

IX... The Magnetosphere and Us

Introduction:

Distortions in the magnetosphere, caused by the solar wind, alter the way the magnetosphere looks as compared to how it would look if there were no solar wind.

Objectives:

Label and describe the parts of the magnetosphere.

Determine a scale based on the distances given in the accompanying figure. The scale should be in kilometers.

Materials:

A diagram of the magnetosphere

DATA needed to complete activity:

- 1) Speed of light.....300,000 km/sec
- 2) Earth radius (Re).....6,378 km (Equatorial average)
- 3) Solar Wind (plasma).....450 km/sec (average value)
- 4) Distance to Sun..... 145,000,000 km (average)
- 5) Magnetosphere size:
 - Daytime side..... 6 to 12 Earth radii
 - Nighttime side..... 1,000 Earth radii, or greater.

Questions:

1. How long will it take electromagnetic radiation, including visible light, to reach the earth's surface ?

2. A solar flare has just been detected by a ground-based telescope. How long will it be before the plasma ejected into space could reach the earth and cause a possible power outage or some other disturbance?

Teacher Notes:

1. Students should compare the diagram of the magnetosphere to the diagram of magnetic lines of force. The distortions are caused by the interaction with the solar wind.

2. Students should be aware of the magnitude of the magnetosphere and the scope of the solar winds.

Diagram of the Magnetosphere for Activity IX

