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Shelf-edge sedimentary systems off Rio de Janeiro State, northern Santos basin-Brazil

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The sedimentary record of the continental shelf off Rio de Janeiro State is related to the opening and evolution of Atlantic Ocean. The combined analysis of high resolution seismic acquired in the early 80's (Geomar cruises) and 2D seismic lines of petroleum industry, coupled with chronostratigraphic data from oil industry's exploratory wells, allowed us to observe two different orders of sequences: of 3-4th order, that represents sedimentary units related of the Milankovitch cycles (100/40/20ky), and of 2nd order (10-100my). High resolution seismic allowed us to outline a first architectural framework for the actual shelf that is composed of stacked seismic units making up the major seismic sequences bounded by angular unconformities. According to the intern and extern configuration of their clinoforms, the seismic sequences were grouped into two distinctive stratigraphic sets, identified as Set I (Pliocene) and Set II (Upper Quaternary). Some architectural components of note include: (1) the characteristic upbuilt-outbuilt geometry of sequences that compose Set I (SqA, SqB and SqC), indicating that deposition has probably been favoured by a combination of prevailing subsidence regime (upbuilt pattern) accompanied by forced regressive deposits (outbuilt pattern); (2) the majority of sequences that make up Set II outbuilts as a composite seaward-thickening progradational wedge formed under dominant forced regression conditions, implying that the generation of accommodation space was less important than during the build-up of Set I. However, these sequences consistently pinch out in a progressively landward direction, suggesting a prevailing and increasing subsidence regime able to induce the progressive seaward tilting of the margin during the middle-late Pleistocene, and the subsequent partial preservation of regressive sequences of about 100-200 m thick at the level of the present-day mid-shelf, that prograded seaward for circa 15-25 km. These architectural elements provide a hint at a prevailing subsidence regime and effective sediment supply into the basin that clearly contrast with the conveyed idea of a sediment-starved and tectonic stable shelf. They naturally raise questions about the nature and origin of sediment supply, since no significant point siliciclastic fluvial source flows directly into the shelf. Stemming from that, we are forced to speculate about: (A) the role of neotectonic movements involving the Serra do Mar coastal mountain ranges to potentially source clastic influx into the basin during the Quaternary, or about the real importance of secondary drainage basins debouching today; and (B) the mechanical nature of a supposed subsidence during the Pliocene and the Quaternary time span (overloading ? sediment compaction ? thermal cooling ?). The interpretation of industrial seismic lines can provide the answers of many of these questions. The next step of this work is to make a stratigraphy model of the sedimentary systems of Santos basin to understand how the ancient creation of accommodation space can influence the recent sedimentary architecture and how is the change in sedimentary influx and the sedimentary records of different orders of cyclicity.