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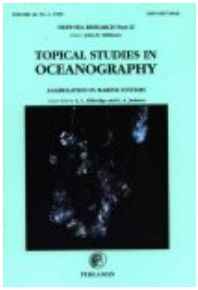
Aggregation in Marine Systems, Guest Edited by A.L. Alldredge and G.A. Jackson



The chemical and biological economies of the ocean revolve around particles and their physical and chemical properties. One major process which significantly alters the sizes, characteristics and abundances of suspended particles is aggregation. This special issue presents a variety of papers addressing aggregation processes and the characteristics and impacts of aggregates in natural and simulated marine systems. The majority of these papers derive from a multiple investigator study by the SIGMA group of a diatom bloom in a laboratory mesocosm to test coagulation theory in a complex marine system. This volume also contains papers describing aggregation characteristics in diatom-dominated natural systems.

The mesocosm bloom was dominated by chain-forming diatoms. The concentration of transparent exopolymeric particles (TEP) in the mesocosm was tightly correlated with the concentration of certain surface-active carbohydrates and closely tied to particle stickiness, which dropped during bloom development. Bacterial degradation of TEP and cell surface mucous presumably contributed to the decrease in stickiness during the bloom. Particle size spectra measurements were combined into particle size spectra spanning microns to millimeters. Coagulation theory could reproduce most of the changes in particle size spectra. Separate analyses of TEP's role in aggregation reach different conclusions. One concludes that TEP rather than algal aggregation is the dominant coagulation mechanism for diatom blooms. A second analysis concludes that TEP dynamics could not be considered separately from those of other particles. Field studies in Bedford Basin, Canada, describe physical Characteristics of natural aggregates and the role of colloidal matter in the transport of radionuclides to depth.

While this special issue covers a broad range of topics relevant to aggregates and aggregation processes in the sea and answers many previously unanswered questions, it also generates many new ones and leaves some unresolved.

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