

Consideration about generation of the Earth's magnetic field - Based on the model experiment of three fold water tank -

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1 Purpose The Earth's magnetic field can be viewed as a dipole in the first approximation. This means that an electric circular current along the equator must exist. So, we set the hypothesis and we try to inspect that one, by using the experiment named of "three-fold water tank" which is well known in the field of Meteorology as a hint.

2 Method (1) Used by rotating three fold water tank, which is consisted of three tanks, that is, first a center tank with hot water as inner core, next a intermediary tank with usual water as outer core, and the last is a most outer side tank with icy water as mantle and crust, we did experiments repeatedly. Then, we observed the movement of the second main tank's water-surface, which is covered with aluminum powder faintly by changing same experiments conditions. (2) Next, we really charged the water tank with minus electricity (corresponding to plus charged outer core, but here for experimental convenient, minus charge adopted) by using a high-voltage static-electricity generation device which is known as Vandegraph one, and executed above experiment (1) again. On this occasion, we measured the magnetic field's intensity and the polarity of the space surrounding three fold water tank by Tesra meter (accuracy 0.01mT). And also we measured the value at a fixed point with time passage in order to inspect our hypothesis.

3 Result <Experiment 1> Experiment for finding generation-mechanism of the Earth's magnetic field by taking advantage of model experiment which is well known as one of three fold water tanks in Meteorology. Then, astonishingly, on the surface of the water covered with aluminum-powder as a tracer of that flow-direction, a reversal flow like a snake dance against the turn table's rotation (clockwise direction), appeared from the high temperature's side, namely, hot center-tank. Our hypothesis has been verified to be right. The same magnetic field as present Earth's polarity has appeared really. By the way, outer core is thought to be made of iron (Fe) which is fluid and is charged with plus electricity. So, we can think that in the outer core, there are electric current in the clockwise direction as along equator. As a result, the magnetic field like a dipole could be understood to appear. Thus, we could succeed in and reconstruct the occurrence of reversal flow against the turn-table's rotation (the Earth's rotation of North hemisphere) by this our original way of experiment. <Experiment 2> Experiment for exploring the new knowledge and clue on the mechanism of occurrence the N-S pole's reversal of the Earth's magnetic field. We noticed important factors concerning with N-S pole reversal phenomenon. Namely, when the difference of the temperature T between inside and outside of outer core comes to diminishing, the time point of H=0 (magnetic force disappears) arrives and after that, the N-S pole reversal begins. As reversal flow like a snake dance, occurred from high temperature's side (center tank's side) get weakened and become small sized one, we can observe that the difference of temperature T between inside and outside of outer core also get becoming to diminish. From this fact, we can understand that the Earth's magnetic field is generated by a tug of war of two opposite flows, namely a flow for the direction of the Earth's direction and the reversal flow against it. And eventually, the magnetic field of the Earth is thought to disappear when these two flows come to a certain power balance point. If T becomes under some one value, namely the certain power balance point, the flow of the Earth's rotation-direction overcome eventually. This means that the Earth's magnetic field turns to to be a reversal one.

4 Summary N-S pole reversal of the Earth's magnetic field does not occur when a drastic or dramatic change of somewhat happen to begin instantly. But, unexpectedly, we noticed it occurs during the process of diminishing the value of temperature difference T.