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**COMPUTER MODELING OF THE PLEISTOCENE CARBONATES  
IN THE RYUKYU ISLAND ARC, JAPAN**

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**ABSTRACT**

A computer model, Facies-3D, has been developed to simulate the distribution of deltaic and carbonate sediments. Outlines and a case study of the Facies-3D carbonate model are presented in this session. In the carbonate model, several inputs, such as basement configuration, tectonic subsidence, eustatic sea-level change and boundary condition of water current are specified for executing the simulation. Types of sediments to be examined are also specified as a function of water depth and current velocity. Based on these inputs, surface topography and current velocity of sea water are calculated. Type of sediments to be deposited is determined by the calculated water depth and current velocity for each point of the area simulated. These procedures are sequentially conducted at each time step. Consequently, three dimensional distribution of sedimentary facies is reconstructed.

The Pleistocene carbonates from the Ryukyu Group distributed in Irabu Island in the southwestern tip of Japan was simulated. The cyclic sedimentation of coral reef-dominant and rhodolith-dominant limestones found in the group is considered to reflect the relative sea-level change induced by glacio-eustasy, ranging over tens of meters during the Quaternary time.

Taking these geological backgrounds into account, a series of simulation studies was conducted with various conditions of tectonic subsidence. The result successfully approximates the actual facies distribution if the tilting of the basement toward the west-southwest is assumed as the tectonic subsidence data. Significant control of tectonism, together with eustasy, on carbonate sedimentation was revealed and evaluated through the simulation study.

The simulation study indicates that the model would be a useful tool for understanding the interaction of the factors operating on sedimentation of carbonates and for reconstructing the distribution of carbonate sediments deposited under the analogous geological setting. The computer model has a considerable potential applicable to the Miocene carbonate reservoirs in Southeast Asia, because the geological setting for these carbonates are considered to be similar.

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