
Foraminiferal Indicators of Modern and Last Glacial Maximum Water Masses in the Southwestern Gulf Of Mexico

María L. Machain Castillo¹, Raúl Gío Argáez¹, Barbara L. Cuesta Castillo¹,
Xavier A. Alcalá Herrera¹, and Barun K. Sen Gupta²

¹Universidad Nacional Autónoma de México

²Louisiana State University, Baton Rouge, Louisiana

ABSTRACT

Changes in the structure and chemistry of abyssal waters in southwestern Gulf of Mexico during the Last Glacial Maximum (LGM) were deciphered by numerical analysis of benthic foraminiferal data from three sediment cores (water depth 1988–2735 m). Modern species data from 12 core tops (water depth 960–3255 m) were also analyzed. Q-mode factor analysis separated the modern foraminiferal faunas of the Gulf Basin Water (GBW, deeper than ~2000 m), dominated by *Nuttallides decorata*, *Alabaminella turgida*, *Ioanella tumidula*, and *Globocassidulina subglobosa*, from those of the shallower Subantarctic Intermediate Water (SAIW) and Caribbean Midwater (CMW), characterized by the association of *Bolivina lowmani*, *Bulimina aculeata*, *Alabaminella turgida*, *Globocassidulina subglobosa*, *Epistominella exigua*, and *Epistominella vitrea*. Most of the species are found in the entire stratigraphic interval studied, but detailed examination shows differences between the LGM and modern assemblages, which can be traced to climate-related modifications in world ocean circulation, particularly those of North Atlantic Deep Water (NADW). During LGM, *Alabaminella turgida*, a species sensitive to oxygen depletion, along with a group of dissolution-prone species such as *Biloculinella irregularis* and *Cornuloculina inconstans*, thrived in the well-oxygenated glacial NADW (GNADW) in the deepest part of the study area. As the production of GNADW ceased in the Holocene, the deep areas in the Gulf were occupied by present GBW.