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Meeting of JOIDES Sea-Level Working Group

Marathon Oil Company
Littleton, Colorado

March 2-3, 1991

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Ans'd.....

Attending:

P. D. Crevello (Chairman, USA), D. Aissaoui (France), M.-P. Aubry (France), R. Carter (Australia), N. Christie-Blick (USA), P. Davies (Australia), A. Droxler (USA), G. Eberli (Switzerland), R. Flood (USA), R. Halley (USA), T. Loutit (USA), C. Kendall (USA), K. Miller (USA), G. Mountain (USA), M. Sarnthein (Germany), J. Van Hinte (Netherlands), A. Watts (England), E. Winterer (USA)

Liaisons:

J. Watkins (USA), C. Fulthorpe (USA)

Regrets:

W. Sager (USA), Japanesse Representative

Welcome and Introductory Remarks

The meeting was called to order at 0800 hours on Saturday, March 2, 1991. The SL-WG meet for the first time since its formation in early 1991. All members were present at the meeting except W. Sager and a Japanesse representative. The meeting was held at the Research Center of Marathon Oil Company, in Littleton, Colorado. Prior to the meeting, Crevello circulated an agenda with objectives for the first meeting. The purpose of the first meeting was to discuss the major issues facing the question of sea level and its role on the sedimentary record, and to establish an agenda, objectives, and strategies for the SL-WG. The two-day meeting was scheduled over the weekend of March 2 and 3 to accommodate committee members busy schedules.

Background and Objectives of the Sea Level Working Group

The SL-WG is the outgrowth, in part, of a JOI/USSAC workshop meeting which convened in El Paso, Texas, October, 1988. The workshop brought together scientists researching various aspects of the eustatic record in sediments and sedimentary rocks, and the role of sea level on sedimentary sequences, sequence boundaries, and stratal patterns or basin-fill geometries. Results from the the El Paso meeting were summarized in a report which provided principal objectives, targeted time intervals, and a drilling strategy necessary to achieve a successful sea-level program. The El Paso meeting and report provided a framework from which JOIDES PCOM established the SL-WG. Invitations to committee members of the SL-WG were initiated in September and October, 1990, with selections completed by February, 1991.

The SL-WG is charged with formulating a global strategy for gauging the eustatic signal as it is recorded in sedimentary basins. As outlined in correspondence from R. Moberly (9/7/90), the committee is mandated to formulate a focused drilling program that utilizes the JOIDES Resolution, specifying the number of legs required to answer fundamental questions about the eustatic sea-level change, and outline areas that will bring greatest scientific returns. The global strategy should be multi-disciplinary, incorporating biologic, geochemical, ocean-history, sedimentary, tectonic, and quantitative modeling objectives that directly or indirectly record, or test, the sea-level signal. The multi-disciplinary expertise of the committee will ensure that comprehensive global strategy will be formulated to address the issues of sea level and the sedimentary record. With this mandate in hand, the SL-WG held its first meeting in Littleton, Colorado, and discussed the scientific and technical issues facing a successful sea level drilling program.

Presentations and Discussions

Two days of presentations and discussions provided a complete schedule for the group. Five state-of-knowledge topics were presented on Saturday, which served as the starting points for discussion. K. Miller presented current understanding of the sea-level record in deep-sea sediments. N. Christie-Blick discussed siliciclastic margins, sequence stratigraphic concepts and methodologies. G. Eberli presented carbonate margins and

depositional sequence models. T. Watts presented stratigraphic modeling and demonstrated the potential for tectonic control on depositional sequences. C. Kendall provided a comprehensive discussion on methodologies and concerns for measuring the magnitude of sea-level change. The presentations and discussions lasted between 1 to 1 1/2 hours for each topic. Additional presentations were offered by various members of the committee on Saturday afternoon and Sunday morning. In addition to the scientific presentations, discussions regarding technical and mechanical capabilities for achieving a successful sea-level leg were also addressed.

Sunday afternoon the committee established the mission of the SL-WG and compiled a preliminary outline of guidelines to be used to evaluate the scientific and technical merits of proposals submitted to address sea-level issues. One of the goals of the SL-WG will be to provide a position paper that details the scientific and technical requirements for sea-level drilling legs.

Points of Discussion and Objectives:

1) The mission of the SL-WG is to formulate a strategy for estimating the timing, rate of change, and magnitude of the eustatic signal and the response to the sedimentary record. The major scientific and technical guidelines were compiled in a preliminary outline for a position paper. A first draft will be completed by the next meeting, which has not yet been formerly requested. It appears that the group can not convene before November 15.

2) Testing the global sea level chart (i.e., is it global? is it synchronous?) and the unconformity bounded sequence stratigraphic model prior to embracing the sequence concepts are critical issues facing the SL-WG. Implicit in the sequence stratigraphic model is the premise that stratigraphy responds, in part, to sea level change, and that methodologies derived from seismic sequence stratigraphy are currently being routinely applied to delimit the sea-level record. Sea-level legs should focus on testing these issues.

3) The need for an extensive stratigraphic frameworks with high-frequency seismic data is essential prior to choosing drilling localities. The New Jersey transect was given as an example of a comprehensive pre-site study.

4) Problems concerning ship stability and technology in shallow water and/or the possibility of combining a supplemental drilling platform to compliment the JOIDES Resolution was a major concern. The success of Bob Ginsburg's (U. Miami) drilling project in the Bahamas was presented as an example of a supplemental platform used for drilling in shallow water. The use of a supplemental platform is also likely more cost effective in shallow water sites.

5) The advantage of correlating shelf stratigraphy to land data is equally important, though not a requisite, for examining the stratigraphic response in up-dip continental or shallow-marine sedimentary facies as it is in shelf and deep-sea sediments. Again, the New Jersey transect offers this potential.

6) Complete core recovery, or at least approaching better than 80%, is essential before any of the sea-level legs can be seriously expected to achieve scientific success. Concern regarding recovery of core is an extremely critical problem that needs to be addressed immediately. Poor recovery is common in lithified carbonate rocks, which essentially included all carbonate platform sites, and in equally important unconsolidated terrigenous sands. Drilling technology must be adapted/improved to accommodate these problems, and pre-drilling studies and proposals should anticipate these technological difficulties.

7) The obvious lack of mature sea-level proposals is a major concern of the SL-WG. Working group members will encourage proposals for the 1993 Atlantic legs, which, because of review processes and proposed site selection in December, 1991, should be an immediate goal. Currently, only two proposals have been submitted. Additional high-quality and mature proposals are necessary.

8) Identify additional sea-level sites/legs that will provide comprehensive coverage of depositional settings and time intervals (see Table). The sites must have a high potential for scientific achievement of the sea-level objectives.

9) Prioritize sites and formulate plan by next meeting with optimum number of legs required to achieve sea-level objectives.