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Detailed Surface Structural Mapping Reveals Multiple CSD's and Other Significant Structural Stratigraphic Relationships West-Central Pennsylvania

Within the sixty or seventy odd airline miles from Johnstown, Cambria County, Pennsylvania northeastward to Snowshoe, Centre County, Pennsylvania, at least ten prominent northwest-trending Cross Strike Discontinuities (CSD's) are traced on detailed surface structure maps (twenty six 7 ½ Quads as of September, 2003) created through the stereoscopic interpretation of aerial photos. Marking these CSD's are such structural features as abrupt strike offsets, trend offsets of major folds, abrupt changes in axial direction of major folds, abrupt plunging of major folds, small narrow folds paralleling CSD's, and actual normal faults which probably have more strike-slip than vertical motion. These CSD's will be of great interest to the industry as Trenton exploration moves southward from New York. Detailed mapping of all the major folds in the area is enhanced by the delineation of subtle flank steep zones and structural terraces hinting at deep development in the area will recognize some striking subtle, and not so subtle, relationships between depicted surface structure and Upper Devonian productive facies distribution. In addition, because of the large extent of the mapped area, some interesting regional tectonic implications can be inferred. The construction of the detailed surface structure maps utilized in this study was made possible through the unique three-dimension perspective afforded by stereoscopic viewing, which permits the accurate tracing on the aerial photos of the outcrops of many exposed Appalachian Plateau bedrock units. When carefully plotted from photos to 7 ½' topographic maps, the intersections of these outcrop traces with topographic contours yield a dense network of elevation control points. Contouring these data produces detailed surface structure maps, which neither overemphasize micro-geology nor smooth over subtle structural detail. Utilizing these maps to extrapolate surface structural detail from known productive areas to undrilled "look-alikes" could lead to the identification of new leads and/or the enhancement of existing prospects.