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How to Achieve HiRes Stratigraphic Resolution, Using Cyclostratigraphy

Over the last few years, Shell has developed a new high resolution stratigraphic correlation tool, based on cyclicity contained in the wireline log signal. These cyclicities are related to variation in proximity of the Earth to the Sun (eccentricity) and in the angle of the Earth axis (obliquity, precession). The cyclicities were studied in detail by Milankovitch, who detected frequencies of 400 and 100ka for eccentricity, 50ka for obliquity and 20 ka for precession. Interference of the frequencies results in a unique Insolation curve, which can be considered a high-resolution stratigraphic standard for a specific latitude. Last year studies have indicated that based on the local Insolation curve stratigraphic correlations can be achieved with an accuracy up to 20ka. This almost bed-to-bed resolution is far more refined than the resolution achieved by any other means of correlation tool. Based on the robustness of the technique, it has been decided to combine this methodology into an easy handling tool. Cyclolog is an easy to use commercial software package, which has proven capabilities in cyclicity detection in wireline log. The cyclostratigraphy methodology has been developed on top of current Cyclolog capabilities.

Cyclolog was tested on various OU settings: (1) Tertiary delta settings show an excellent match particularly for the high resolution eccentricity frequencies. (2) The Cretaceous carbonates of the Tamama Formation show an excellent match with the well stratigraphy. This allows for detailed HiRes correlations in the reservoir and establishing reservoir connectivity. (3) Correlation of four Rotliegend show a good match by combining Cyclolog with SIM, Mesa and Inpefa curves, confirming the capabilities of the new easy-handling tool.