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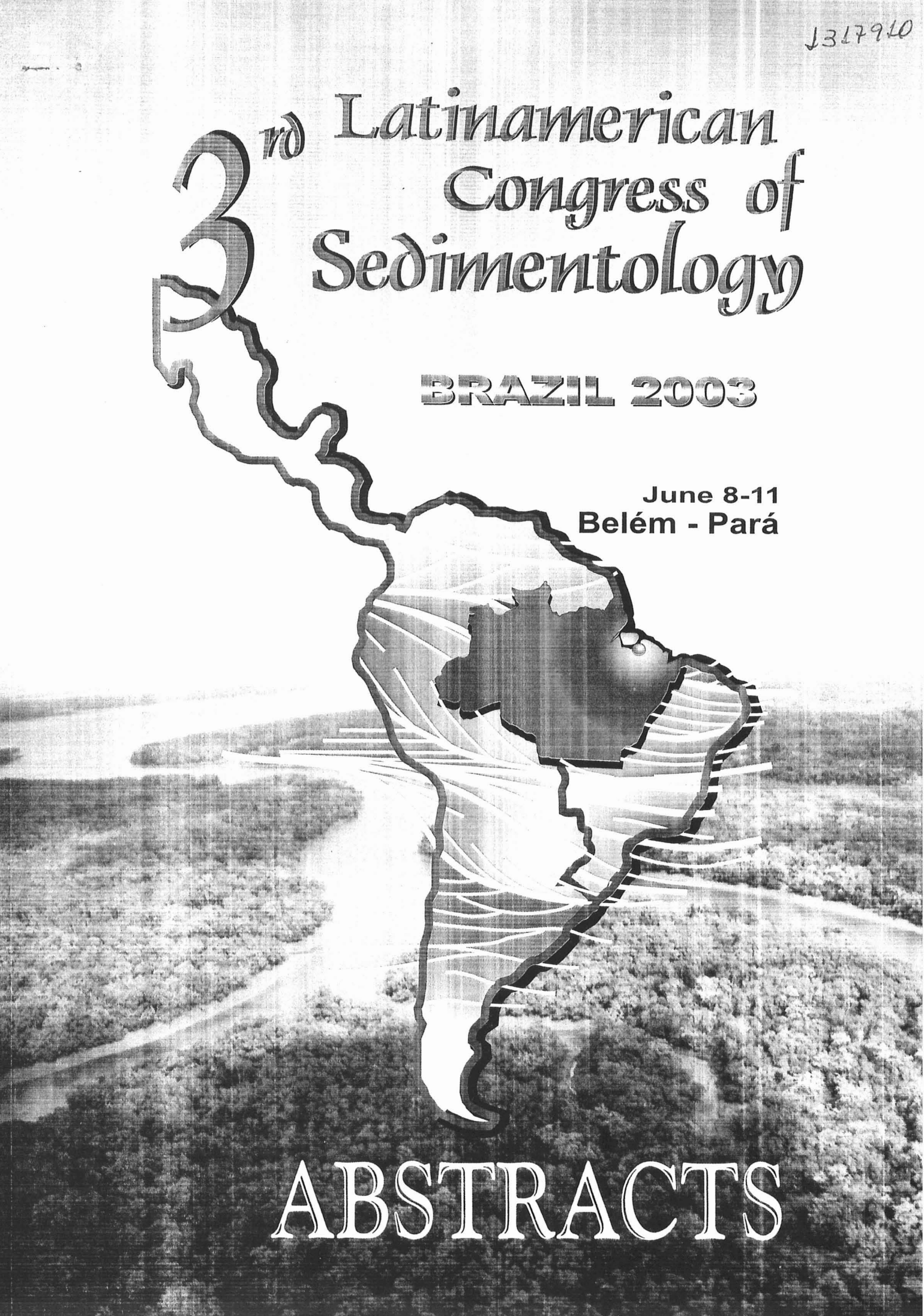

ABSTRACTS

ICEBERG SCOURS AND ASSOCIATED SUBGLACIAL FURROWS AND STRIAE ON SANDSTONES OF THE LATE PALEOZOIC CURITUBA FORMATION, NE BRAZIL

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Parallel, rectilinear furrows of varied dimensions up to around 30 m long, 3.5 m wide and 40 cm deep, and striae occurring on a single or several bedding planes of the late Paleozoic Curituba Formation at two localities in NE Brazil (Fig. 1), about 70 km distant from each other, are interpreted as resulting from iceberg scouring and subglacial plowing of soft, subaqueous sand beds.

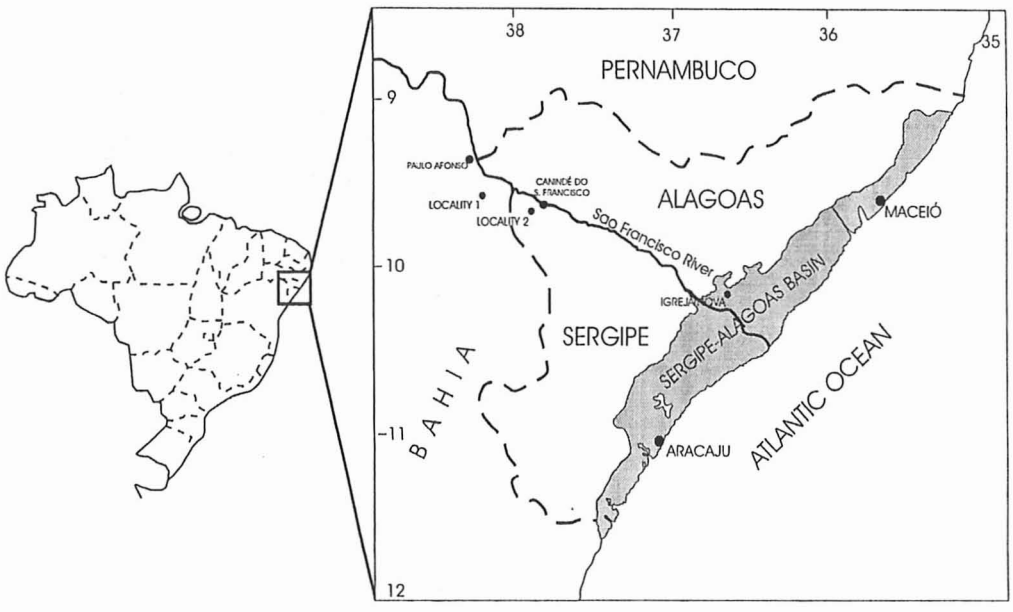

Fig. 1: Localities studied in Santa Brígida "graben" and Sergipe Alagoas Basin

At locality 1 (Curituba, State of Sergipe) furrowed/striated surfaces are found on top of 5-6 different bedding planes of a large tilted and fractured/faulted block of hard Curituba sandstone. Diamictite is absent in the section and no dropstone has been found in the sandstone. On three different, extensively exposed bedding planes of the sandstone, larger berm-bound furrows appear superposed on and parallel oriented with densely disposed narrow furrows (cm-dm wide) and striae (Fig. 2 A). Larger furrows have a shallow "U" section and are typically bound by marginal berms resulting from floating ice plowing of the soft sediment. Parallel smaller furrows and striae found on the flat bottoms of larger furrows and on top of berms have probably been excavated by ice protuberances at the bottom of the floating ice (Fig. 2 B). Better-preserved larger furrows become narrower and shallower toward one end, probably indicating gradual decoupling of ice keel from the bottom. Internal striae may be partially covered by sediment laterally slumped from berms. Other partially exposed intermediate bedding planes also contain densely disposed, parallel, smaller furrows and striae that are not clearly bound by berms. These smaller features may be of subglacial origin. Features are cut or slightly displaced by transversal fractures and faults in the sandstone.

Furrows at locality 2 (Lagoa Seca, State of Bahia) occur isolated on a single, ample, horizontal, smooth bedding plane of the Curituba sandstone (Fig 2 C), a few decimeters above its erosional contact with a sandy debris-flow diamictite. Furrows here are smaller (10-30 cm wide and up to 25 m long). The more common ones have a shallow, open "V" or "U", with symmetrical to asymmetrical section. Berms are not always preserved on both margins of furrows. Some of them have raised piles of sediment at one end (Fig 2 D). Complex, narrow areas made of irregular, interfering parallel, undulating, small troughs have also been noted. At places, elongated, deformed and furrowed mounds of sandstone are found between furrows. They seem to have been formed by sand bulldozed by a displacing ice keel and/or compressed between parallel moving icebergs. A few isolated clasts up to boulder size found in the sandstone may represent dropstones.

Besides being iso-oriented in each locality, features from the two studied localities are also roughly parallel, in average around N 110°. At both places poorly preserved sedimentary structures suggest a shallow water (marine?) depositional environment for the Curituba Formation.

In addition to the iceberg scours, facets and striae on clasts of the Curituba diamictites, of varied composition and including far-travelled lithologies (Precambrian BIF), support a glacial influence during deposition of the unit. Independent evidence of a glacial environment for the late Paleozoic beds of NE Brazil is furnished by a striated and polished pavement on Precambrian gneiss that crops out near Igreja Nova, State of Alagoas (Sergipe-Alagoas Basin). The pavement is directly overlain by diamictite and fine rhythmites of siltstone and argillite bearing dropstones of the Batinga Formation, correlatable with the Curituba Formation.

Regional paleogeography of the glaciclastic succession of NE Brazil is, however, not yet clearly understood.

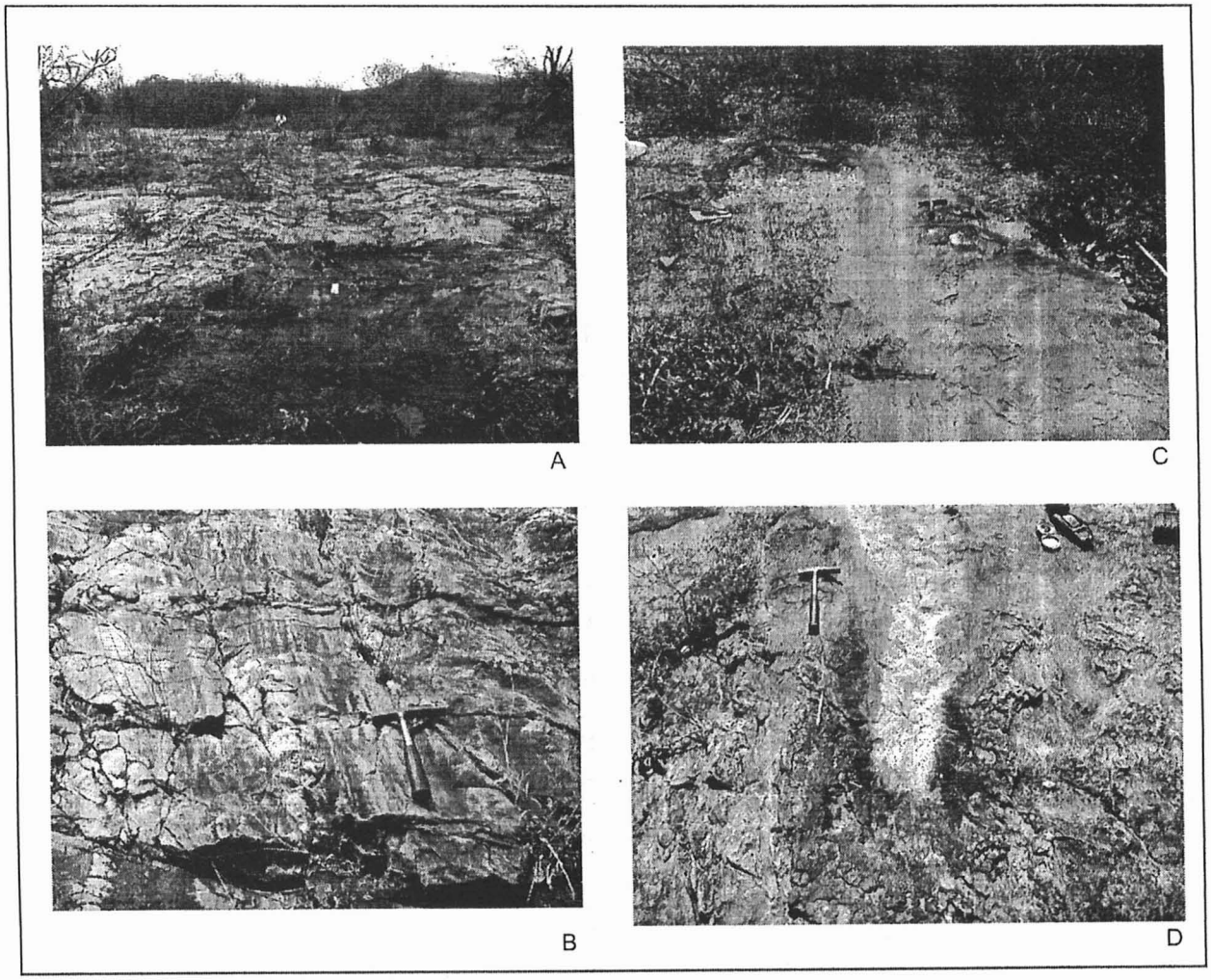

Fig. 2: Locality 1 (Curituba, SE): A: iceberg furrow on sandstone of the Curitu Formation superposed on parallel glacial striare. Note furrows and atriae on bottom; B: parallel furrows and striae on bedding plane of sandstone. Locality 2 (Lagoa Seca, BA): C ans D: iceberg furrow on sandstone of the Curituba Formation. Note berms and pile of sandstone on lower end of furrow (D).

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