Bay Area Geophysical Society Seminar Series

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Total Wine & More in Pleasant Hill

Title: Low Frequencies: All you need (now) is Source

Abstract: Great progress in seismic receivers has left the source behind in the low frequency game. Offshore, this includes ocean bottom nodes, multi-sensor streamers, and slanted streamers. Low frequencies are needed for exploration under overburden such as salt and basalt and for building blocky reservoir models. In data processing, gone are the days when low cut filters were used aggressively to attenuate noise such as swell and ground roll. The low frequency content of air guns is in the bubble which has desired amplitude spectra, but its phase or timing requires correction. Turning the bubble from noise into signal is a challenge which used to be avoided by the low cut filters. But now, most of the people who build velocity model models, many

of them call it Full Waveform Inversion, demand lower frequency signal. The next big thing in seismic technology is therefore the source. There is also an environmental motivation. The air guns that we are using now were designed (in the 1960s) to be just like the dynamite that they replace. Air guns generate more high frequency noise than is useful and they got a bad name. Guns are used to kill. If they are killing whales, no doubt they must be killing the plankton that the whales prey on. What can we do? It's too late to change the name and without some design changes the high frequency noise (that is probably lethal to plankton in short ranges) will not go away. Most of all, we need lower frequencies-- otherwise there is no point to acquire more seismic data. I will shortly mention some marine vibroseis sources, and mainly focus on one future pneumatic source operating with low pressure air and designed to produce low frequency signal down to 1 Hz, lower sound pressure level, much longer rise-time, much lower slope, and avoid cavitation.

Speaker Bio:

Shuki Ronen is a partner in Low Impact Seismic Sources, the owner of Totum-Geo, and a part time adjunct professor at Stanford. In the past he contributed to the development of ocean bottom nodes, imaging, and quantitative interpretation. Past employers include in reverse order, Dolphin, SBGS, CGG-Veritas, Chevron, Geco-Prakla, Schlumberger, Colorado School of Mines, and Saxpy Computer.