Preliminary results of MC 118 Hydrates Mound morphology evolution, by comparison multi-time AUV surveys.

By
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Presented at
Gulf of Mexico Hydrates Research Consortium
Semiannual meeting, Columbia SC November, 7-8 2009
Scientific Hypothesis

- Since 2002 seafloor morphology at MC118 has been investigated by several acoustic and video surveys
  - C&C AUV (2005)
  - Multiple Consortium SSD surveys 2007-present

The seafloor has been showing a high variability, both over time and space of sediments distribution and biological habitats. Therefore the seafloor morphology reflects these changes.

This variability is largely caused by venting activity and/or hydrates formation/dissociation.
We would like to evaluate the possibility to quantitatively monitor morphology variations repeating AUV acoustic and video surveys.
DATA AVAILABLE

- **2005 C&C AUV survey**
  - Multibeam bathymetry
  - Multibeam backscatter imagery

- **2009 NIUST Eagle Ray AUV Survey**
  - Multibeam bathymetry
  - Multibeam backscatter imagery
Data spec.

- C&C data:
  - Surveyed entire Lease Block
  - Lines spaced 200m
  - AUV flying 40-60m off seafloor
  - Bathymetry map 5m bin
NIUSt EAGLE RAY
Surveyed only the mound area

Two Dives
1) Lines spaced 70m, AUV flying 35 off seafloor
2) Lines spaced 5m, AUV flying 10m off the seafloor (WHOI mass spectrometer survey)

Bathymetry map from 5m to 2m bin size.
Data Processing, Calibration and homogenization

- Comparing different AUV surveys requires a robust evaluating of data congruity

AUVs surveys are affected by system position errors:
- INS starting points
- INS Kalman filter drift

Data need to be correct and calibrate using independent parameters and statistical mistie data analysis.
Mapping morpho-bathymetry features

- Craters
- Pockmarks
- Topographic reliefs and depressions
- Rims and linear structures
Seafloor morphology features map

2005

2009
2005-2009 comparison
Topographic profiles
Topographic profiles
# Pockmarks

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Preliminary observations

- Over the last 4 years seafloor morphology at MC 118, seems have not been affected by serious changes
- We do observe differences between the two surveys, especially in the NW area
- Changes in dimensions of the NW pockmarks appear to be the most significant seafloor difference and a good indicator of ongoing activity.
- Comparison of topographic profiles show morphological evolution in the active craters area, but the differences are within the limits of method errors.
Next studies

- Analyze 2009 Eagle Ray backscatter
- Compare the two patterns and evaluate possible changes
- Integrate the model with the previous video picture and with the schedule Mola Mola video survey.
Acknowledgments

- NIUST engineers
- R\V Pelican crew
- CARIS
- Funds provided by DOI-MMS, DOE-NTEL, NOAA-NIUST