

Technical Announcement

U. S. Department of the Interior
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region

Date: January 2013

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Ultra-Deepwater Circulation Processes in the Gulf of Mexico

[OCS Study BOEM 2012-004](#)

The Bureau of Ocean Energy Management (BOEM), Gulf of Mexico OCS Region, announces the availability of a new study report, *Ultra-Deepwater Circulation Processes in the Gulf of Mexico*.

Deep circulation (approximately 1,000 m [3,281 ft] below the free surface) in the Gulf of Mexico is poorly known and its dynamics are not well-understood. Observations at the present time give an incomplete, sometimes misleading picture of the circulation and, therefore, often lead to misinterpretations of the related dynamics. Models are simpler but also often give misleading conclusions if not carefully analyzed. Moreover, models are imperfect and have errors due to their numerics (e.g., truncation errors), forcing, and incomplete physics. This study attempts first to identify these imperfections in the models and then conducts a series of carefully controlled model experiments that do not crucially depend on the detailed (and hence imperfect) model physics. We first check our circulation model for the Caribbean Sea and the Gulf of Mexico, which is based on the Princeton Ocean Model, against deep observations in the central Gulf of Mexico. We then conduct a series of carefully designed experiments and theoretical analyses to understand both the deep eddy-kinetic-energy and the mean circulation. We then relate these processes to upper-layer forcing by the Loop Current and rings, and also to the ring-separation process itself. The pursuit of these ideas was based on the following objectives: (1) to compare model simulation against deep observations in the Gulf of Mexico; (2) then to use the model to describe and explain the deep mean circulation; (3) to identify and explain regions of deep, high-eddy kinetic energy; and (4) to describe and explain the coupling between the Loop Current and rings with the deep flows.

This report is available on CD from the Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, for \$15.00, and free of charge as a pdf file downloaded from the BOEM Web site. Copies can also be viewed at selected Federal Depository Libraries. The addresses are listed below.

To order a CD, use the Gulf of Mexico OCS Region contact information below and reference OCS Study BOEM 2012-0xx. To download a pdf copy, use the [Environmental Studies Program](#)

[Information System](#) (ESPIS) and search on the study report number. In the near future, you will also be able to get this report also from the National Technical Information Service.

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