G121-001 **Room: 301B** **Time: May 21 13:45-14:00**

Simulation of landform changes for the future 100,000 years

Michio Nogami[1]

[1] Geography, Nihon Univ.

We observe landform changes in the these domains: slopes of mountains or hills, river beds or fronts, and coasts or shallow sea floors. The changes are resulted by transportation of the surface materials. We geomorphologists categorize the sediment transportation based on how fast materials are moved. Soil creeps under the gravity component of hill slopes, abrading and grading of materials on the river or sea floor etc, these work very slowly in velocity but continuous in time, by which landforms are integrated mainly. So we introduced diffusion models for these types of landform changes. On the one hand, landslides on the slopes by heavy rains, river sediment transportations by floods, collapses of sea cliffs by big waves etc are typical rapid landform changes. These phenomena are caused by occasional but intense weathers. So we introduced the probabilistic models which describe the phenomena under specific landform conditions.

The recent ice core analyses tell us that for the last 700,000 years or 300,000 years at least, sealevel and climate have changed cyclically with firm regularity. We introduced an unconfirmed but confident assumption that for the future 100,000 years climate and sealevel shall be changed repeatedly just like the past 100,000 years. After this assumption we could fix the curve of future sealevel changes and adopt concrete values for the diffusion coefficients as function of time. We resolved the models under these independent conditions and in the absence of convulsion of nature, such as meteorite impacts and volcanic eruptions.

Initial conditions are given by ortho-hexagonal network DEMs(side length:30m) of an island. The island is virtual but exists as a small mountain in the Northeast of Tokyo. We submerged the mountain by 200m, because we need a detailed digital map beneath sealevel. For the future, that is eventually the period of low sealevel, we must have detailed submarine topographies of the same resolution for the simulation. Drainage networks on the ortho-hexagonal network DEM give us great advantages by which we could concisely extend one-dimensional transportation models to two-dimensional ones on drainage network structures.

We intended geomorphological knowledge described above for the models and

simulated landform changes of a virtual island during the future 100,000 years. We will show the changes as an animation.