

Polarity reversals in a geodynamo model with a stably-stratified layer

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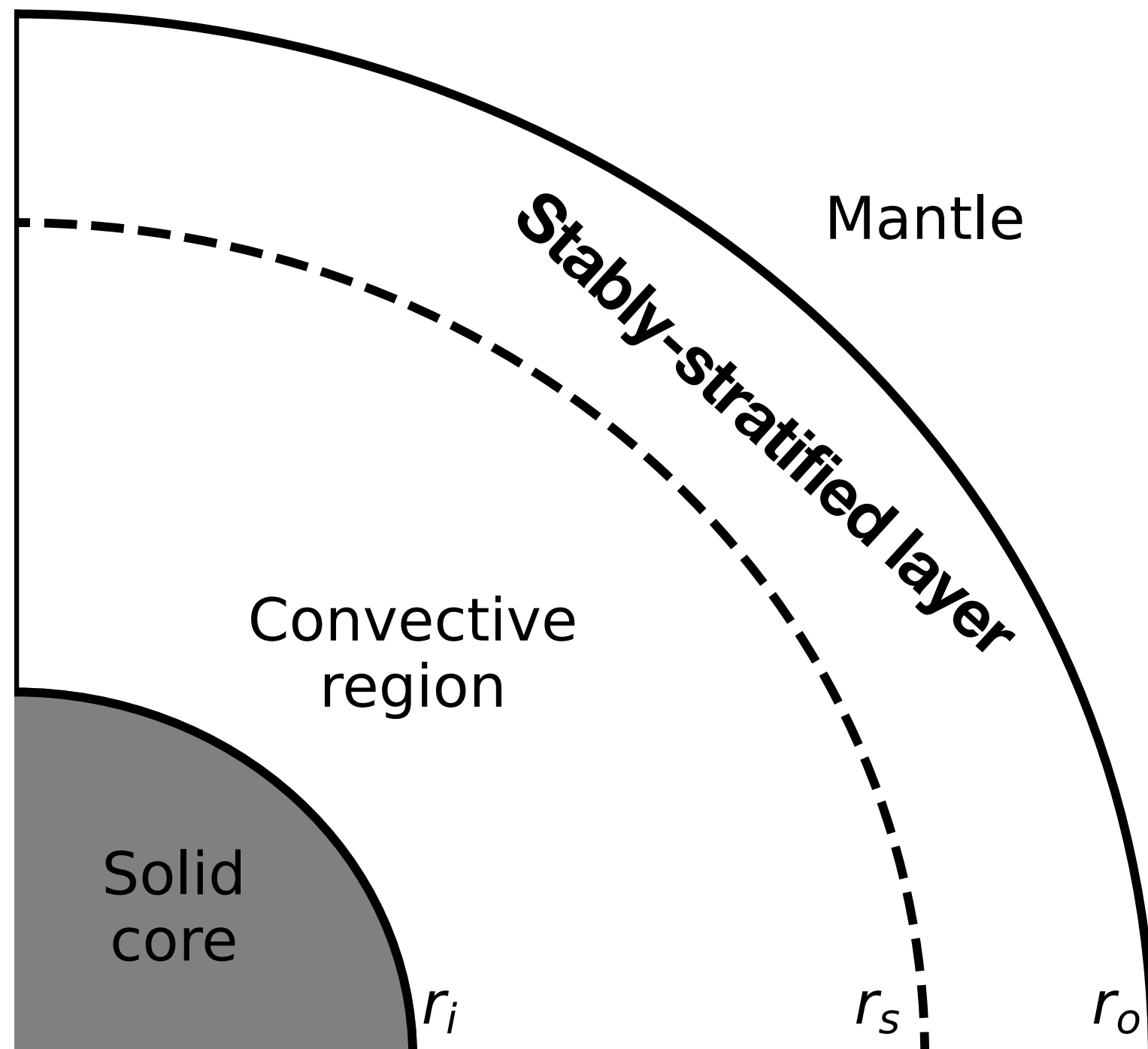
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Introduction of thin stably-stratified layer close to the outer core

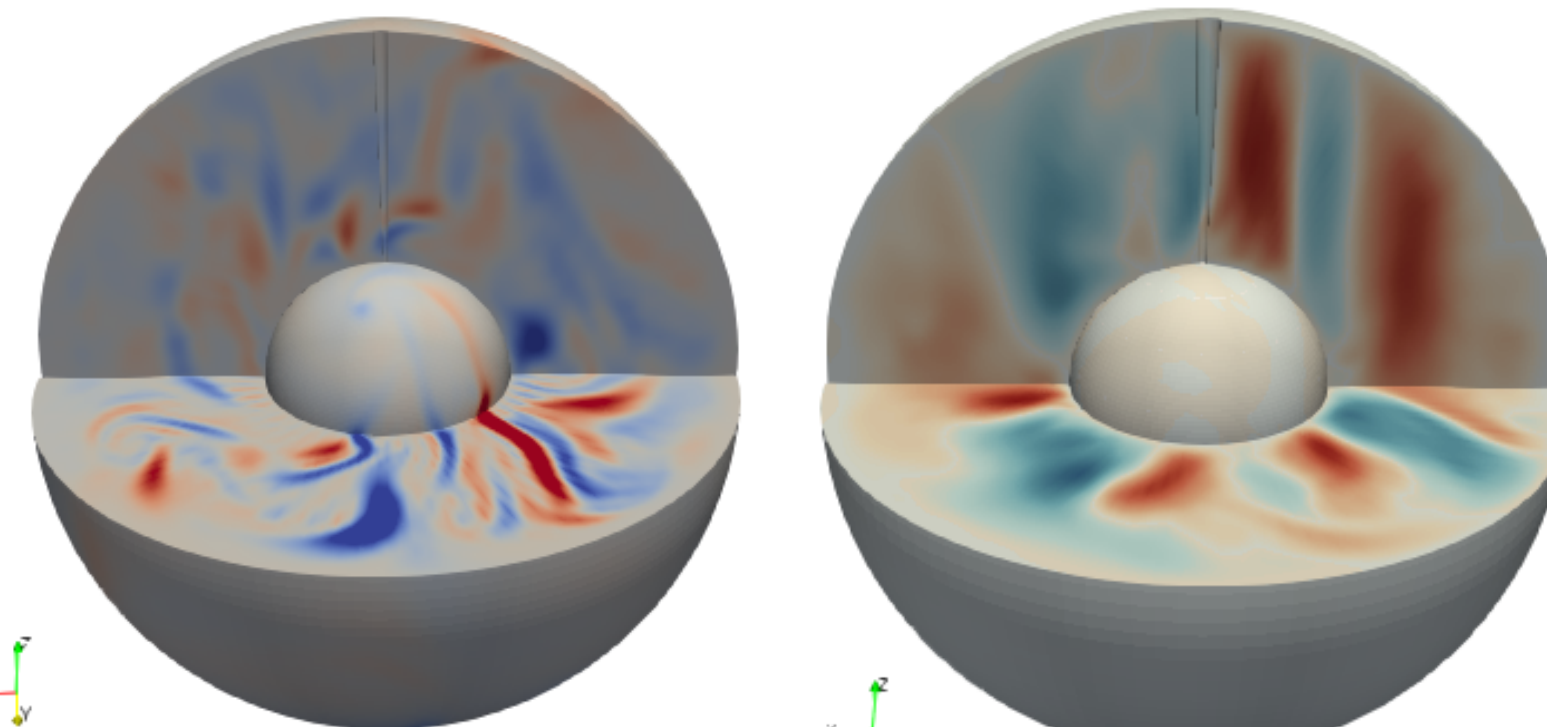
$$\frac{\partial \mathbf{u}}{\partial t} + \mathbf{u} \cdot \nabla \mathbf{u} = -\nabla p + \nu \Delta \mathbf{u} - 2\Omega \hat{z} \times \mathbf{u} + \alpha g T \hat{r} + \frac{1}{\rho \mu} (\nabla \times \mathbf{B}) \times \mathbf{B}$$

$$\frac{\partial \mathbf{B}}{\partial t} = \nabla \times (\mathbf{u} \times \mathbf{B}) + \eta \Delta \mathbf{B}$$

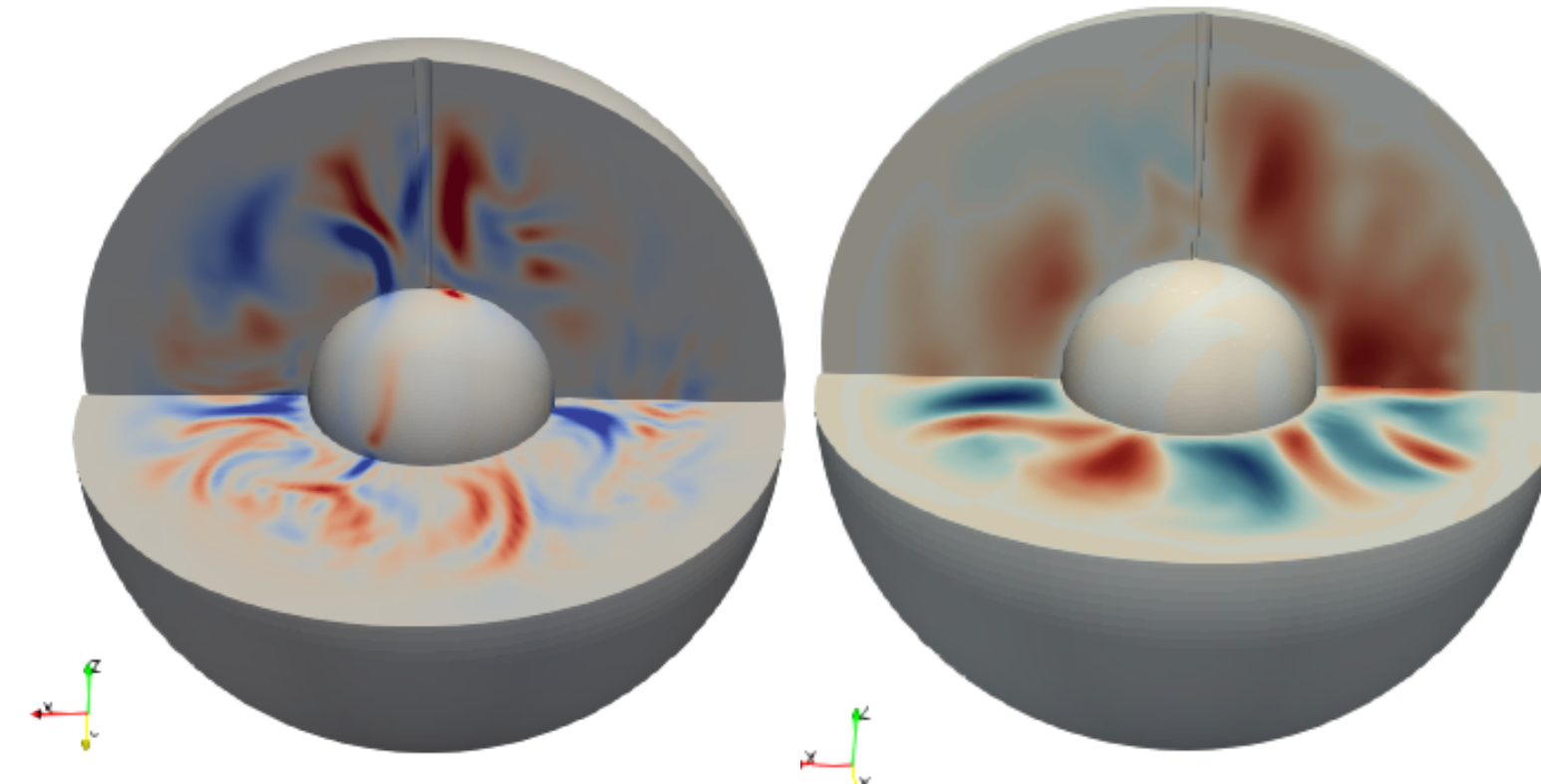
$$\frac{\partial \theta}{\partial t} + \mathbf{u} \cdot \nabla \theta = -u_r \frac{dT_s}{dr} + \kappa \Delta \theta$$



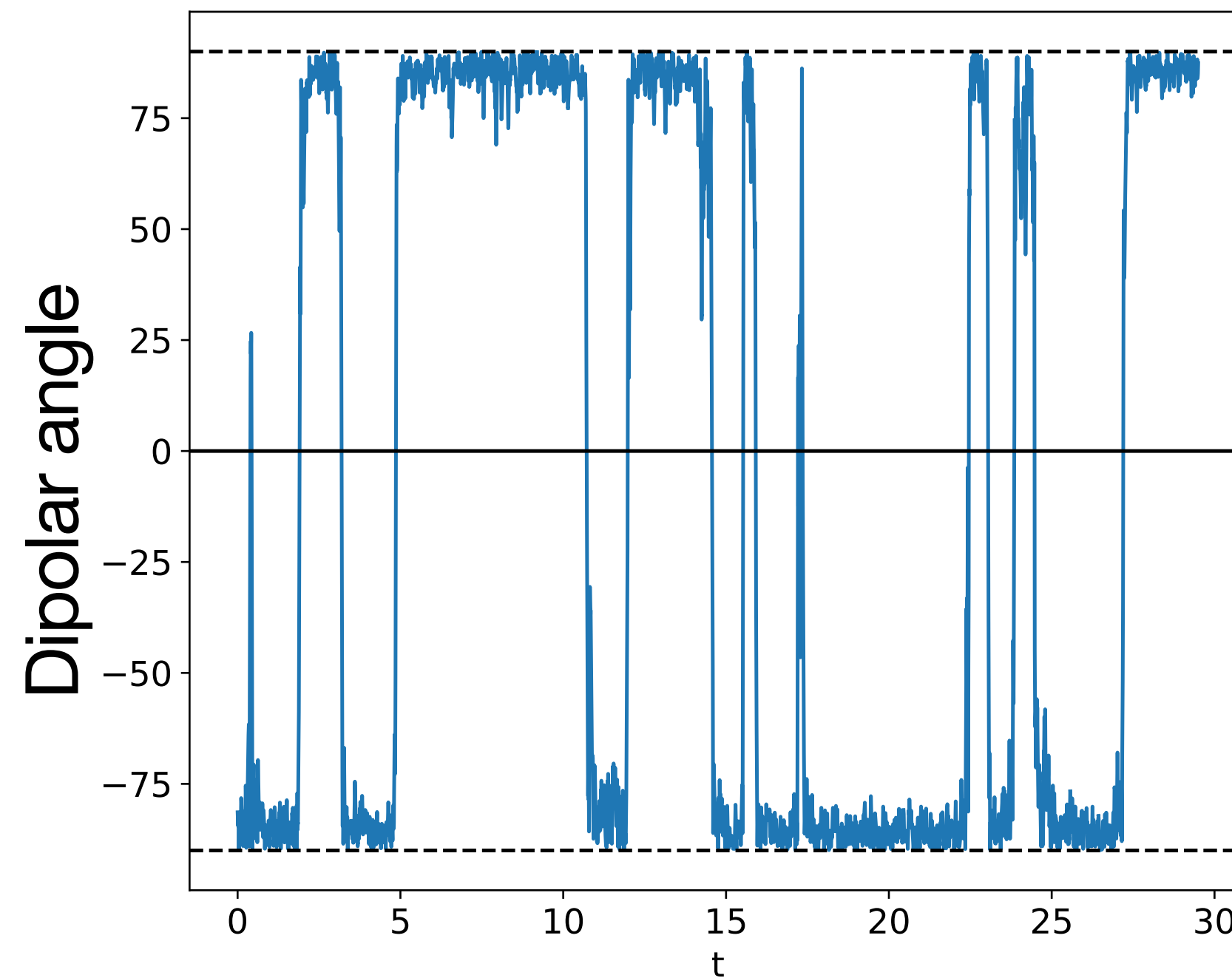
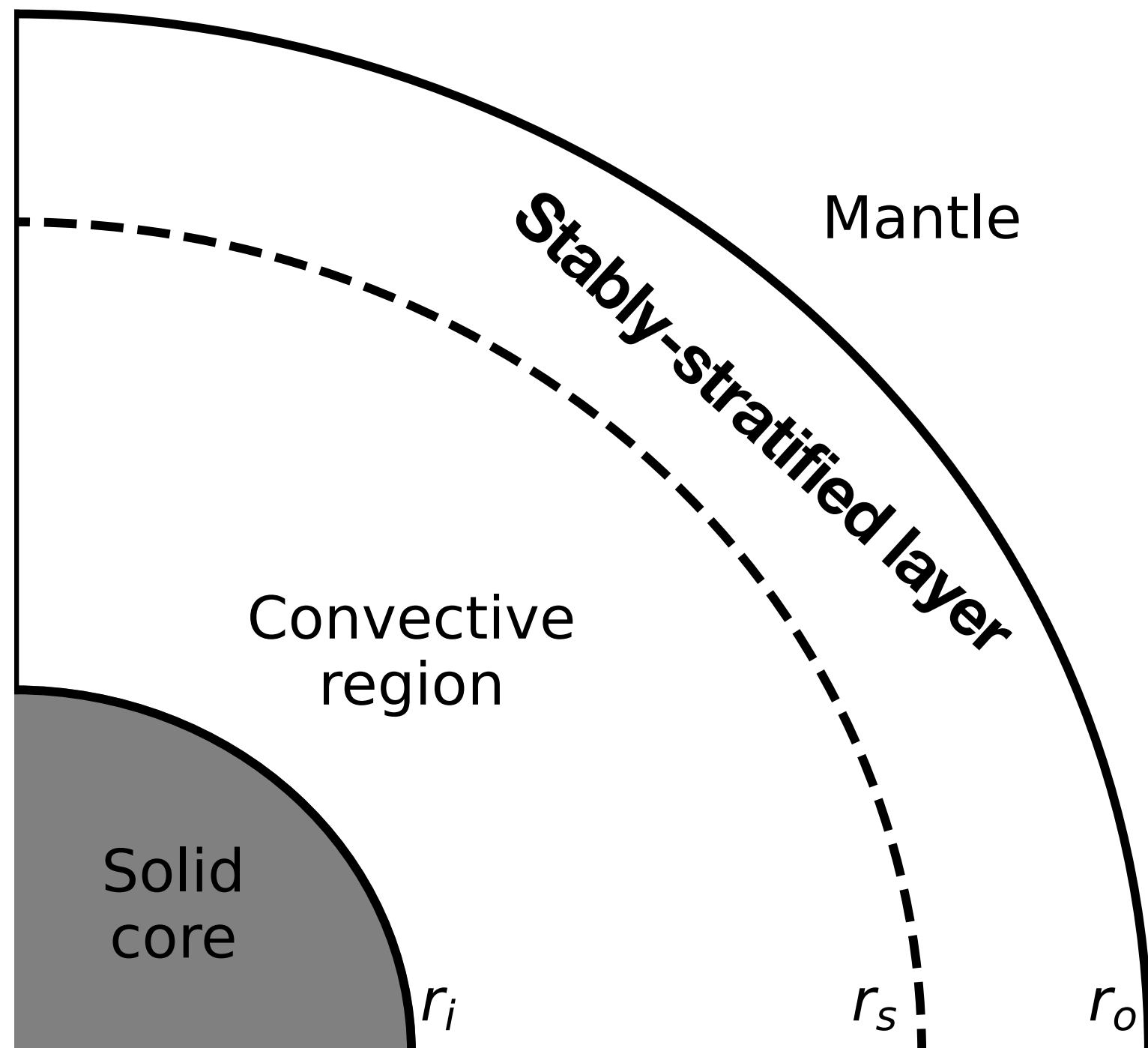
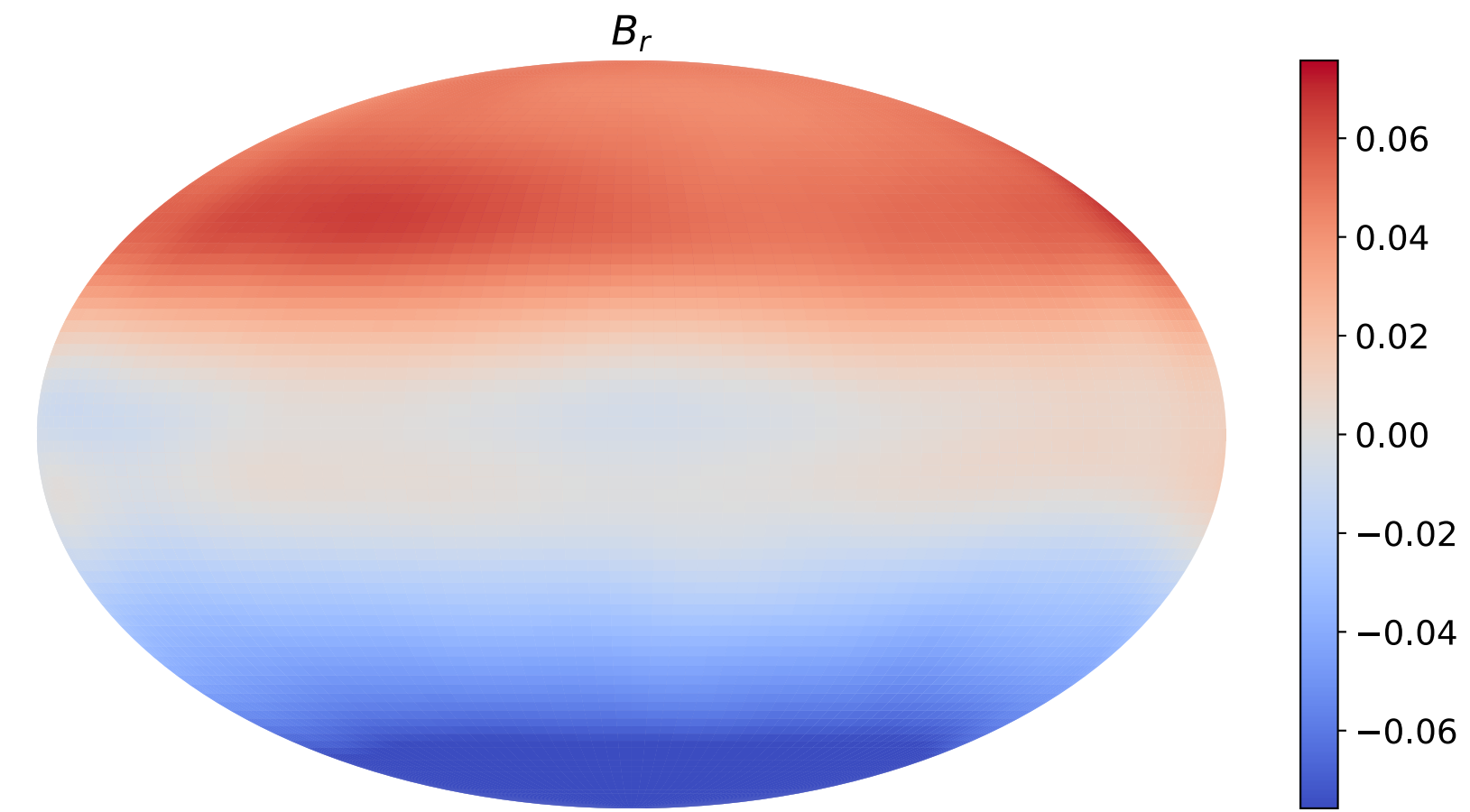
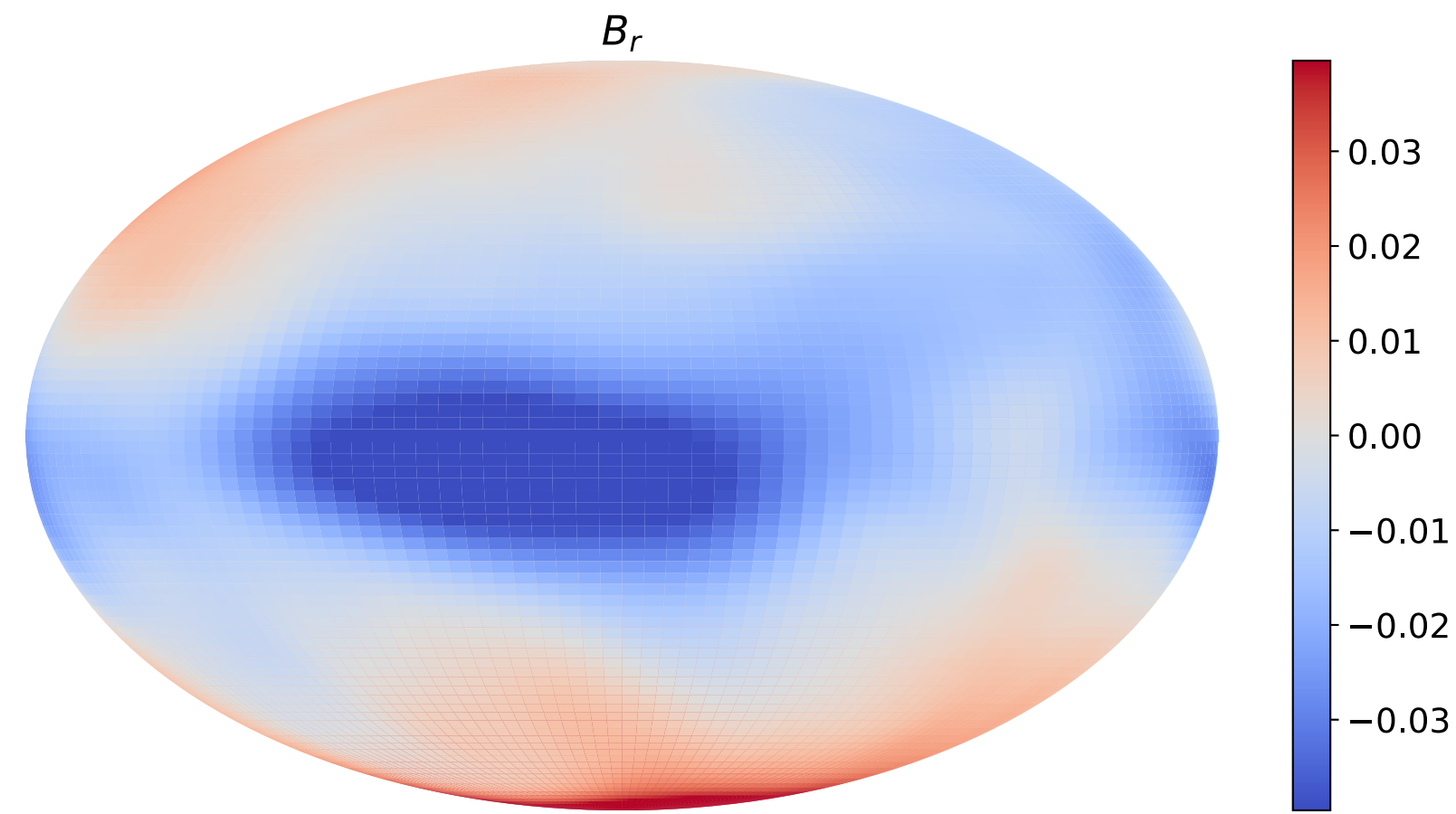
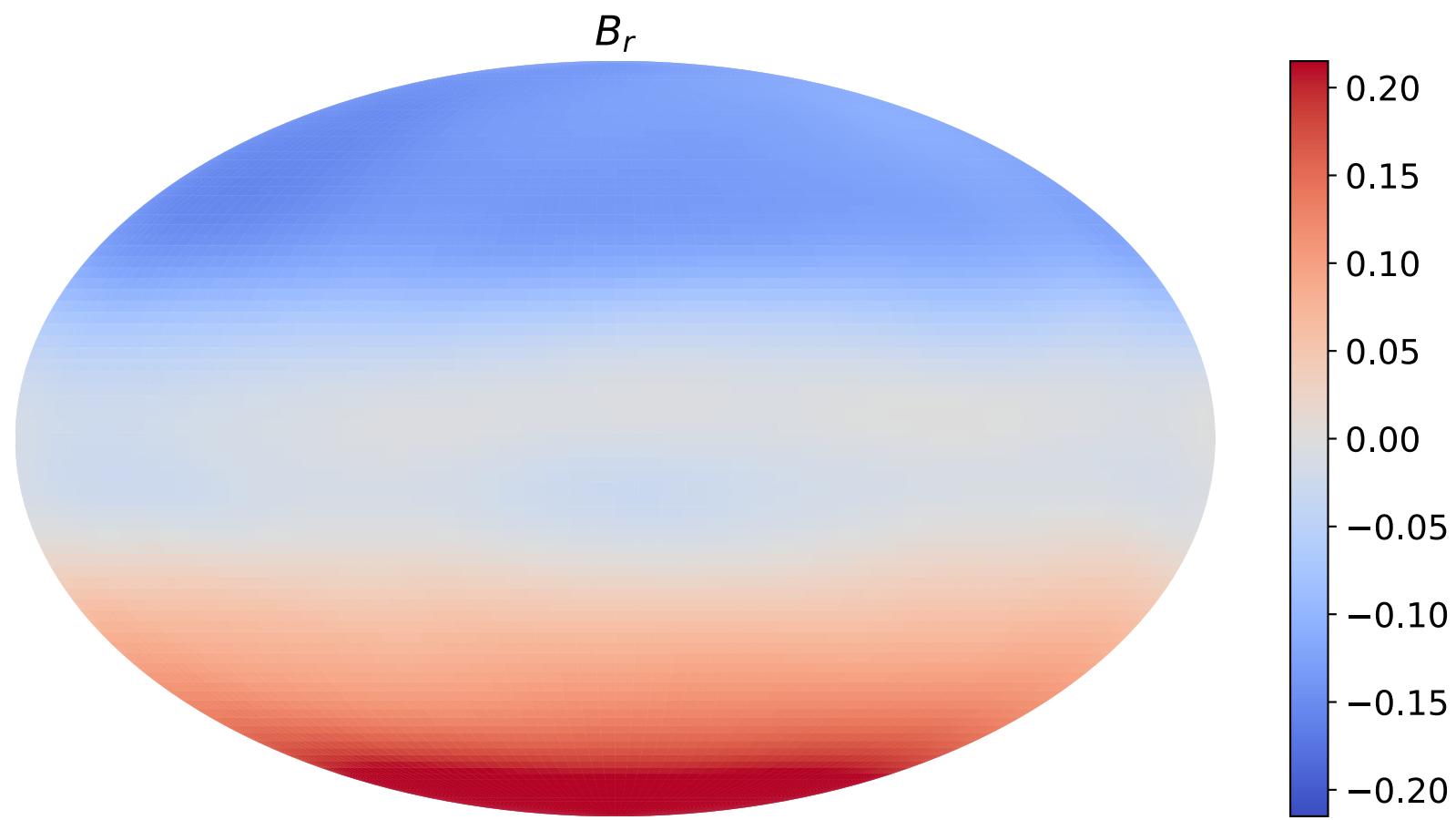
Without stably-stratified layer
Magnetic field **Velocity field**



With stably-stratified layer
Magnetic field **Velocity field**



Polarity reversals



- What triggers polarity reversals?
- Are these Earth-like reversals?
- Can we develop a simple model to describe this process?