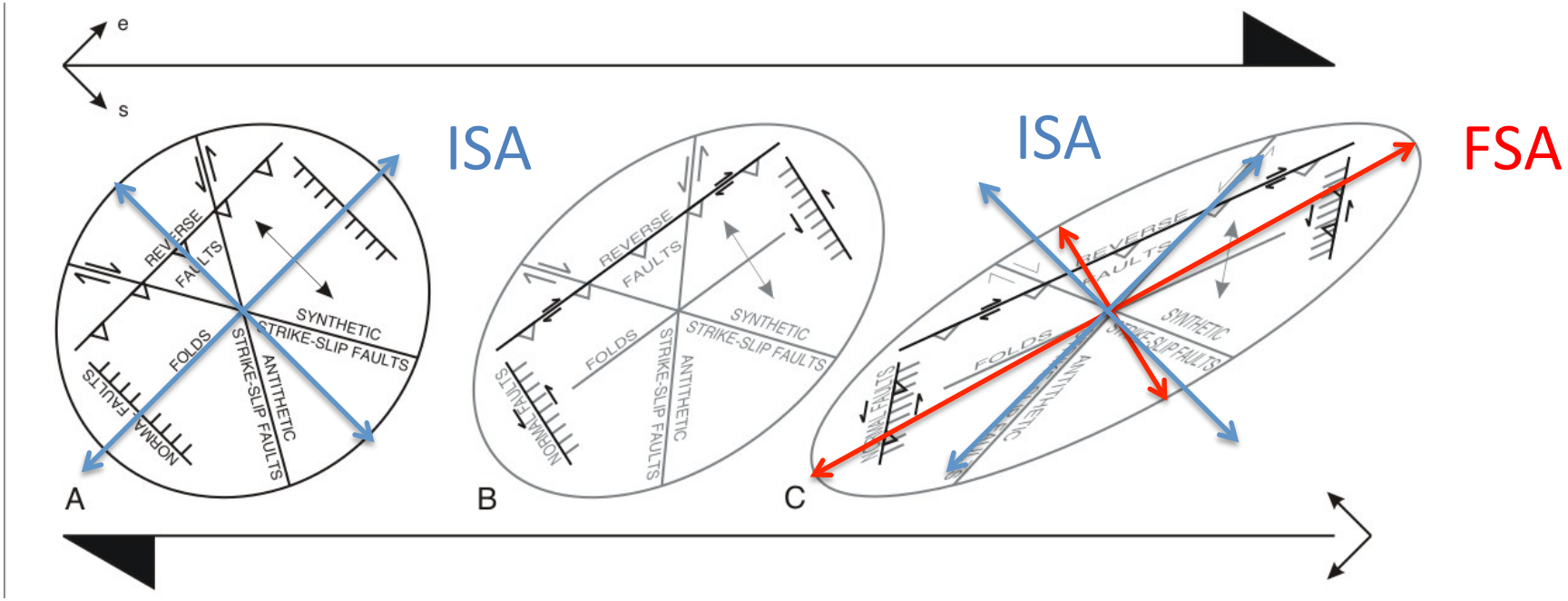


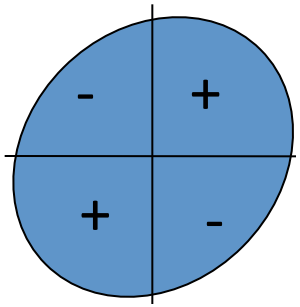
+ Field of lengthening

- Field of shortening

Progressive strain in strike-slip – everything rotates!

- Early-formed structures may be overprinted by later stages of deformation



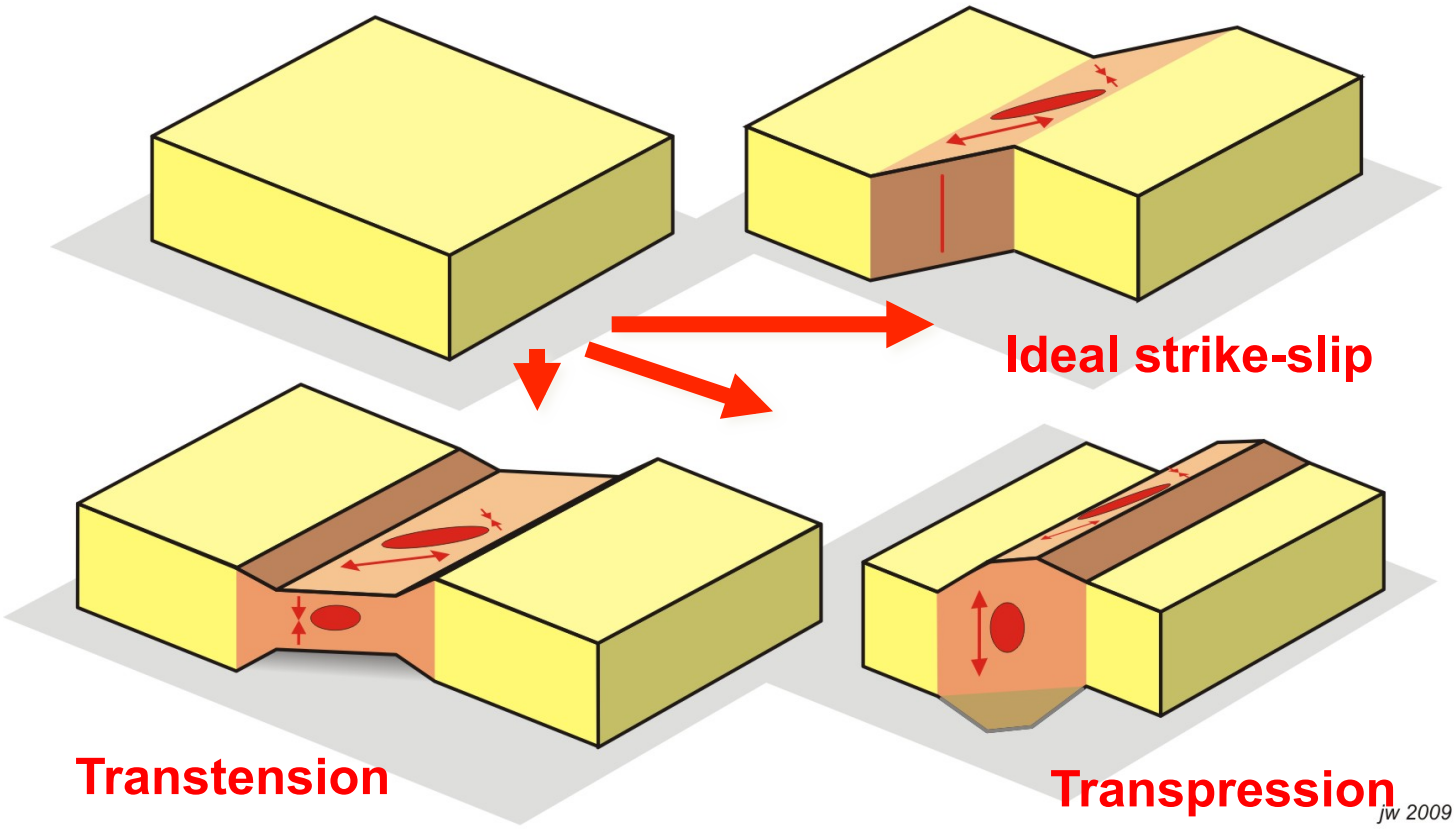


+ Field of lengthening

- Field of shortening

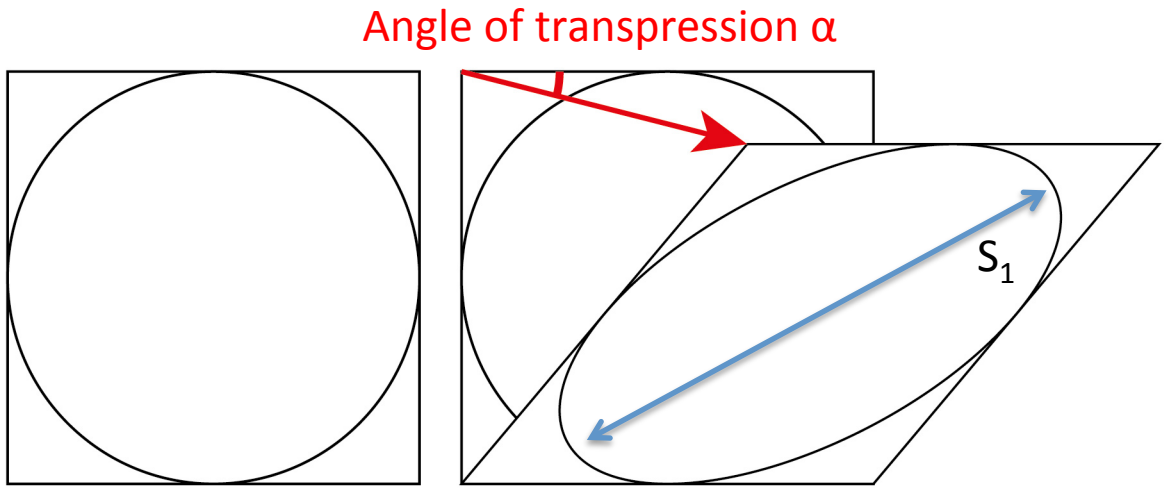
Departure from plane strain

- Transpression and Transtension
- Caution – these sound like dynamic terms but are *kinematic* terms



Strain in transpression

- Reduction in area
- Constant volume can be maintained by upward extension
- Resulting ellipsoid is oblate
- Maximum horizontal extension directions (instantaneous and finite) are typically at < 45° to shear zone boundary
- Departure from ideal strike-slip can be represented by angle of transpression α



Structures in transtension

- Increase in area
- Constant volume can be maintained by vertical contraction
- Resulting ellipsoid is prolate
- Incremental extension axis S_1 is at > 45° to shear zone boundary
- Finite extension axis rotates toward shear zone boundary but more slowly than in simple shear
- Departure from ideal strike-slip can be represented by angle of transtension α