NEAR SURFACE BOREHOLE GEOPHYSICAL IMAGING IN A HIGHLY STRUCTURAL AREA, BEARTOOTH HILLS, MONTANA

Tania Mukherjee, Dr. R.R Stewart
University of Houston, Houston, TX -77204

Abstract

University of Houston conducted a student geophysical field camp at YBRA (Yellowstone Bighorn Research Association), Red Lodge Montana. The idea was to provide a detailed interpretation of the sub vertical Mississippian Madison lime stone bed beneath the YBRA camp using seismic and well logs. Several 2D seismic lines (E-W) were acquired and several logs were run in the two wells drilled in the camp. The depth of the wells are 30m and 60m, the wells were drilled then cemented and cased with PVC. SP, gamma, sonic, temperature, conductivity and sonic televiwer logs were run in the wells. Several multicomponent VSP (Vertical Seismic Profile) with different offset were also done. A shot offset of 3.5 m was selected for VSP. Both the wells were compared to see high frequency noise and shot signature. The limestone P wave velocity is about 2600 m and shale velocity is about 2800 m/s. The Vp/Vs is 2 for limestone and 1.7 for the shale unit. As there is very steep dipping reflectors, there is only little upgoing wave in the data. A VSP-NMO was also done and a corridor stack was then created. With the help of all dataset, composite plot and a quick look interpretation shows the limestone-Redbed encounter to be at 40 m and the probable dip of the bed looks to be 45° towards south.