

SCG064-P09

Room:Convention Hall

Time:May 24 10:30-13:00

Governing parameters on transgression and regression of shorelines

Hajime Naruse^{1*}, Tetsuji Muto²

¹Chiba University, ²Nagasaki University

What controls the transgression and regression of shorelines? This question has been an issue of arguments for long time in geological research field. The transgression is landward migration, and the regression means seaward migration of shorelines. When shoreline migration occurs in short time period (years to decades), it causes serious problems in human activities. On the other hand, the shoreline migration in long time period (100s to millions years) dominates stratigraphic patterns of geologic records. It is known that geometrical features of the sedimentary rocks are strongly influenced by transgressions and regressions. Therefore, studies on governing parameters can be useful for predictions of subsurface geometry of sedimentary rocks and inverse analysis of paleoenvironments from geological records.

Here, this study investigated shoreline migration mechanisms during relative sea-level rise by using geometrical and linear diffusion models of river-delta systems, revealing two governing dimensionless numbers for shoreline migrations. The first is a dimensionless rate of sediment supply. This parameter is obtained by rate of sediment supply subdivided by product of size of terrestrial depositional system and rate of relative sea-level rise. Conventional sequence stratigraphy considered that the shoreline migration is determined by ratio between rates of sediment supply and relative sea-level rise (A/S ratio). However, the result of this study indicates that the size-scale of the depositional system is also significant for shoreline migrations in addition to two parameters described above. The second dimensionless number is a ratio between size scales of terrestrial and marine depositional systems. This parameter describes the geometry of the entire depositional system, which tends to be ignored by discussions about the transgression-regression problems. However, the terrestrial and marine systems are actually combined, and their ratio in size scale plays a critical role for shoreline migrations.

To understand governing dimensionless numbers is significant also for comparison between experiments and natural systems. As future studies, it seems necessary to examine the mechanisms of shoreline migration by using more detailed models and field surveys.

Keywords: Sequence Stratigraphy, Transgression, Regression, Delta, Shoreline Migration