

Haupt, B.J. and K. Statteger: The ocean-sediment system and stratigraphic modeling in the North Atlantic, IAMG'98, The Fourth Annual Conference of the International Association for Mathematical Geology, Ischia, Italy, October 4-9, 1998

S9 session

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MODELING CARBONATE SEDIMENTATION AND CARBONATE/SILICICLASTIC TRANSITIONS

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AN IMPROVED WAVE INDUCED LITTORAL SEDIMENT TRANSPORT MODEL

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THE OCEAN-SEDIMENT SYSTEM AND STRATIGRAPHIC MODELING IN THE NORTH ATLANTIC

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THE OCEAN–SEDIMENT SYSTEM AND STRATIGRAPHIC MODELING IN THE NORTH ATLANTIC

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The 3–D forward sedimentation model SEDLOB (SEDimentation in Large Ocean Basins) is used to simulate the climatically driven Quaternary sedimentation history of the North Atlantic. This model is driven by the thermohaline oceanic circulation and coupled to an ocean general circulation model.

Sedimentation processes including erosion, transport and deposition in large ocean basins depend strongly on sediment input from various sources and on ocean circulation patterns. Sedimentation and ocean thermohaline circulation are controlled to a large extent by the morphology of a basin and by climate, and are subject to long term tectonic and short term climatic changes. Process–oriented 3–D modeling of sedimentation in the North Atlantic should be performed on the basis of (a) an adequate geologic/oceanographic data base; (b) efficient algorithms and parameterization for the simulation of sedimentation processes; (c) accurate model initialization with respect to the external forcing of sedimentation and (d) reproducible model validation in comparison to the modern state of the investigated system.

In view of numerical experiments in stratigraphy, an efficient model is aimed of simulation of sediment distribution patterns on the sea floor, especially accumulation and erosion of sediments integrated over time intervals long enough to represent the stratigraphic architecture. Based on the stratigraphic record, this architecture is composed of succeeding sequences in a chronostratigraphic time frame.

We use SEDLOB to generate basin–wide glacial and interglacial sedimentation patterns of the North Atlantic. Sediment accumulation is integrated over time spans covering succeeding cold and warm periods as defined by the high–resolution Plio/Pleistocene sedimentary record. Synthetic stratigraphic sections are obtained from this climatically forced basin fill. Examples with maps and synthetic cross sections are presented for the North Atlantic using stratigraphic data from sediment cores covering the last 2.62 million years.

Different pathways of particles, sediment, and synthetic seismograms from cross sections will be shown in several video presentations.