

Overview of the Depositional Styles by Chronozone of the Northern Gulf of Mexico

David A. Marin, United States Department of Interior, Minerals Management Service
Katherine M. Ross, United States Department of Interior, Minerals Management Service
Barbara J. Bascle, United States Department of Interior, Minerals Management Service
Lesley D. Nixon, United States Department of Interior, Minerals Management Service

The Minerals Management Service (MMS), U.S. Department of the Interior, has classified the producible sands from the approximately 1,100 fields across the northern Gulf of Mexico into groups of genetically related plays defined by production, chronostratigraphy, lithostratigraphy, depositional style, and structure. Products resulting from this work are the *Atlas of Northern Gulf of Mexico Gas and Oil Reservoirs* (Seni et al., 1997 and Hentz et al., 1997) and *Assessment of the Conventionally Recoverable Hydrocarbon Resources of the Gulf of Mexico and Atlantic Outer Continental Shelf* (Lore et al., to be published). The offshore Atlas project provided the basic framework for play definition used by MMS. The assessment project utilizes the play concept to further evaluate and provide an estimate for undiscovered resources in the Gulf of Mexico

The MMS defined chronozones in the northern Gulf of Mexico on the basis of benthic foraminifera stratigraphic zones. The 26 chronozones identified by

Reed et al. (1987) were further grouped into 15 Cenozoic and 3 Mesozoic chronozones for correlation purposes (figure 1). Type logs for each field in the Gulf of Mexico were constructed. Each type log is a composite of field wells showing all productive sands and their chronostratigraphic relationship. Not only were the productive sands organized by chronozone, but, based on SP log characteristics, paleoecozones, and sand content, they were also characterized by retrogradational, aggradational, progradational, and fan depositional styles. (figure 2). The chronozones and depositional styles identified on each type log were then correlated among the fields across the Gulf of Mexico. All productive sands correlated to the same chronozone and depositional style or structural setting define a unique play.

Assessment play maps for each chronozone build upon the proved reserves play limits illustrated in the offshore Atlas by including major unproved field reserves. In addition, for each play, known

hydrocarbon and sand limits based on additional wells with either hydrocarbon shows or sand development, respectively, are shown.

The assessment play maps provide an organizational framework for exploration analogs in the Gulf of Mexico. Understanding the relationships of the different depositional styles allows the user to characterize reservoirs in relation to sand content and geographic extent. This knowledge further allows the user to identify the most prolific reservoir types, their locations, and the areas most favorable for future discoveries.

Hentz, T.F., S.J. Seni, and E. G. Wermund, Jr. (eds.). 1997. Atlas of northern Gulf of Mexico gas and oil reservoirs: volume 2. Pliocene and Pleistocene reservoirs. Texas Bureau of Economic Geology, Gas Research Institute, Department of Energy, and Minerals Management Service, 78 p. plus plates and CD-Rom

Reed, C.J., C.L. Leyendecker, A.S. Khan, C.J. Kinler, P.F. Harrison, and G.P. Pickens. 1987. Correlation of Cenozoic sediments of Gulf of Mexico outer continental shelf, part 1: Galveston area offshore Texas, through Vermillion area, offshore Louisiana. Minerals Management Service, OCS Report MMS 87-0026, 35p. plus appendices.

Seni, S.J., T.F. Hentz, W.R. Kaiser, and E. G. Wermund, Jr. (eds.). 1997. Atlas of northern Gulf of Mexico gas and oil reservoirs: volume 1. Miocene and older

reservoirs. Texas Bureau of Economic Geology, Gas Research Institute, Department of Energy, and Minerals Management Service, 199p. plus plates and CD-Rom.

Era or Erathem	Period or System	Epoch or Series	Chronozones (Used in Reporting Resources)	Informal Geologic Times M.Y.A.*	Biozones		
Cenozoic	Quaternary	Holocene		0.01			
		Pleistocene	UPL		Sangamon Fauna Trimosina "A" Hyalinea "B" Angulogemma "B"		
			MPL		Lenticulina 1 Valvulinera "H"		
			LPL				
	Tertiary	Pliocene	UP		2.8	Buliminella 1 Textularia "X"	
			LP				
		Neogene	Miocene	UM 3		5.5	Robulus "E" / Bigenerina "A" Cristellaria "K"
				UM 1			Discorbis 12 Textularia "L"
				MM 9		10.5	Bigenerina 2 Textularia "W"
			Oligocene	MM 7			Bigenerina humblei Cristellaria "I" Cibicides opima
				MM 4			Amphistegina "B" Gyroldina "K"
				LM 4		18.5	Discorbis "B" Marginulina "A"
		Paleogene	Eocene	LM 2			Siphonia davisi Lenticulina hansenii Cristellaria "R"
				LM 1			
				O		24.8	Discorbis zone
Mesozoic	Cretaceous	Eocene	E	38			
		Paleocene	L	55			
		K		63			
Jurassic	U		138				
	TR		205				
				-240			

(Modified from various published and unpublished sources)

* Million Years Anum

Figure 1. Gulf of Mexico MMS geologic time scale.

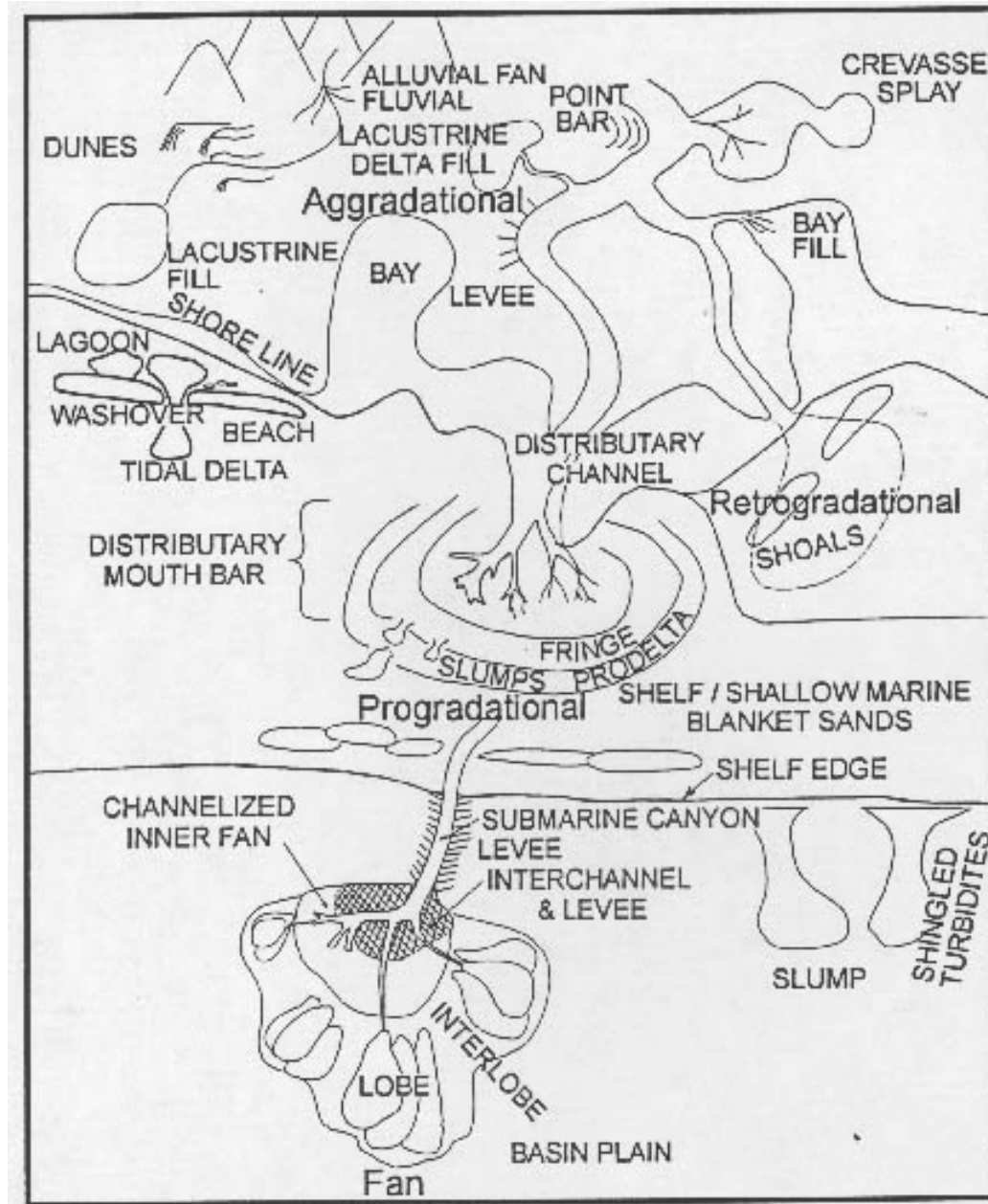


Figure 2. Model for deltaic deposition.