IODP Full Proposal
“Dynamics of a Transient, Fault-Controlled, Thermogenic Hydrate System at MC-118 in the Gulf of Mexico”

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University of South Carolina
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IODP Drilling Proposal History

• Re-emerged from discussions at NETL Merit Review in Jan. 2009
• Preliminary Proposal submitted to IODP on 01 April 2009
• Reviewed by Science Steering and Evaluation Panel (SSEP)
• Recommended review by Environmental Protection and Safety Panel (EPSP) and Engineering Development Panel (EDP)
IODP Drilling Proposal History II

• Full Proposal submitted 01 October 2009
• Motivated in part by success of JIP during summer 2009
• Will be reviewed again by SSEP in mid-November
• Either sent out for external review, or returned with additional suggestions
Proposal Proponents

- James H. Knapp – University of South Carolina
- Laura L. Lapham – Florida State University
- Carol B. Lutken – University of Mississippi
- Camelia C. Knapp – University of South Carolina
- Leonardo Macelloni – University of Mississippi
- Paul D. Higley – Specialty Devices
- Tom McGee – University of Mississippi
- Charlotte Brunner – University of Southern Mississippi
- Jeffrey Chanton – Florida State University
- Ian MacDonald – Florida State University
- Thomas Naehr – Texas A&M University, Corpus Christi
- Mandy Joye – University of Georgia
- Chris Martens – University of North Carolina
Scientific Hypotheses - I

• Gas hydrates form in association with and as a result of active normal faults which are conduits for thermogenic hydrocarbons;
• Fluid flow and gas hydrate formation are segmented laterally along faults;
• Gas hydrate formation and dissociation vary temporarily in the vicinity of active faults, and can temporarily seal them as conduits for thermogenic fluids;
Scientific Hypotheses - II

- Craters and pock marks on the seafloor mark periodic dissociation and venting of hydrate along associated underlying fault systems;
- Discontinuous, shallow (~100 mbsf), high-amplitude, negative-polarity reflectors which are spatially correlated with faults mark free gas at the base of the hydrate stability field (BSR??);
Scientific Hypotheses - III

• Gas hydrates in the Gulf of Mexico are controlled by a highly heterogeneous stability field both laterally and vertically, leading to the general paucity of BSRs;

• Subsurface salt plays a major role in hydrate stability by influencing the temperature, salinity, and gas composition within the overlying volume of sediment.
Shallow Bright Spot (BSR?)
Shallow High-Amplitude Anomaly
Proposed Drill Sites
Proposed Drill Sites
Long-Term Observatory

Gas Hydrate Sea-Floor Observatory - Mississippi Canyon Block 118