Strain analysis of elliptical grains from a fold and thrust belt, Kavik River area, northeastern Alaska

**A RUDIMENTARY EFFORT TO APPROXIMATE PENETrATIVE SHORtENING AND TO GENERATE INTEREST IN QUANTIFIED STRAIN ESTIMATES FOR NORTHEASTERN ALASKA.***

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Schematic cross-section A-A'. Lisburne Limestone has been simplified into lower and upper units. Subsequent strain integration parallel to principal transport direction provides an estimate of shortening due to penetrative strain. Opposing geologic studies in the petroleum producing northwest Alaska field and the McArthur River fold and thrust belt. Balanced cross sections are commonly used to estimate shortening, but this method ignores penetrative strain. Strain markers from the Mississippian-Pennsylvanian Lisburne Group were subjected to the Rf technique to quantify the penetrative component of shortening in these units. Samples with appropriate random and clustered grain distributions were identified using the center-to-center Rf technique. This section from oriented field samples included nodules, calcite veins, and calcite-filled fractures from the Lisburne. Three orthogonal sections from each sample were cut in order to determine the local three-dimensional strain if possible. A symmetry test assessed the assumption of original symmetry of grain distributions and identified samples likely to have had pre-strain sedimentary or tectonic fabrics. Integration of strain values across local structures provides an estimate of penetrative shortening that can be added to values from balanced cross sections, providing a clearer appreciation of total shortening.

**LOCATION & GEOLOGIC SETTING**

The field area lies within the foothills of the northeastern Brooks Range, a north-south elongated fold and thrust belt. This map shows the distribution of lithologies and structural patterns within the study area and presents balanced and restored cross sections. They estimate minimum shortening from the tectonic shortening. The corrected and restored sections were used to estimate the penetrative component of shortening in these units. Samples with appropriate random and clustered grain distributions were identified using the center-to-center Rf technique. This section from oriented field samples included nodules, calcite veins, and calcite-filled fractures from the Lisburne. Three orthogonal sections from each sample were cut in order to determine the local strain. A symmetry test assessed the assumption of original symmetry of grain distributions and identified samples likely to have had pre-strain sedimentary or tectonic fabrics. Integration of strain values across local structures provides an estimate of penetrative shortening that can be added to values from balanced cross sections, providing a clearer appreciation of total shortening.