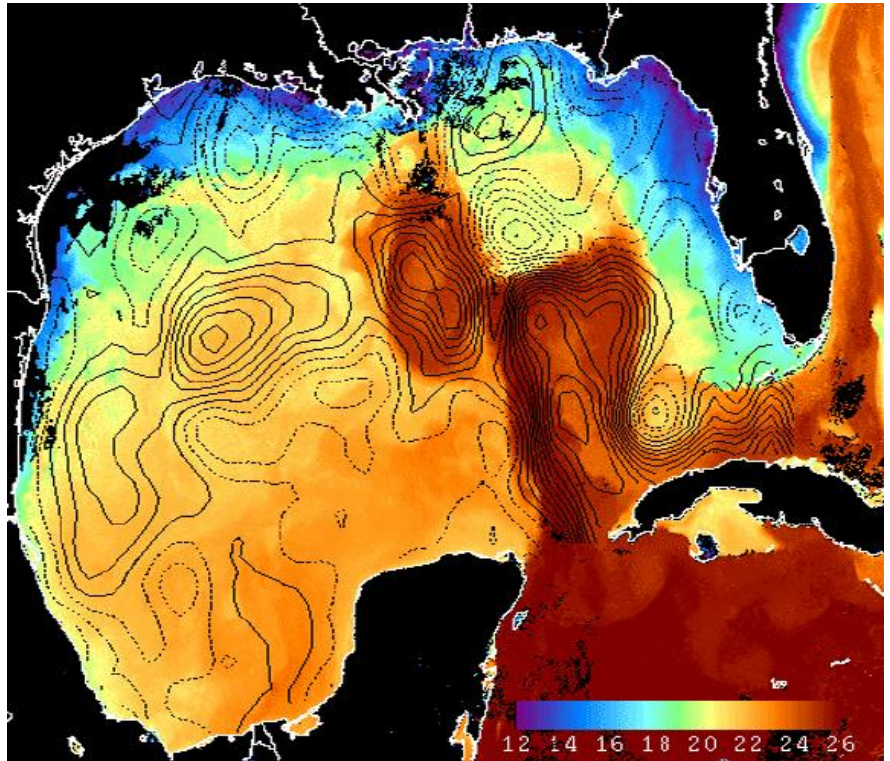


Ocean Models

Satellite data and measurements from coastal buoys, drifting buoys, and oil platforms, can be assimilated into a model.



Ocean models are used to simulate and predict the future behavior of the ocean.

Physical ocean models, or circulation models, use powerful computers to solve mathematical equations. These equations require information regarding the waters, such as temperature and salinity, and information regarding the domain, such as water depth and shorelines. In order to achieve useful predictions, three-dimensional models require a great deal of accurate data as well as computing resources. Satellite data and measurements from coastal buoys, drifting buoys, and oil platforms can be assimilated into a model that covers some past time period to produce a “nowcast”, which is a depiction of the current state of the ocean. The nowcast then will be used to begin the forecasts.

A number of these ocean circulation models are employed in the Gulf of Mexico at a variety of space and time scales and are used for a variety of applications. For example, a regional model configured for the entire Gulf of Mexico, and possibly surrounding seas, is typically used for studying the Loop Current and eddies within the Gulf. Forecasting these circulation features is particularly important for petroleum industry operations.

More detailed (finer grid resolution) models are used to study the circulation in coastal areas of the Gulf of Mexico. These models derive their lateral boundary conditions from larger scale models,

such as those configured for the entire Gulf of Mexico, and are considered to be “nested” within the larger models. Data used for assimilation into these models come from coastal ocean observing networks (buoys, high-frequency radar, and satellite data). These models are used for many applications such as marine ecosystem studies, forecasting for harmful algal blooms, search and rescue operations, marine transportation, and recreational and commercial fishing. These models also could supply lateral boundary conditions to very detailed models of particular bays and estuaries. Specialized applications of these models also may be used for forecasting storm surge or engineering purposes.

Sample web sites for more information

Ocean/Atmosphere Circulation Modeling Projects:

http://stommel.tamu.edu/~baum/ocean_models.html

<http://adcirc.org>

<http://polar.ncep.noaa.gov/ofs/>

<http://seawater.tamu.edu/tglo/>

Hypoxia Model:

http://www.noaanews.noaa.gov/stories2009/20090618_deadzone.html

Surf and Wave Models:

<http://www.stormsurf.com/page2/links/gulfsrprt.shtml>

<http://polar.ncep.noaa.gov/waves/index2.shtml>

Flooding and Sea Level Rise:

<http://www.warrenpinnacle.com/prof/SLAMM/index.html>

<http://www.nhc.noaa.gov/HAW2/english/surge/slosh.shtml>