

The Aptian-Albian South Atlantic: a Tethyan Gulf

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The water mass of the northern part of the South Atlantic, from the Walvis-São Paulo Ridge northward, formed a long and narrow arm of the Tethys Sea during Aptian-Albian time. This water mass, here termed “the Tethyan South Atlantic”, constituted the most restricted portion of the Tethys at that time. Evidence for this is based on the plankton content and microfacies of the late Aptian-Albian open sea carbonates of Brazil's coastal basins. These rocks are very similar to the Aptian-Coniacian open sea carbonates from the Gulf of Mexico, Cuba, Europe, North Africa and Asia. They are formed by a large number of identical zoo- and phytoplanktonic organisms such as favusellids, hedbergellids, globigerinelloidids, pelagic crinoids, pithonellids, calpionellids (colomiellids), and nannoconids. Thus, the same warm water mass was connecting these distant basins in the late Aptian-late Albian.

Shallow areas of the late Aptian-Albian South Atlantic were occupied by cyanobacteria, which produced oncoidal packstones and grainstones commonly associated with oolitic carbonate deposits. High temperatures and hypersalinity in the water mass excluded coral and rudistids reefs as well as large foraminifera.

As indicated by the characteristic biota and microfaciological pattern, the southern limit of this Tethyan gulf is coincident with the São Paulo-Walvis Ridge, a low topographic barrier at that time. No Tethyan Aptian-Albian pelagic biota has been found in the Pelotas Basin, south of the São Paulo Plateau. Nor has the complete Tethyan biota ever been reported in coeval sediments in Argentine coastal basins or in DSDP/ODP sites. Thus Walvis-São Paulo Ridge, episodically exposit or not, was a barrier to Austral water masses during the Aptian and most of the Albian.

Evaporitic in its earlier stage, the gulf largely lost its Tethyan character at the end of the Albian. At that time, a global rise in sea-level induced the South Atlantic to initiate a new phase.