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## **New concept “FREEZE” and sedimentological approach to “freeze”**

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Freezing of movement, as like chaos, occurs in various phenomena on the earth and in the world. We propose the concept of “Freeze” in order to analyze sudden stop of flowing sediments such as fluidization and antidune-forming flow etc. “Freeze is first defined as sudden stop of the motion of a moving system in infinitesimally short time without any change of the internal features of such as the structure and the fabric of the system [1]. Because of law of inertia, “freeze” in the strict sense cannot happen in real nature, and investigation of freezing process is important for understanding the freeze. Stoppage of movement without actual change of features in a very short time can actually be regarded as an instance of freezing and can be called “actual freeze”. Sedimentary phenomena and their records, namely some event deposits, provide good examples of “actual freeze”.

Two senses of “sedimentary freeze” are to be considered. I) Freeze of movement, that is, an abrupt stop of flowing water and particles without change of their relative position and internal structure of the particle -including water flow. This must be studied mathematically. The use of two formulas, 1) equation of fluid (or rheological) dynamics and 2) the order to control the dynamics, can describe a freezing phenomenon. II) Another type of freeze is the abrupt stoppage of the sedimentary process without change of some defined features such as structure of the flow which contains clastic particles because of some sudden change of sedimentary condition such as escape (movement!) of water. This freeze, namely “structural freeze” (structural freezing), may be examined by computer simulation technique and some special experiments.

Human civilization is going to continue to grow up like a complicated technological jungle-like world. Real lives in natural jungles sustain their dynamic ecosystem. However, we are afraid that technological jungle of mankind can fall into chaos and / or freeze. This is why we propose the urgent need for studying the new philosophical and mathematical concept of “freeze”.

### **REFERENCES**

[1] Shiki, T. and Suzuki, K. (1998) “Freeze” and “freeze deposits” – A preliminary report. *J. Sed. Soc. Japan*. No.47, 95-101, (in Japanese with English abstract).