

ORBITAL CYCLICITY STUDY USING SONIC LOG AND SEISMIC DATA

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Cyclostratigraphic analysis of a well log and a seismic trace in a Miocene sedimentary succession of Campos Basin allowed evaluating the potential of applying cyclostratigraphy to seismic data. It was used a combination of visual and spectral analysis to identify cycles in a sonic log, to put them in a hierarchical order and to establish their temporal magnitude and the mean sediment accumulation rate. The correlation between the periodicities obtained from spectral analysis with those of the Milankovitch band was then evaluated using a comparison of the similarity of their ratios. Similar analysis was done to the converted-to-depth seismic trace that coincides with the well projection on the seismic section. Different levels of success were obtained. These depended on the sedimentary cycle thickness and the seismic resolution. Cycle thickness is a function of accumulation rate; seismic resolution, considering the same acquisition parameters, varies conversely to the investigation depth. The sonic log analysis revealed cycles associated to eccentricity (100 ka), obliquity (41 ka) and precession (23 and 19 ka). The rhythmicity in the sedimentary succession was mostly influenced by precession cycles, excepts to the segment N-570c, where obliquity prevails. Accumulation rates range from 16.8 to 40cm/ka. The seismic trace spectral analysis allowed the identification of cycles with periods around 100 ka (eccentricity). Since the accumulation rates increase it is possible to relate cycles to obliquity (41 ka). Seismic may be a useful tool in cyclostratigraphy. However, it's necessary to maximize temporal resolution, especially in the environments with lower accumulation rates.