# 3-D Interpretation of a Meteorite Impact Field, Red Wing Creek Field, Williston Basin, Western North Dakota

Herber, Ben [1]; Weimer, Paul [*1]; Bouroullec, Renaud [1]; Barton, Roger [2]; Hammon, William [3]; Dorn, Geoff [3]; Huang, Chunju [4]; Jiang, Shu [5] (1) Geology Dept., University of Colorado, Boulder, CO. (2) True Oil, Casper, WY. (3) Terra Spark, Boulder, CO. (4) Geology Dept., Johns Hopkins, Baltimore, MD. (5) EGI, University of Utah, Salt Lake City, UT.

The Red Wing Creek Field in the Williston Basin was discovered in 1972, and is one of a few well known petroleum fields in the world to produce from a structure associated with a meteorite impact. Interpretation of a 3-D seismic dataset, covering 145 km2 over Red Wing Creek Field, shows that the crater has a diameter of 9.1 km and can be divided into three unique structural zones. First, the central uplift complex has a maximum diameter of 5.1 km, and consists of an uplifted central core, composed entirely of the Mississippian Madison Group strata, and flanking annular rim. The seismic reflectivity within the central core is poor, but well log data indicates extensive stratigraphic repetition. The central core is surrounded by an annular rim (1.7 km wide), structurally thickened by imbricate thrusts that dip towards the central core. This rim comprises eight distinct areas radially, segmented by nine high-angle, reverse faults.

The second portion of the crater is a depressed, annular trough that has a maximum diameter of 1.5 km; it is bounded by antithetic normal faults and concentrically linked, normal faults that dip toward the central crater. This group of faults marks the edge of the third zone, the outer rim. This zone is slightly uplifted, relatively undisturbed, and its strata dip at a maximum angle of 8° away from the central crater.

Through detailed mapping of the stratigraphic and structural variation within the Red Wing Creek seismic dataset, a multistep kinematic model of crater formation has been developed.