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# Exploring the Earth's Interior


http://www.exploratorium.edu/imagery/stills/Prism.jpg

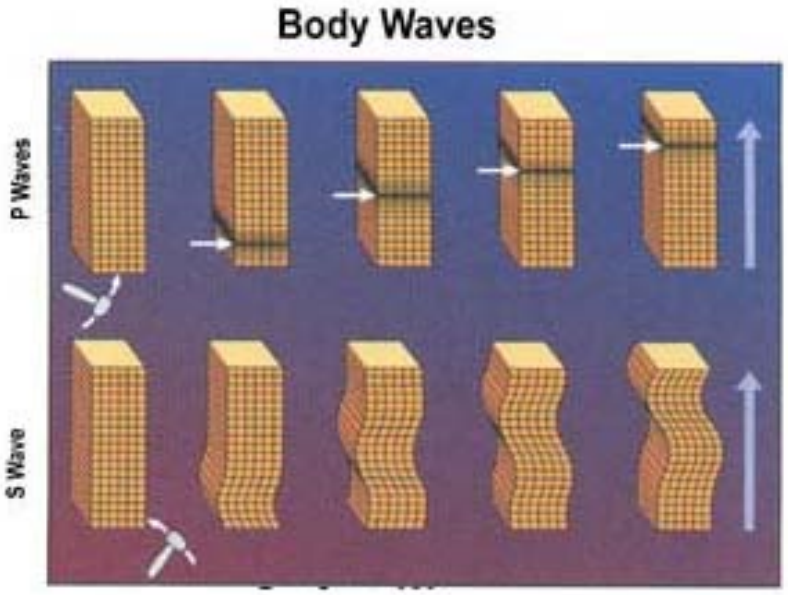
**How was the Earth's core discovered?**

The recordings fo seismic waves gave the first clue about the Earth's core.

Seismic waves (as happens with light and other types of waves) will refract and reflect between different materials.

**Types of seismic waves**

There are two types of seismic waves: P (compressional) waves and S (shear) waves.




http://upload.wikimedia.org/wikipedia/commons/3/38/Pswaves.jpg

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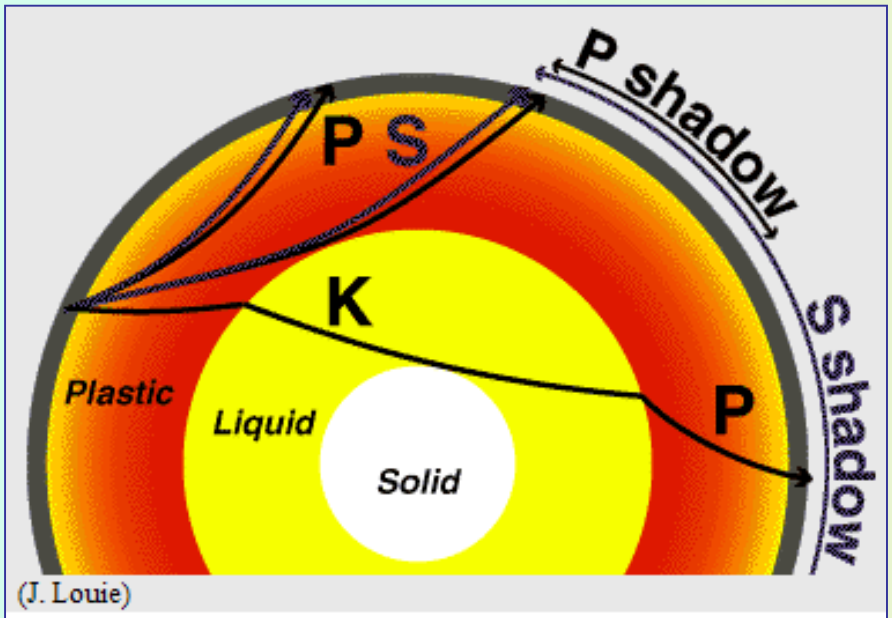



http://www.seismo.unr.edu/ftp/pub/louie/class/100/earth-rays.GIF

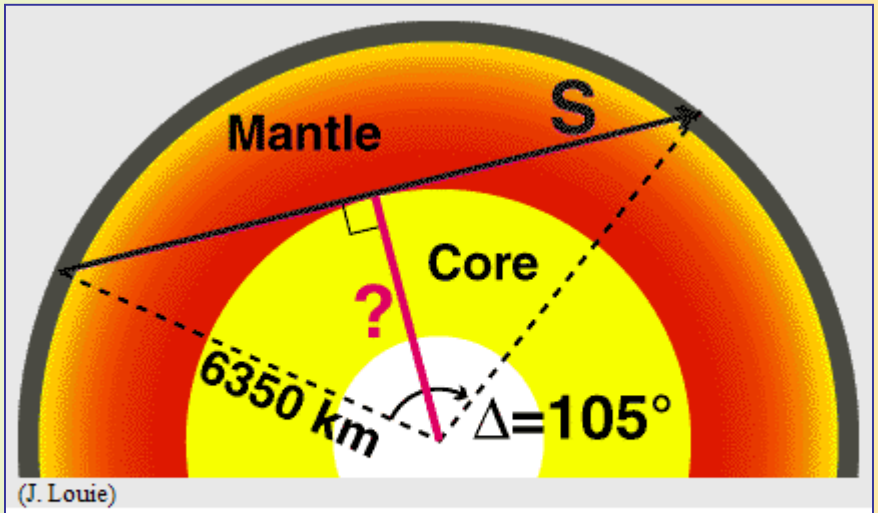
Seismologists noticed that that once the event was more that 105º (angle between the points of earthquake-center of earth-seismograph) P and S waves disappeared almost completely, but slow surface waves taking other path would arrive.

**Properties of seismic waves**

The two types of waves (P and S) behave differently, depending on the material.

P waves can travel and refract (travel from one material into another) through both fluid (liquids, in this case) and solid materials.

On the other hand, S waves cannot travel though fluids.




http://www.seismo.unr.edu/ftp/pub/louie/class/100/earth-core.GIF

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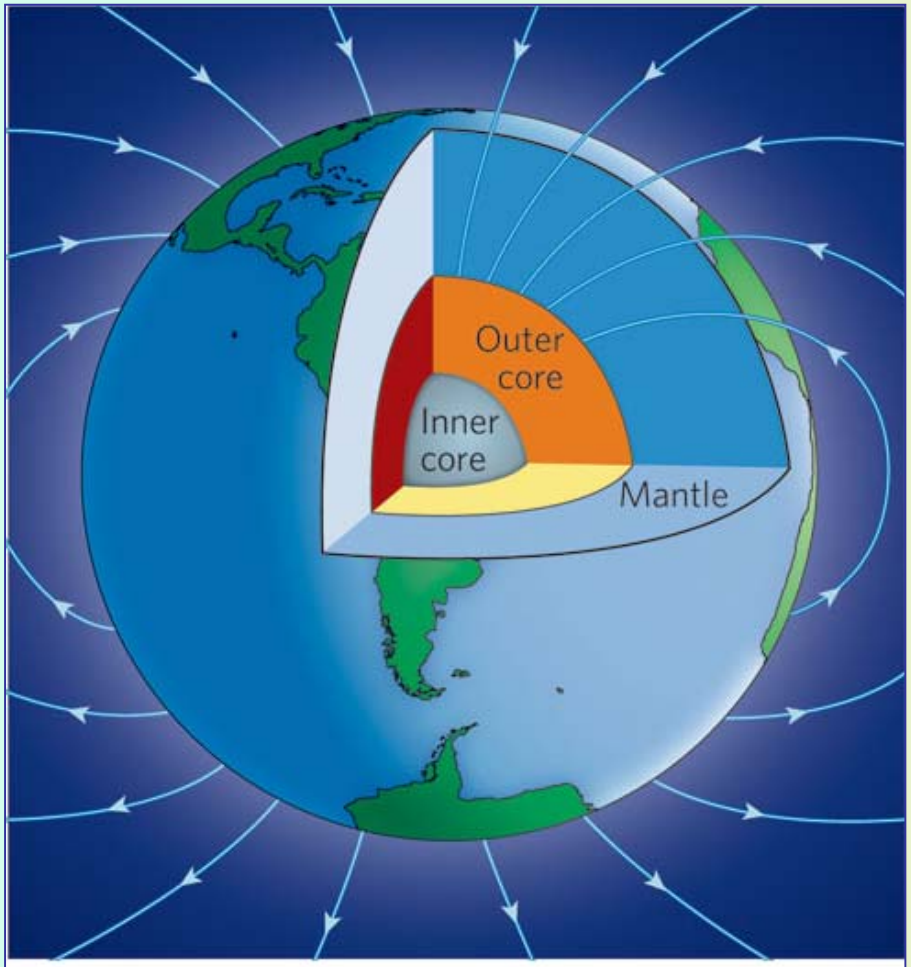


http://www.nature.com/nature/journal/v452/n7184/images/452165a-f1.2.jpg

**Evidence from Earth's Magnetic Field**

The fact that the Earth has a magnetic field is an independent piece of evidence for a molten, liquid core.

The earth cannot be a large permanent magnet, since magnetic minerals lose their magnetism when they are hotter tan 500 ºC.

Almost all of the earth is hotter, and the only way to make a magnetic field is with a circulating electric current.

Circulation and convection of electrically conductive molten iron in the earth's outer core produces the magnetic field.

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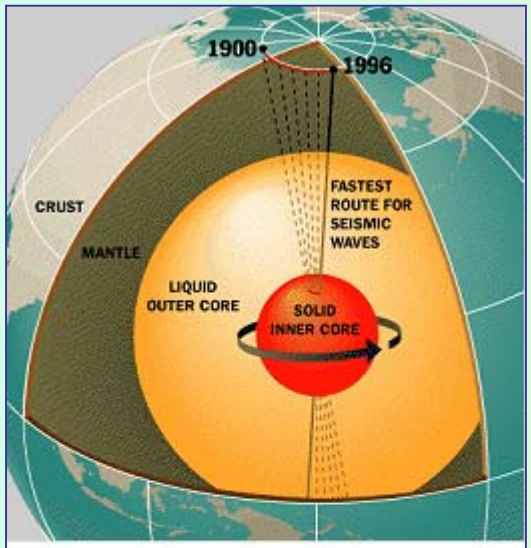



a schematic diagram of Earth's interior. The outer core is the source of the geomagnetic field

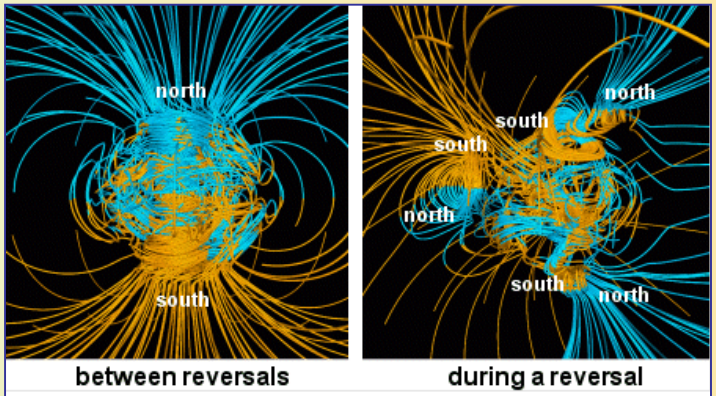
http://www.nasa.gov/images/content/54558main_world_med1.gif

## Geomagnetic reversal

A geomagnetic reversal is a change in the orientation of Earth's magnetic field such that the positions of magnetic north and magnetic south become interchanged.

These events often involve an extended decline in field strength followed by a rapid recovery after the new orientation has been established.

The rate of reversals in the Earth's magnetic field has varied widely over time. 72 million years ago (Ma), the field reversed 5 times in a million years




Supercomputer models of Earth's magnetic field. On the left is a normal dipolar magnetic field, typical of the long years between polarity reversals. On the right is the sort of complicated

http://www.nasa.gov/images/content/54559main_comparison1_strip.gif