

Geoscience evolution: extensive data integration for real time geosteering and modeling in unconventional reservoirs

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ABSTRACT

Over the past 5-7 years, effective and low-cost geosteering technologies became a game changer for unconventional development in North America, allowing thousands of oil and gas companies to stay profitable during the ongoing economic downturn. Modern geoscience and geosteering technologies indicate an increasing focus on IT and software, rather than downhole hardware tools. IT technologies have advanced enormously over the past 8-10 years, but these capabilities are not yet fully endorsed by oil and gas industry. Modern computing power, low cost storage facilities, super-efficient algorithms, big data analysis, artificial intelligence and cloud collaborative technologies will eventually completely transform the current practices. This will lead to a new way of how we model reservoirs, geosteer wells, integrate data and communicate with each other. But this process is an evolution, rather than a revolution, due to a fact that the oil and gas industry is conservative and adapts slowly to new technical and economical trends and realities. Knowing the true stratigraphic position of a well trajectory, constantly and proactively monitoring this position and adjusting as needed in real time while drilling - represent a significant breakthrough in keeping the well in the best target zones no matter how thin those are. However, this is just the beginning. The next step in geoscience technology is to be able to integrate massive amounts of available data, such as previously drilled wells, production history, various types of logs, cores, seismic, maps, correlations, regional geological trends, etc. Connect this with the modern IT capabilities and you get geoscience to be real time, high resolution, fully collaborative, intelligent and automatic.