

Tutorial: A general introduction to geodynamo

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This is a short tutorial on geodynamo for those who are non-specialists but interested in the origin of the Earth's magnetic field. It will cover fundamental structure and properties of the Earth's interior, some observational facts such as polarity reversals and key issues to understand the magnetohydrodynamics under the ground.

It is believed that the dynamo process operating in the Earth's fluid metallic core is the source of the geomagnetic field. The basic idea seems to be quite simple; fluid motion is driven by chemical or thermal buoyancy and electromagnetic induction ensures so that electric currents are sustained inside the fluid core. However, we are facing to some difficulties arising from extreme conditions of the core. The location of the core prevents us from knowing its present dynamical state. The size is too huge and the rotation rate is too high to reproduce its models by laboratory or numerical experiments. Moreover, the viscosity is so low that highly developed magnetohydrodynamic turbulence occurs.

Many attempts have been made to untangle complicated features of geodynamo from various points of view. We are pleased to hold this international joint session together with active researchers with various backgrounds and hope that it contributes to our deep understanding.