Okeanos Explorer 2011 Cruise

Left Key West, FL, August 22, 2011, arrived at Pascagoula, MS, September 10, 2011

Due to calibrations, travel time, and weather, only spent 11 days on planned surveying
Goals of Cruise

• Use EM 302 multibeam sonar, in conjunction with EK 60 single beam sonar, to locate and characterize water column gas plumes from:

  – Natural seafloor hydrocarbon seeps

  – Active and abandoned wellheads

  – Pipelines
Future Goals of Program

• Estimate flux of oil and gas into the GOM and atmosphere from natural and infrastructure sources – to accomplish this, over the next several years, NOAA plans to:

  – Use ROV video to visually estimate flux at various sites
  – Use direct measurement (with “bubble-ometer”?)
  – Correlate these estimates with backscatter of plumes
Why we came...

We can detect/map this acoustically
2010 Singlebeam Results – 32 plumes
(four vessels, ~3 months)
EM 302 has
~ 4000 m spread
2010 GoM Acoustic Observations

Natural Seep

18 kHz raw observation

18 kHz after standard split-beam processing

Capped Macondo Well (pre-kill)

20 July 2010c

27 July 2010

note: vessel speeds are different on 20 and 27 July

TCW UNH/CCOM
Red dots: 2011 EM302 Seep Observations (UNH/NOAA OER)
Black circles: Well tops (BOEMRE)
Yellow line: Pipelines (BOMRE)
Green circles: Well completions (BOEMRE)
Prime Survey Coverage Area

>2237 sq. mi. surveyed in 11 days

1326 mi. of pipeline surveyed – no suspected leaks

84 BOEMRE
Mapped seismic
Anomalies confirmed

60 wells surveyed – 2 minor CH4 leaks
4 nitrogen leaks

236 natural seeps from EM 302 multibeam sonar

39 natural seeps from EK 60 single beam sonar
EM 302 bathymetry spread – 5000 m, gas plume spread – 4000 m
Blue dots: EX1105 EM302 Gas Seep Observations
Red lines: Positive Seismic Anomalies (BOEMRE)
Green lines: Negative Seismic Anomalies (BOEMRE)
MC 426 Seismic Amplitude Map
MC 426 N-S Seismic Line
Mud Volcano MC 345 – EK 60 Plume
MC 345/388 Seismic Amplitude Map

Active mud volcanoes
MC 345/388 Seismic Traverse

MC 345 active mud volcanoes
MC 253 Seismic Amplitude Map
MC 253 Seismic Traverse
MC 36 Basemap
MC 36 Seismic Traverse
MC 118 Bathymetry (meters) with Amplitude and EM 302 Plumes
MC 118 Bathymetry (meters) with EM 302 Plumes
There is still a lot to look for out here.
Saving the taxpayer’s money... 
because our seafloor interpreters get paid in bananas