MMS Technical Announcement

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Minerals Management Service
Gulf of Mexico OCS Region

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Subsurface, High-Speed Current Jets in the Deepwater Region of the Gulf of Mexico: Final Report

OCS Study MMS 2004-022

The Minerals Management Service (MMS), Gulf of Mexico OCS Region, announces the availability of a new study report, *Subsurface, High-Speed Current Jets in the Deepwater Region of the Gulf of Mexico: Final Report.*

The report contains the analysis and characterization of known occurrences of high-speed, subsurface intensified currents, known as jets, as well as exploration of possible mechanisms responsible for their generation. A total of 13 candidate cases of jets were identified in an extensive observational database. Jets typically have temporal durations of a few hours to one day, subsurface maxima that can exceed 200 cm/s, peak speeds that occur between 150 and 350 m below the surface, and little to no surface expression. Jet-like phenomena are observed in the outputs of several general circulation numerical models but typically have longer temporal scales (1-3 days) and occur higher in the water column (not deeper than 200 m). Likely causal mechanisms include motions derived from the Loop Current and associated eddies, motions caused by eddy-eddy and/or slope-shelf/eddy interaction, internal/inertial wave motions, and instabilities along eddy frontal boundaries. Instrumentation limitations may also be responsible for certain biases in the data record. Targeted field studies using long-term moored instrumentation and ship surveys are recommended to characterize causal mechanisms fully.

Currents at all depths are important factors for the transport of pollutants and other substances, including oil. Therefore, offshore operators design drilling and production systems to account for forces exerted by these currents. Because several deepwater petroleum operators have reported cases of unusually high-speed, subsurface-intensified currents that have disrupted, suspended, or delayed platform operations, the frequency, persistence, and speed characteristics of jets are important design criteria to reduce down time and to compensate for potential hazards like riser and tendon fatigue because of vortex induced vibration (VIV). Further, knowledge of the occurrence of subsurface current jets can be important considerations for oil-spill trajectory analysis and modeling, including spills from the deep seafloor.

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 2004-022. 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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1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394
Telephone requests may be placed at
(504) 736-2519 or 1-800-200-GULF
or FAX: (504) 736-2620

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National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
(703) 487-4650 or FAX: (703) 321-8547
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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.

*** *MMS:* **Securing Ocean Energy and Economic Value for America** ***

Return to Technical Announcements