

**An integrated approach from seismic, well logs and cores for characterization of fractured Mississippian Chat reservoir,
north-eastern Oklahoma, USA**

Malleswar Yenugu
University of Oklahoma
School of Geology and Geophysics
Norman, OK 73019
malleswar.yenugu@ou.edu

Chert is a microcrystalline or cryptocrystalline sedimentary rock material composed of silicon dioxide (SiO_2). Chert occurs as nodules, concretionary masses and as layered deposits. Chert is an unconventional reservoir rock that has been developed successfully in west Texas, Oklahoma, California and Canada. The deposition of chert reservoirs commonly occur in close stratigraphic proximity to carbonate rocks, although chert reservoir origin, characterization, and distribution may be quite different from adjacent carbonate rocks. Cherts which show high porosity and low resistivity are sometimes called Chat. The Mississippian tripolitic chat is currently an exploration and development objective through- out southern Kansas and northern Oklahoma, including the survey area of Osage County.

Analysis of Mississippi Chat core from a well within the study area show porosity values ranging from 12% to 36%. Image log of the Mississippi Chat shows complex internal architecture characterized by vugs, nodules, fractures and little remnant of original depositional fabric. Through core and log measurements, I could be able to establish a good correlation between impedance and porosity. To this end I map seismic acoustic impedance volume to predict additional sweet spots. The chert is also controlled by diagenetically altered fractures which are able to seismically map using coherence and most-negative principal curvature volumes. Combining these geometric attributes with impedance estimates and well control, and also by integrating the laboratory petrophysical measurements such as porosity, permeability, ultra-sonic velocity, I built a comprehensive geological model for the characterization of fractured Mississippian Chat reservoir.