MMS Technical Announcement

U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

Technical Announcement

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Modeling and Data Analyses of Circulation Processes in the Gulf of Mexico
Final Report

OCS Study MMS 2003-074

The Minerals Management Service (MMS), Gulf of Mexico OCS Region, announces the availability of a new study report, *Modeling and Data Analyses of Circulation Processes in the Gulf of Mexico, Final Report*.

The report contains descriptions and explanations of specified circulation processes in the Gulf of Mexico obtained through coordinated modeling and data analysis. The study area for this project nominally included the entire Gulf of Mexico from the Yucatan Channel to the Florida Straits. The main focus was on two topics: topographic Rossby waves (TRW's) and slope eddies with particular emphasis on their occurrence in deepwater regions over the northern continental slope and rise in the Gulf of Mexico. Process evaluation and comparison was primarily occurring in deepwater portions of the northern Gulf of Mexico (water depth >1,000 m). Based on the results of a high-resolution model (the Princeton Ocean Model), the analysis concentrated more precisely on regions in the Gulf where TRW's are likely to occur, their possible generation site(s) and mechanism(s), and propagation paths. It was found that TRW's in the 20- to 100-day periods are excited by small-scale peripheral eddies or meanders around the Loop Current or propagating Loop Current eddies. The TRW's propagated westward and the energy was predominantly confined seaward of the 3,000-m isobath in the Central and Western Gulf. It was also concluded that the deep Gulf circulation was cyclonic and that the deep (horizontal) shear, in part, accounted (together with sloping topography) for the seaward confinement of the TRW rays. This study evaluated whether this model can generate the observed spatial and temporal evolution of the slope eddy field over the north-central Gulf of Mexico. Model results agreed with the observed increase of the kinetic energy of the geostrophic flow between initialization and verification intervals. Stability analysis indicated that the growth was caused by mixed barotropic and baroclinic instabilities.

This report is available only in compact disc format. The discs are available from the Minerals Management Service, Gulf of Mexico OCS Region, at a charge of $15.00 by referencing OCS Study MMS 2003-074. The report may be ordered through the Minerals Management Service's on-line ordering system at: **http://www.gomr.mms.gov/WebStore/front.asp**. You will be able to obtain this report also from the National Technical Information Service in the near future. Here are the addresses. You may also inspect copies at selected Federal Depository libraries.

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The Minerals Management Service is the federal agency in the U.S. Department of the Interior that manages the nation's oil, natural gas, and other mineral resources on the Outer Continental Shelf in Federal offshore waters. The agency also collects, accounts for, and disburses mineral revenues from Federal and American Indian lands. MMS disbursed more than $8 billion in FY 2003 and more than $135 billion since the agency was created in 1982. Nearly $1 billion from those revenues go into the Land and Water Conservation Fund annually for the acquisition and development of state and Federal park and recreation lands.