

EVOLUTION OF A MID-CRUSTAL STRIKE-SLIP SYSTEM DURING PROGRADE METAMORPHISM: THE CHUGACH METAMORPHIC COMPLEX, EASTERN CHUGACH MOUNTAINS, ALASKA

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Observations from the eastern Chugach Mountains suggests that two distinct strike-slip systems developed during the Eocene evolution of the Chugach metamorphic complex (CMC). This conclusion is based on overprinting relationships as well as distinctions in style and spatial position of strike-slip systems within the down-plunge, western termination of the metamorphic complex. Previous work established a three-phase ductile deformational history: an early-layer parallel foliation that pre-dated CMC metamorphism (D1); the main continuous cleavage developed during prograde metamorphism that generally records near vertical shortening and subhorizontal, WNW orogen-parallel stretching (D2); and syn-peak metamorphic deformation recorded as upright folding with WNW trending axes parallel to stretching with clear evidence of dextral shear (D3). D3 varies with structural level ranging from a homogeneous, broadly distributed deformation in high-grade gneiss to domainal shear zones cutting D2 fabrics in overlying amphibolite facies schists. The gneiss and schist are separated by a distinct, gneiss-schist transition that is only 30-100m thick. We infer that this gneiss-transition surface acted as a detachment surface during D3 strike-slip with distributed deformation below and motion along narrow shear zones above. This D3 system overprints, and merges with, a 20-30km wide D2 cleavage fan that emanates from the core of the CMC and disappears westward into higher level phyllites that record a uniform, steeply-dipping phyllitic cleavage with a an EW stretching lineation. Finite strains are highest within the core of the cleavage fan and shear sense indicators show clear evidence of dextral shear within the core of the fan; thus, we infer that the fan represents a D2 dextral shear system. Kinematic modeling of this fan suggests an upside-down "attachment zone" (terminology of Teyssier et al., 2002) with a dextral shear zone below passing upward into distributed dextral shear. We interpret these relationships together as the product of a rheologic switch during D2-D3 progression with linear viscous flow via pressure solution above crystal plastic flow (shear zones) during D2 to D3 when low viscosity (linear viscous?) gneissic rocks lay beneath plastically deforming schists.