SPG Student Chapter IIT Roorkee Organises a Guest Lecture by Dr. Rakesh Walia on " Broadband Seismic Data"

On March 31, 2015 SPG Student Chapter IIT Roorkee organised a guest lecture by Dr. Rakesh Walia at the Department of Earth Sciences, IIT Roorkee. The topic of the lecture was "Broadband Seismic Data". Dr. Walia is at present Country Manager and MD of CGG India. He was accompanied by Mr. Hemant Kumar, Technical Business Development Manager-Asia Pacific, CGG. The lecture was attended by around 50 Geophysics students and was graced by presence of faculty members.

Mr. Walia began his lecture by introducing the basics of marine survey, ghosts and broadband seismic. In seismic exploration broadband refers to a wider band of frequencies being recorded than in conventional seismic exploration. In the marine case the conventional acquisition system is said to give a useable bandwidth of typically between 880 Hz, whereas broadband seismic systems claims to give useable frequencies from as low as 2Hz up to 200 Hz or more for shallow targets. The additional low frequencies provided by broadband data means that a low frequency model from the well is not required for inversion, resulting in more quantitative results and higher confidence away from the well locations. Broader bandwidths produce sharper wavelets without side lobes to provide high-resolution imaging of important shallow features such as thin beds and small sedimentary traps. Lower side of frequency spectrum, i.e., 2-10 Hz decreases side lobes of Ricker wavelet (source wavelet). No horizons are mapped if this frequency is missing. Higher side of spectrum enhances the spikiness of Ricker wavelet and thus enhances resolution power of thinner beds.

He further talked about deep towed curved streamer profile, which is optimised for each marine survey, to maximum bandwidth. The streamer is towed at variable depths ranging from 7.5m to 50m. This enables to capture frequencies down to as low as 2 Hz and reduces weather related noise thus extending the survey-operation window. Curved streamer profile provides better compensation of ghost notch for 6-35 m. With broader bandwidth and strong low frequencies, the images of sub-surfaces are rich in details enhancing interpretation and reservoir characterisation. He further mentioned about usage of broad source, multi-level airgun arrays. With curved streamer and broad source, the data is almost fully free from ghost (both source and receiver), extending the bandwidth beyond 6 octaves. This technique offers broadest attainable frequency spectrum, the data is of superior S/N ratio with improvement in depth penetration and illumination enabling better seismic inversion, strategic drilling and completion decision reducing uncertainties.

Dr. Rakesh Walia delivering lecture to attentive audience