

# CYCLOSTRATIGRAPHIC ANALYSIS OF REFLECTANCE SPECTROSCOPY DATA IN THE CARBONIFEROUS RHYTHMITES OF THE ITARARÉ GROUP, PARANÁ BASIN, BRAZIL

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**SUMMARY:** During the late Paleozoic, the Gondwana supercontinent was affected by multiple glacial and deglacial episodes known as “The Late Paleozoic Ice Age” (LPIA). The sedimentary succession of the Itararé Group (Paraná Basin) is the main evidence of these episodes in Brazil, and corresponds to glacio-influenced marine deposits, mainly composed of sandstones, diamictites, shales and mudstones with dropstones, rhythmites and conglomerates. The entire succession represents the advance and retreat cycles of glaciers, and the rhythmites facies occur mostly at the top of the deglaciation sequences. Previous studies already showed orbital and millennial scale cycles recorded in the rhythmic facies of the Itararé Group in Santa Catarina and São Paulo States (Brazil). The purpose of this study is to demonstrate the known cyclicities and recognize new cycles in the same facies located in southern Paraná Basin, by analyzing and processing spectral reflectance data. Spectral data restricted to shortwave infrared (SWIR) were obtained in cores of the Leão and Mariana Pimentel paleovalleys in Rio Grande do Sul. By evaluating electromagnetic radiation, the reflectance spectroscopy technique can identify elements or chemical compounds (including minerals) that present characteristic absorption features due to electronic and vibrational processes. From the reflectance data obtained, covariance matrix, eigenvalues and eigenvectors were calculated. Principal component 1 is directly related to the brightness of spectral data, meanwhile others components may be related to chemical composition of the rock. Wavelength range of the spectral data was limited to a range that is associated with mineral absorption features, which variations might be related to climate changes. Spectral data were processed in the R software using the Astrochron tool, which allowed applying algorithms, such as Robust Locally-Weighted Regression Spectral Background Estimation, Evolutive Harmonic Analysis and Multitaper Method Spectral Analysis. These techniques were used to reduce noise in the data set, and, consequently, identify the cyclicity recorded in the rock. The last technique also allowed to estimate sedimentation rates, even though the time span of the sedimentary succession is not well constrained. Preliminary results show that the cyclicity recorded in spectral data corresponds to orbital cycles and may be associated with paleoenvironmental aspects on a regional scale.

**KEYWORDS:** CYCLOSTRATIGRAPHY; ITARARÉ GROUP, LATE PALEOZOIC GLACIATION.