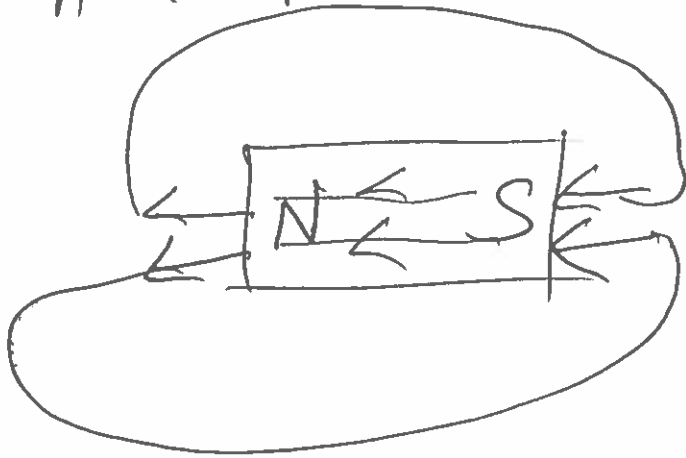


MAGNETISM

What is a compass?

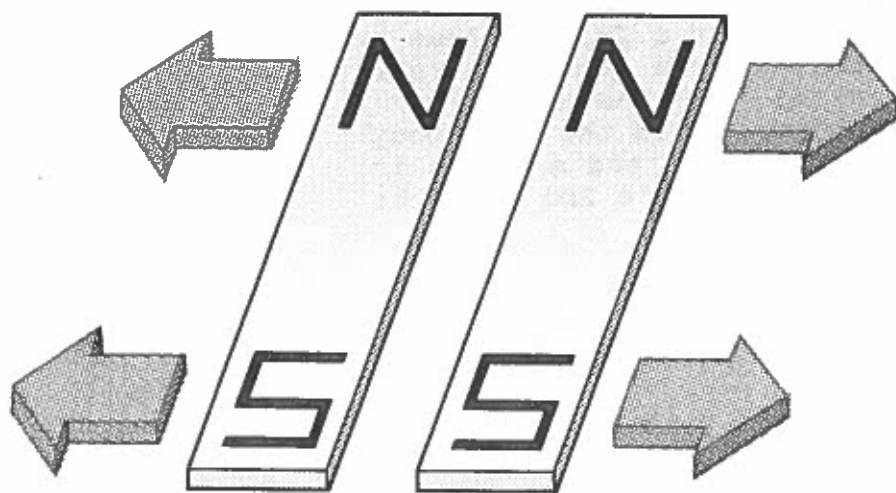
A compass is a small magnet



Bar magnet

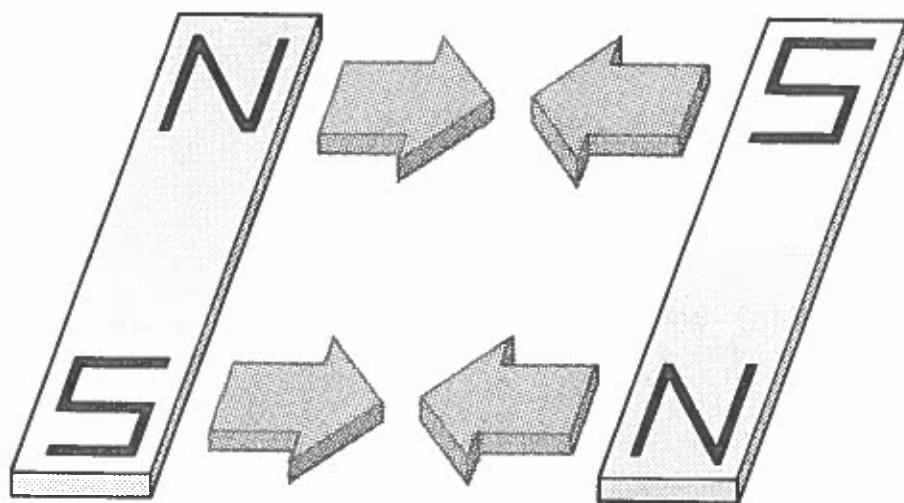
Laws of magnetic Poles

- 1) Like Poles Repel
- 2) opposite Poles ATTRACT



Like poles repel

(a)



Unlike poles attract

(b)

Geographic

North is the direction a North Pole of a Compass points to. Why does the compass point North?

Compass magnet is interacting with the magnetic field of Earth.

So where is the North Pole of the compass pointing to?

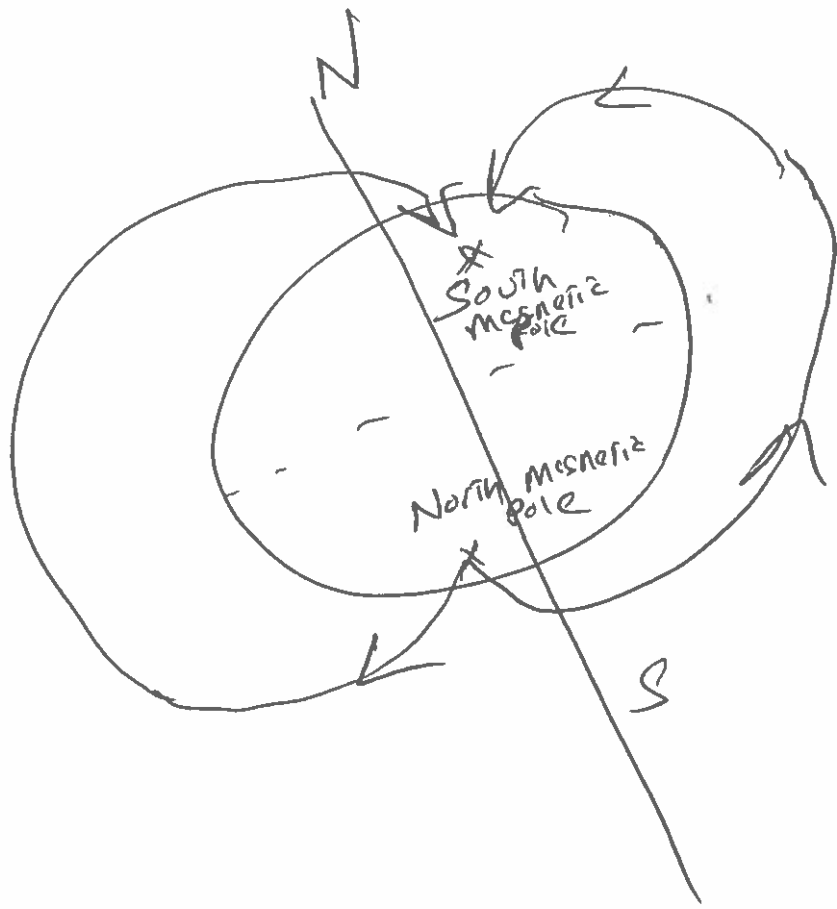
North Pole of compass points to

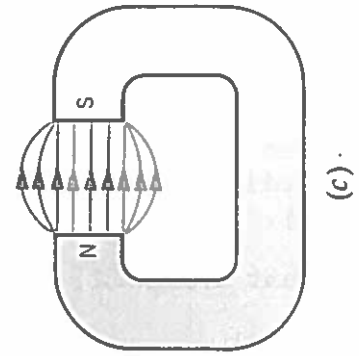
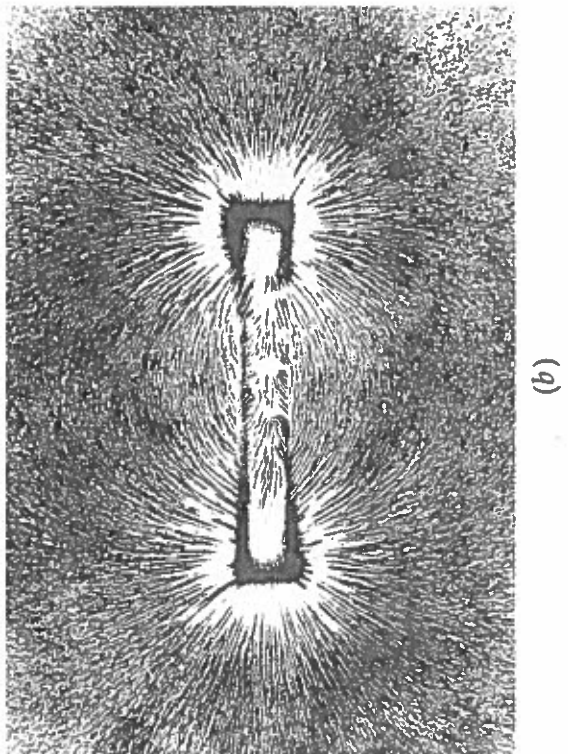
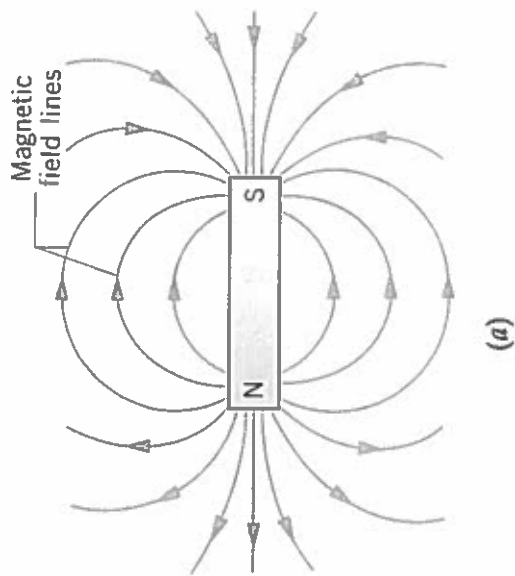
the South Pole of the Earth's magnetic field which right

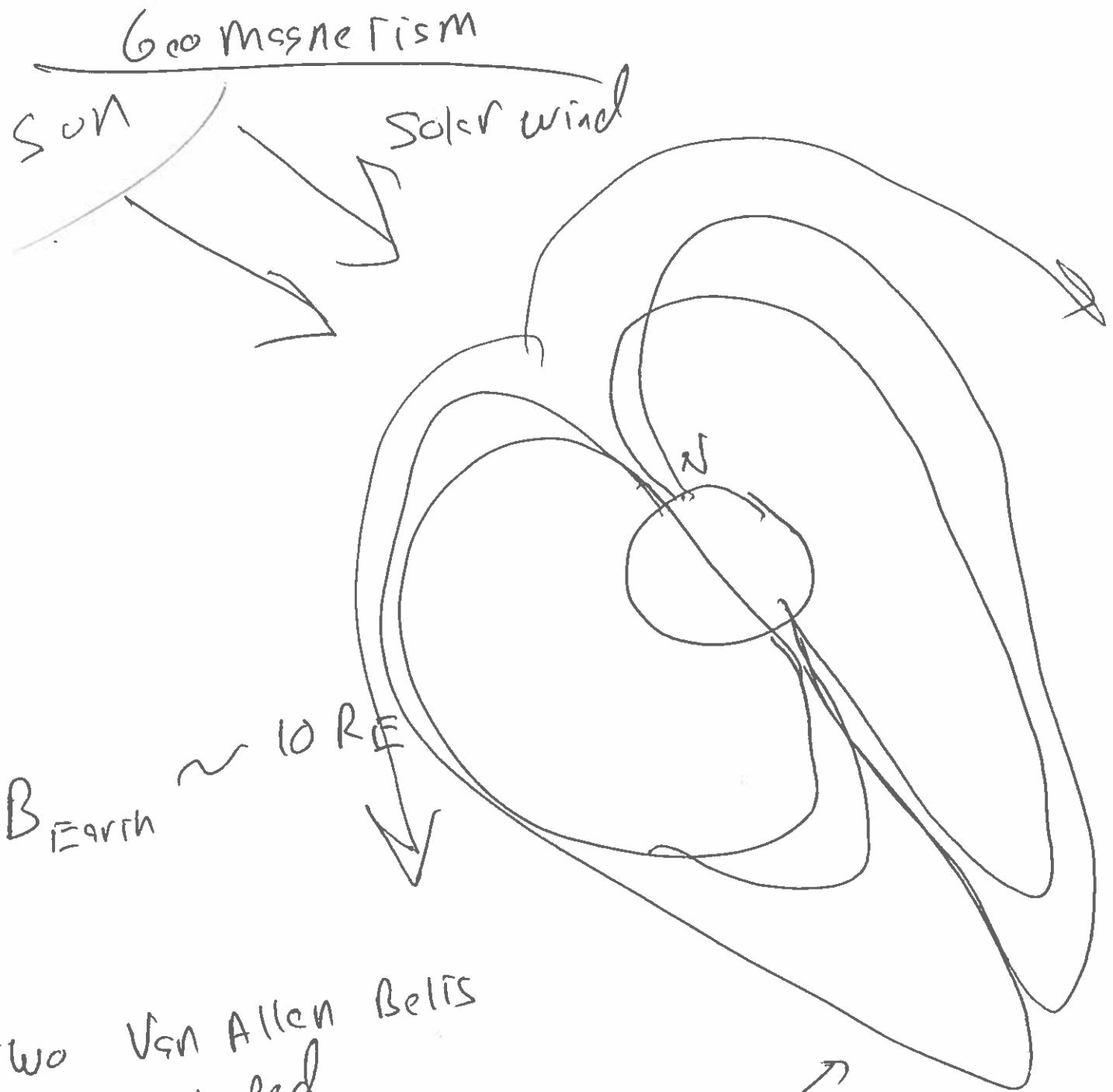
now lies in the Northern

hemisphere. \Rightarrow magnetic field

lines going into ground in Northern Hemisphere.





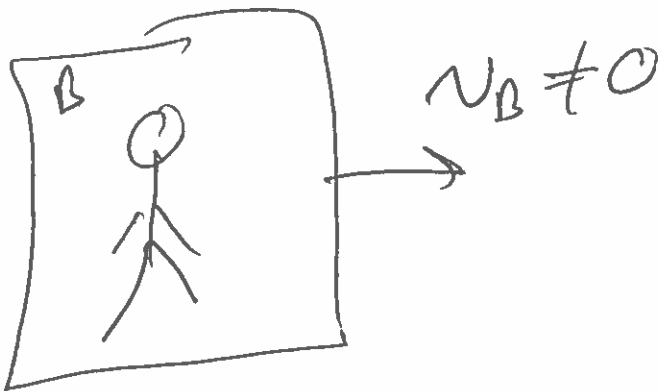


Two Van Allen Belts
 Donut shaped
 areas around
 Earth that trap
 charged particles
 1 for negative
 2 for positive

What is source of magnetic field?

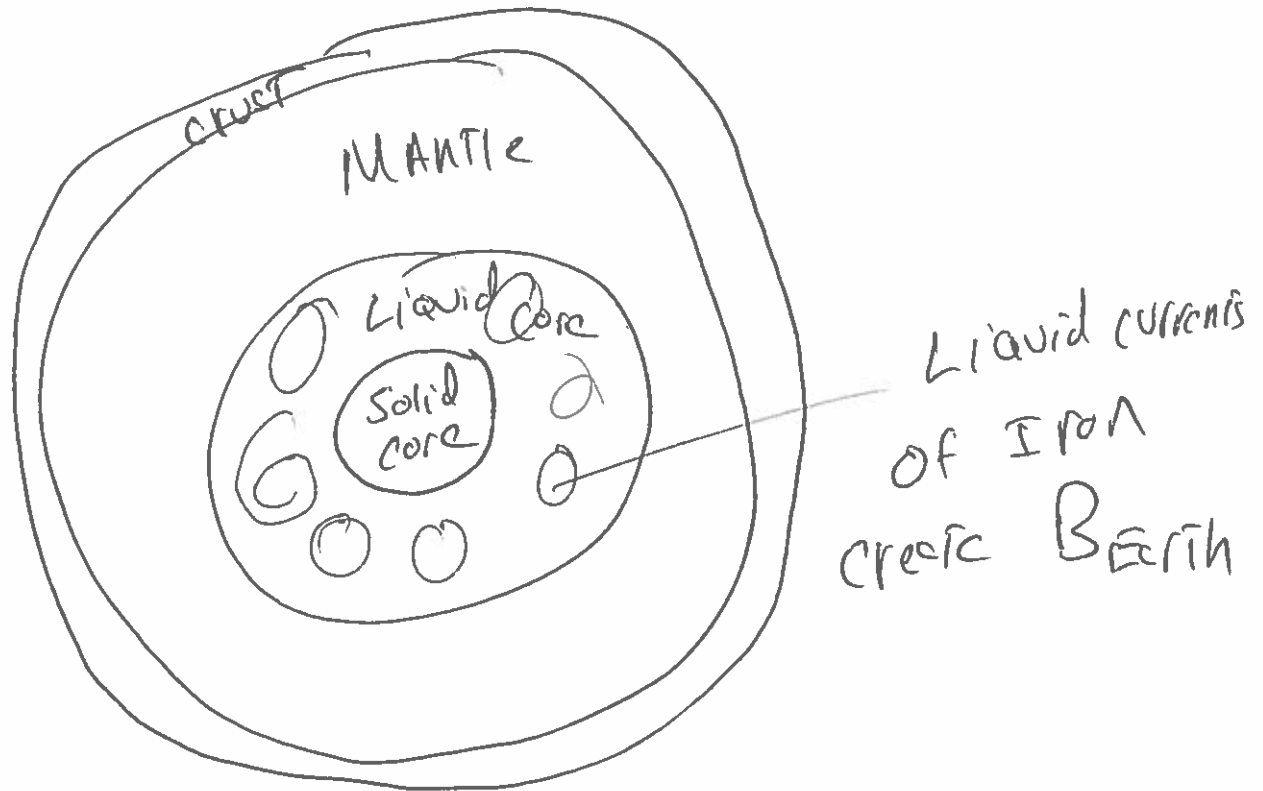
Magnetic fields are created currents,
or moving charges.

Source of electric field is charge.



Both q_A and q_B \vec{E} and \vec{B}

What is structure of Earth?



Earthquake waves and their propagation

3 Earthquake waves

1) L - Rolling surface waves

2) S - interior waves - secondary shear

3) P - interior wave - Primary longitudinal

Jupiter, Saturn, Sun \Rightarrow Large
Magnetic fields

Venus, Mars, Moon \Rightarrow NOT so much
Mercury - weak magnetic

\rightarrow currents of charged particles

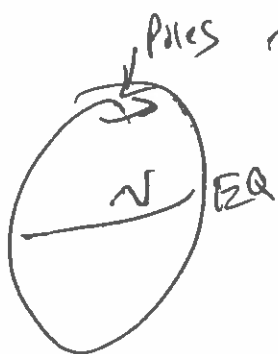
Sunspots are cold spots on surface
of sun.

$T_{\text{sun surface}} \sim 5800 \text{ K}$

$T_{\text{sun spot}} \sim 4800 \text{ K}$

Sun's magnetic field lines get kinked

that reduces energy flow to surface



$T_{\text{sun equator}} \sim 25 \text{ days}$

$T_{\text{sun pole}} \sim 30-35 \text{ days}$

Earth's magnetic field joins
up with Sun's magnetic field
we only beginning to understand
the effects on Earth,