

ROFFER'S OCEAN FISHING FORECASTING SERVICE, INC.

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**ROFFS™ OCEANOGRAPHIC ANALYSIS FOR THE DEEPWATER HORIZON OIL SPILL AREA
UPDATED TUESDAY 15 JUNE 2010 (17:00 HRS) PUBLIC VERSION**

See enclosed PDF analysis as the graphic is enclosed. While we have not been publishing this oil analysis, we have been conducting the analyses on a daily basis. We have been involved in many projects One was a joint Univ. of Miami Cooperative Institution for Marine and Atmospheric Sciences (CIMAS) – NOAA research project (see <http://www.rsmas.miami.edu/pressreleases/20100612-noaa.html>) by providing our analyses to the Research Vessel Walton Smith. Reports from this research cruise confirmed the presence of surface and subsurface oil in several areas that we had been reporting from our satellite observations. In addition, the ocean current drifters also verified some of the currents that we have been showing as well. See <http://www.aoml.noaa.gov/phod/dhos/drifters.php> for more details. We have many years experience of using ocean current drifters in addition to ship reports (other research vessels, fishing vessels and ocean tugboats) along with our satellite analyses which have clearly demonstrated that our satellite oceanographic techniques are valid.

Overall we continue to monitor the distribution and movements of the oil and oil-water-dispersant mixture from infrared, RGB, visible and synthetic aperture radar (SAR). Today we are showing (olive green color) the surface indications of the surface oil using yesterday's and today's synthetic aperture radar (SAR data) from many sources including the University of Miami CSTARS and European Space Agency. Note that the oil distribution has changed dramatically since the last analysis we provided. The oil has spread from the Alabama coastline to an area east of Destin, FL. We also observed a relatively narrow filament of oil off of Panama City. It remains to be seen when the oil will hit the Panama City beaches. The flow of the water, based on our sequential image analysis technique using infrared and ocean color imagery, is favorable for moving the oil eastward toward Port St. Joe, FL and then southward over the west Florida continental shelf in the weeks and months to come as suggested earlier in our analyses.

The counter-clockwise rotating eddy located southwest of Tampa, FL appears to be centered near 85°45'W & 27°00'N. This eddy is pulling some of the oil from the Deepwater Horizon spill site toward the eddy and the continued rotation of the eddy is effectively concentrating the oil that is in the form of globs of oil and tar balls of varying size, as well as, surface sheen. This was verified by the researchers on the RV Walton Smith. The areas marked with "oil" show the distribution of this surface and subsurface oil as some of the water appears to be the same water that originated from the spill site in April. This eddy appears to be pulling some of the water that has been circulating around the Loop Current eddy "Franklin". Depending on what happens over the next few weeks, we could see the development of a classic "hammerhead" dipole eddy system with two eddy features of approximately equal surface area rotating in opposite directions. It would be very unusual for this to happen with a Loop Current eddy. We do not recall this ever happening.

Some of the oil-water mixture continues to travel southward over the west Florida continental shelf from the area near 84°30'W & 27°30'N (west of Tampa) to 84°30'W & 25°00'N (where there was an elongated eddy a week ago). Some of this oil-water mixture has continued around the Loop Current eddy "Franklin," to at least as far west as 88°30'W & 24°30'N and perhaps farther north. The elongated egg-shaped counter-clockwise eddy that was centered near 85°15'W & 24°15'N (see June 08, 2010 analysis) has been stretched in a northeastward – southwestward direction and no longer exists. By last Friday (June 11th) it appeared that most of the oil-water mixture moved southwestward. The SAR data appears to show a surface signature of an unverified substance. But we are not certain that the signature is oil. This is the water that originally came from the Deepwater Spill site after the spill started and we have had independent confirmation of the presence of oil in it. We have been able to track the water this far with confidence using the step wise sequential image analysis technique. Single image analysis alone does not allow one to visualize the water motion and water mass tracking in the eastern Gulf of Mexico this time of year. Some of this dilute oil-water mixture moved eastward to the Dry Tortugas. Since Friday the water masses and perhaps the remaining

dilute oil-water mixture that was in the egg-shaped eddy moved southeastward toward the areas between the Dry Tortugas and approximately 30 miles south of Key West, FL along the northern boundary of the Loop Current and Florida Current (all part of the Gulf Stream Current system). It is important to note that this water mass may contain a dilute oil-water mixture and that most of the oil-water mixture traveled westward. (Editor's note: Don't shoot the messenger). With the present circulation related to the Loop Current eddy "Franklin" we anticipate that most of the dilute oil-water mixture that occurs over the west Florida continental shelf will move westward around the Loop Current eddy. However, we must continue to monitor the conditions and location of the eddy west of Tampa because if this eventually meets the Loop Current, then a substantial amount of surface and subsurface oil could be pulled by the Loop Current toward the Florida Keys. This process will take weeks to happen, if it happens at all. The Tampa eddy could degenerate and release the oil only to be circulated around the Loop Current eddy.

If you decide to use this analysis or the images contained within, please give credit to ROFFS™.

We thank you for your letters of support, including the ones demanding that we continue providing our analyses as a public service due to issues of trust. We thank the media for using our analyses. We thank those who have sent money (keep it coming) and those who have promised to send money to support our efforts since it takes a substantial amount of time and effort to conduct the analyses and produce the final document for public release. Remember that every fishing trip is important to use our ROFFS™ Fishing Oceanographic Analyses to help you find concentrations of fish, as well as, turtles, birds, and marine mammals.

EDITORS NOTE:

While we have been conducting these analyses as a civic duty and as an exercise in technology transfer, we would like to be contracted to do this to support cleanup, restoration, and litigation, as well as, ecosystem research efforts. If you plan to use these reports including the graphics you must give ROFFS™ full credit for this work. ROFFS™ would be appreciative if you would copy this analysis to others who may be interested in our efforts. At ROFFS™ we have been mapping the distribution and movements of the oil from the Deepwater Horizon spill from satellites since the explosion. Basically we are using a host of U.S. (NOAA and NASA) and European (ESA) satellites with a variety of spectral (infrared, near infra-red, visible, RGB and synthetic aperture radar) and spatial resolutions (300 meter to 1 KM) to see the oil. The MODIS satellite data are being received from the University of South Florida IMaRS and the synthetic radar (SAR) imagery is being received from the CSTARS at the University of Miami and also from the NASA's Jet Propulsion Laboratory. We manipulate and integrate these data at ROFFS™ and the analyses are ROFFS™ expert interpretations of the satellite imagery along with other data such as winds, sea surface temperature, currents, and in-situ reports. We routinely discuss our results with several academic and non-academic oceanographers.

We use a plethora of techniques to remove or reduce the effect of clouds and satellite angle, as well as, to manipulate the satellite data to understand the ocean circulation patterns associated with the oil's motion. We focus our efforts on the offshore segment of the oil. Sequential image analysis allows us to visualize the motion. The red "X" indicates the site of the Deepwater Horizon spill area.

We have been deriving these analyses on a daily basis and posting them to our website (<http://www.roffs.com/>). We have many years of experience conducting similar analyses. For example we mapped the plume coming from the New Orleans area after Hurricanes Katrina and Rita (<http://www.roffs.com/katrina.htm>).



