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The Late Quaternary evolution of the southern Brazilian coast: insights from seismic stratigraphy and diatom records

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The peculiar physiography of the southern Brazilian coast makes it an ideal location in which to study Quaternary environmental changes related to sea-level oscillation, climate forcing and incised valley evolution. Seismic surveys, coring and diatom records have been integrated into a multidisciplinary approach to examine the Late Pleistocene and Holocene coastal evolution of S Brazil. Seismic-stratigraphic architectural elements show prominent incised valleys up to 10 km wide, filled with at least 40 m-thick sediments. Three sequences (S1, S2, S3) and two sequence boundaries (SB1-2, SB2-3) were established (Fig. 1). The sequence boundaries were associated with sea level lowstands related to Marine Isotope Stages (MIS) 6 and 2 [1]. The Jacuí River was an important source of sediment to the shelf during sea level fall stages, due to increases in drainage basin area and erosion. The shelf surface was sub-aerially exposed, subjected to high erosion rates and fluvial incision. The main sedimentation occurred in a marine-dominated environment during humid periods. However, the main fluvial drainage was not re-incised (profile 22) but shifted to a new connection (profile 7) with the Atlantic Ocean [2]. The shifts in the sedimentary infilling of the Camaquã River incised valley were associated with the alternation between estuarine and marine deposition. This can be envisaged as related to a migrating inlet that persisted until coastal drowning was complete. The Holocene transgressive event drowned the exposed late Pleistocene coastal plain, causing the infilling of the incised-valleys and channels mainly with marine and estuarine sediments; the seismic records show the transition from the incised valley to an upper unconfined environment. Paleoecological studies indicate that the S. Brazilian coast experienced relatively humid climatic conditions and lower than present daily temperatures during the early Holocene in contrast to the alternating humid and dry periods during the middle to late Holocene [3]. The Holocene coastal barrier system became more continuous, allowing the development of a huge subtropical lagoon (Patos) that is strongly influenced by wind action and fluvial discharge. Abundant diatom taxa are highlighted as excellent indicators of environmental changes, including salinity, sediment composition and transport by incised-valley systems, providing additional insights into coastal evolution.

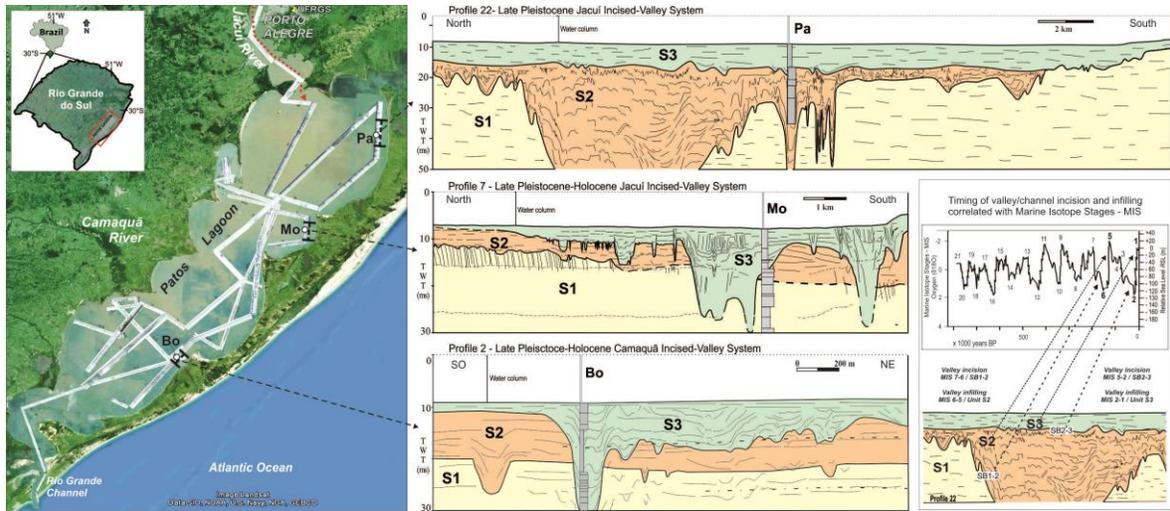


Figure 1: Location map of seismic profiles and cores (Bo, Mo, Pa) in the Patos Lagoon, S Brazil. Timing the events related to the last Quaternary ups and downs sea level in S Brazilian coast is also shown.

References:

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