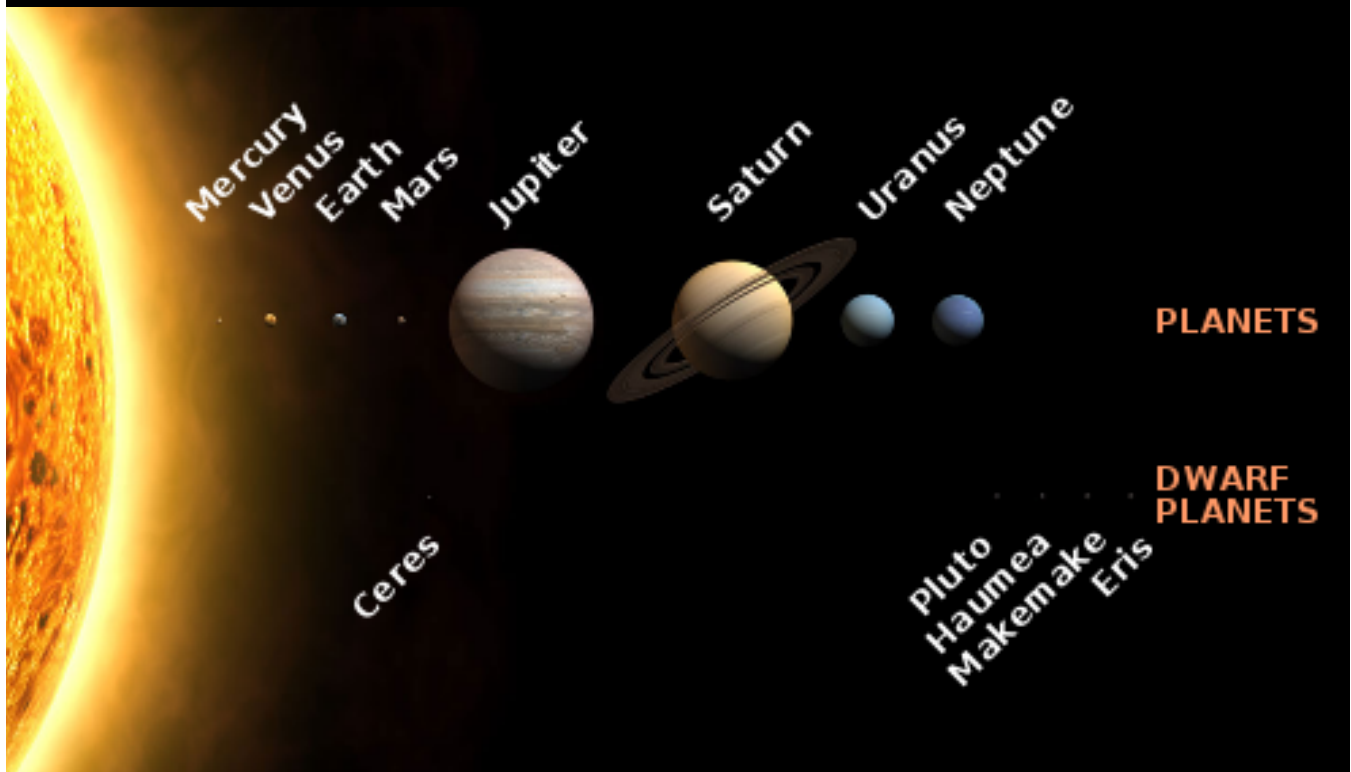


Lesson 2 Slide Presentation:

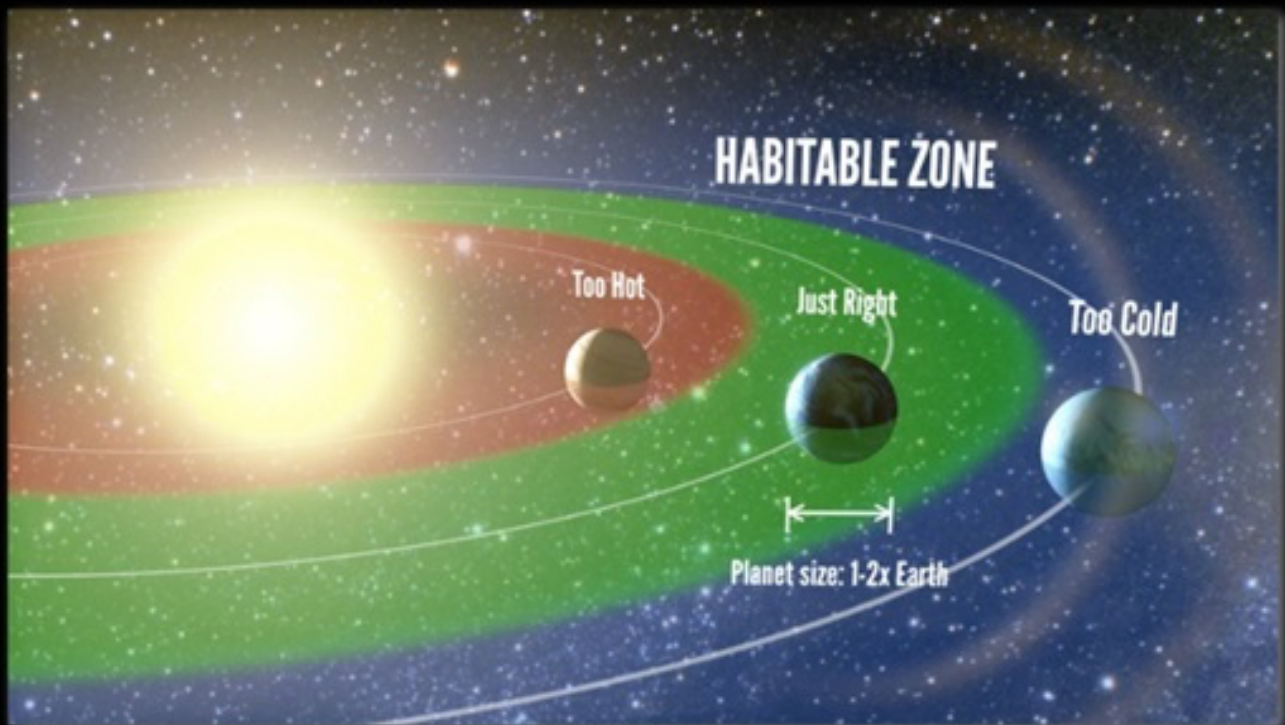
# An Overview of the Universe

# An Overview of the Solar System



SLIDE 1

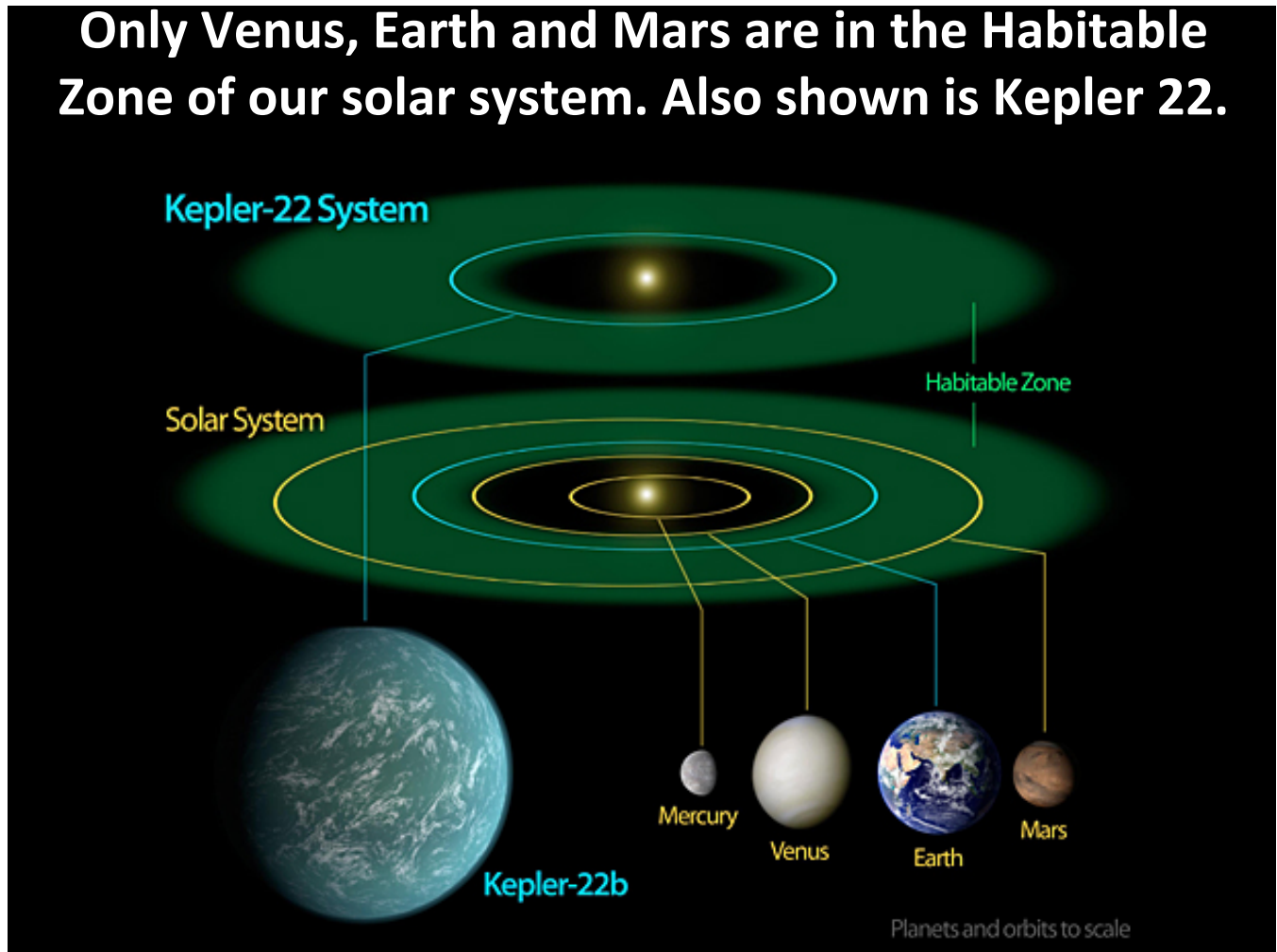
# A Goldilocks Planet



The habitable zone corresponds to the range of orbital distances where liquid water can exist on a planet's surface.

SLIDE 2

**Only Venus, Earth and Mars are in the Habitable Zone of our solar system. Also shown is Kepler 22.**



**SLIDE 3**

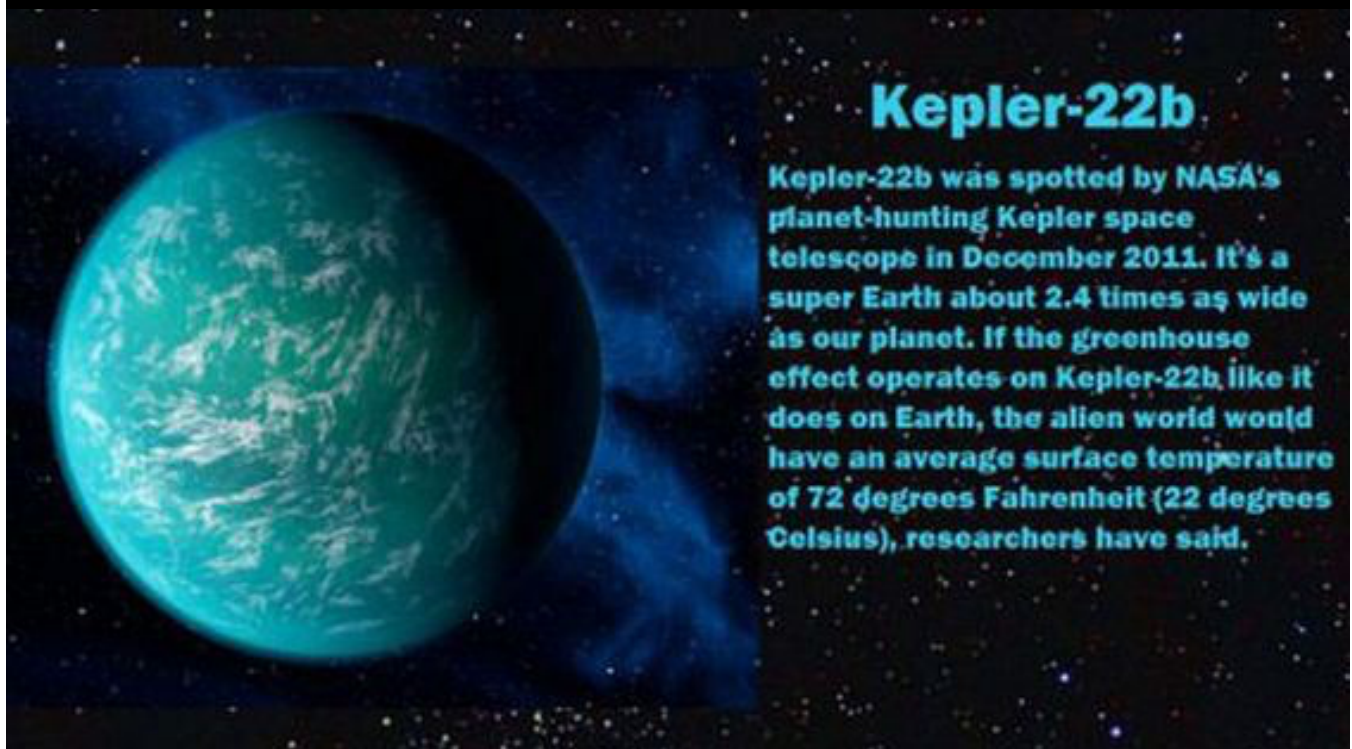


# The Kepler Space Telescope



SLIDE 4

**Are we alone in the universe?**  
**Approximately 20 exo-planets have**  
**been detected that could harbor life!**



**SLIDE 5**

# The Solar System's Goldilocks Planets: Venus, Earth, and Mars

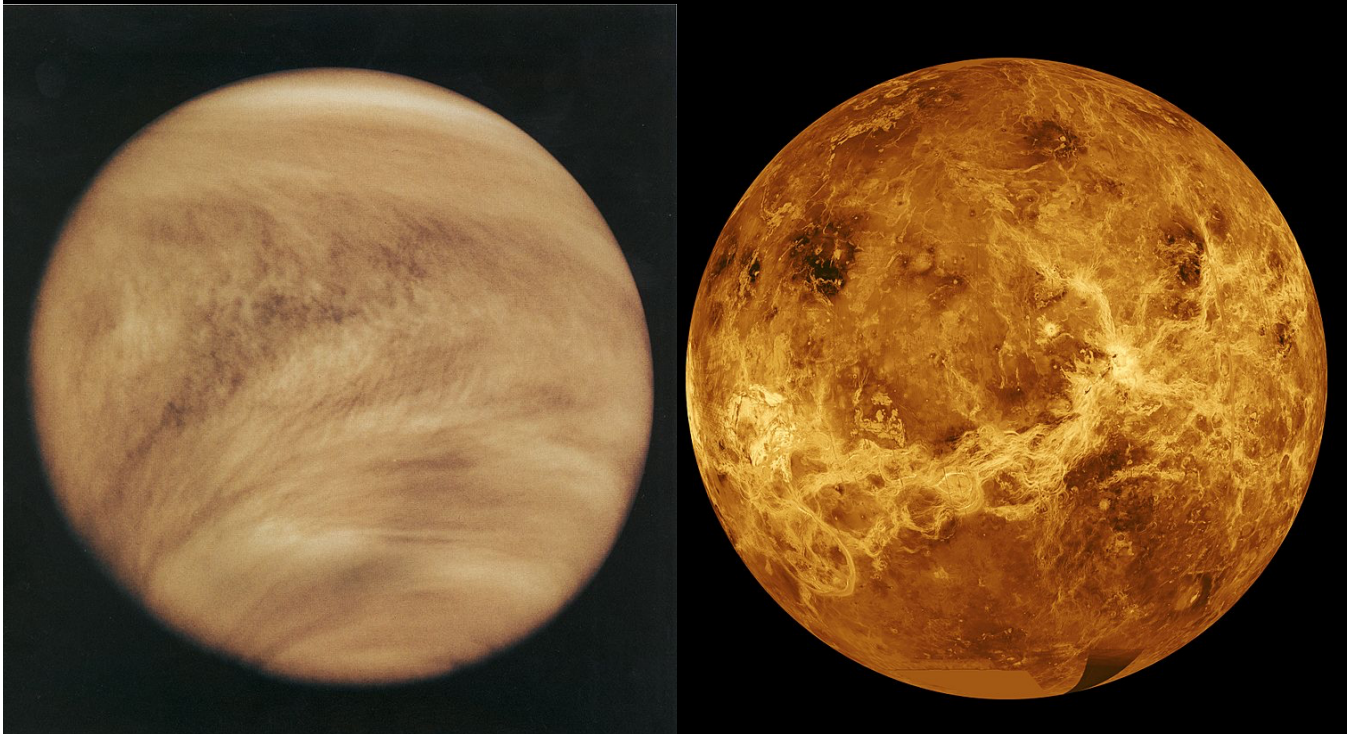


Lunar and Planetary Institute

SLIDE 6



**Venus with and without clouds. The cloudless image is from Magellan's cloud-penetrating radar system.**



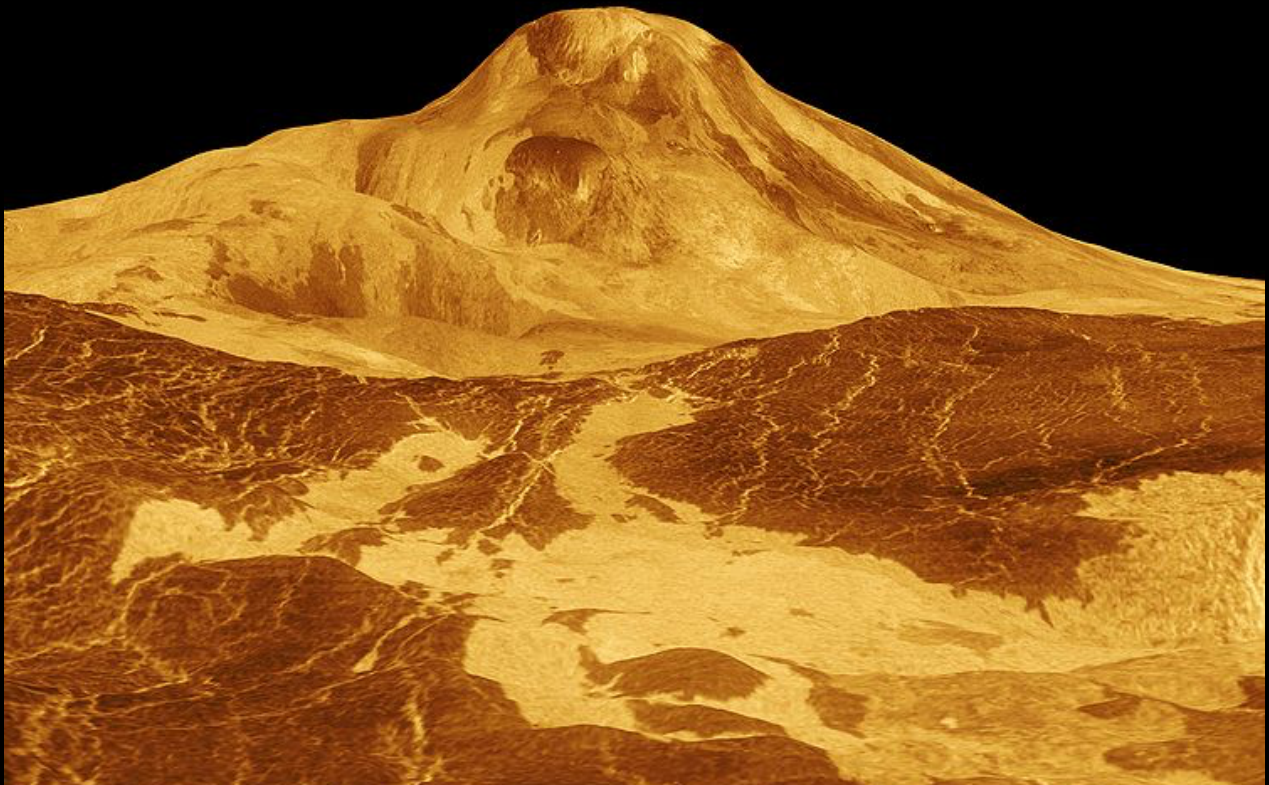
**SLIDE 7**

**The Soviet spacecraft *Venera 13* on the surface of Venus in 1982. The partial disk-shaped object on the surface is likely a lens cap.**



**SLIDE 8**

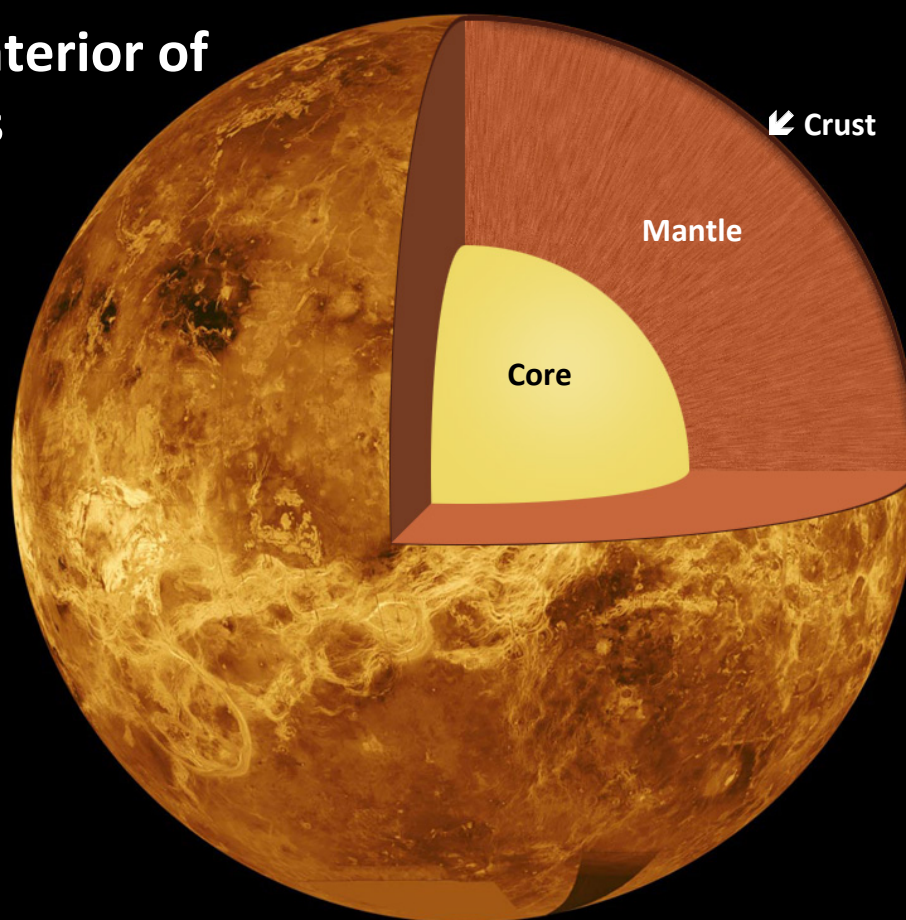
***Maat Mons, a mile-high volcano on Venus. In this false-color image, a yellow lava flow is seen in the foreground. Image is from NASA's Magellan Mission.***



**SLIDE 9**



## The Interior of Venus



**SLIDE 10**



**The famous “Blue Marble” image of the Earth as seen from Apollo 17 on December 7, 1972.**

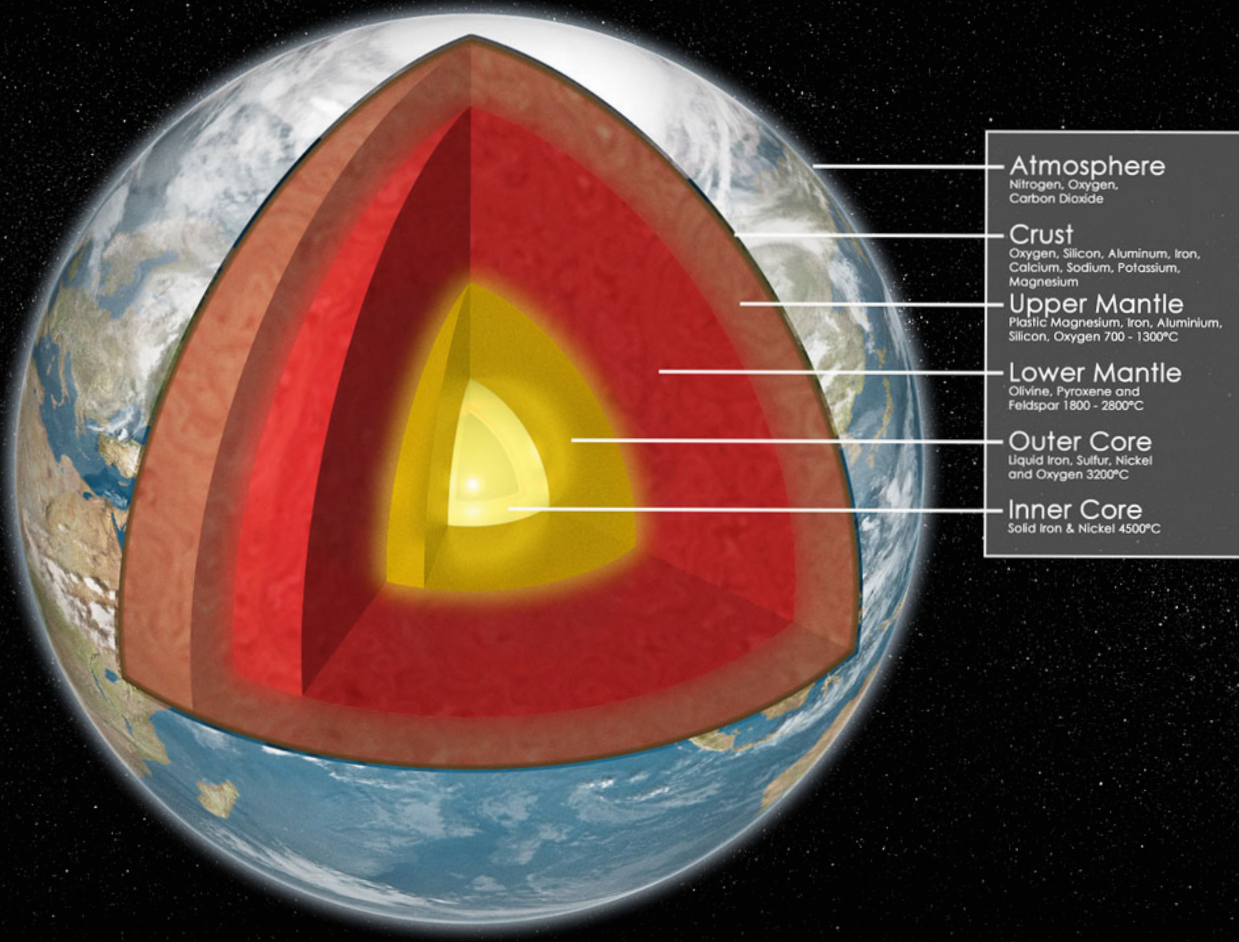


**SLIDE 11**

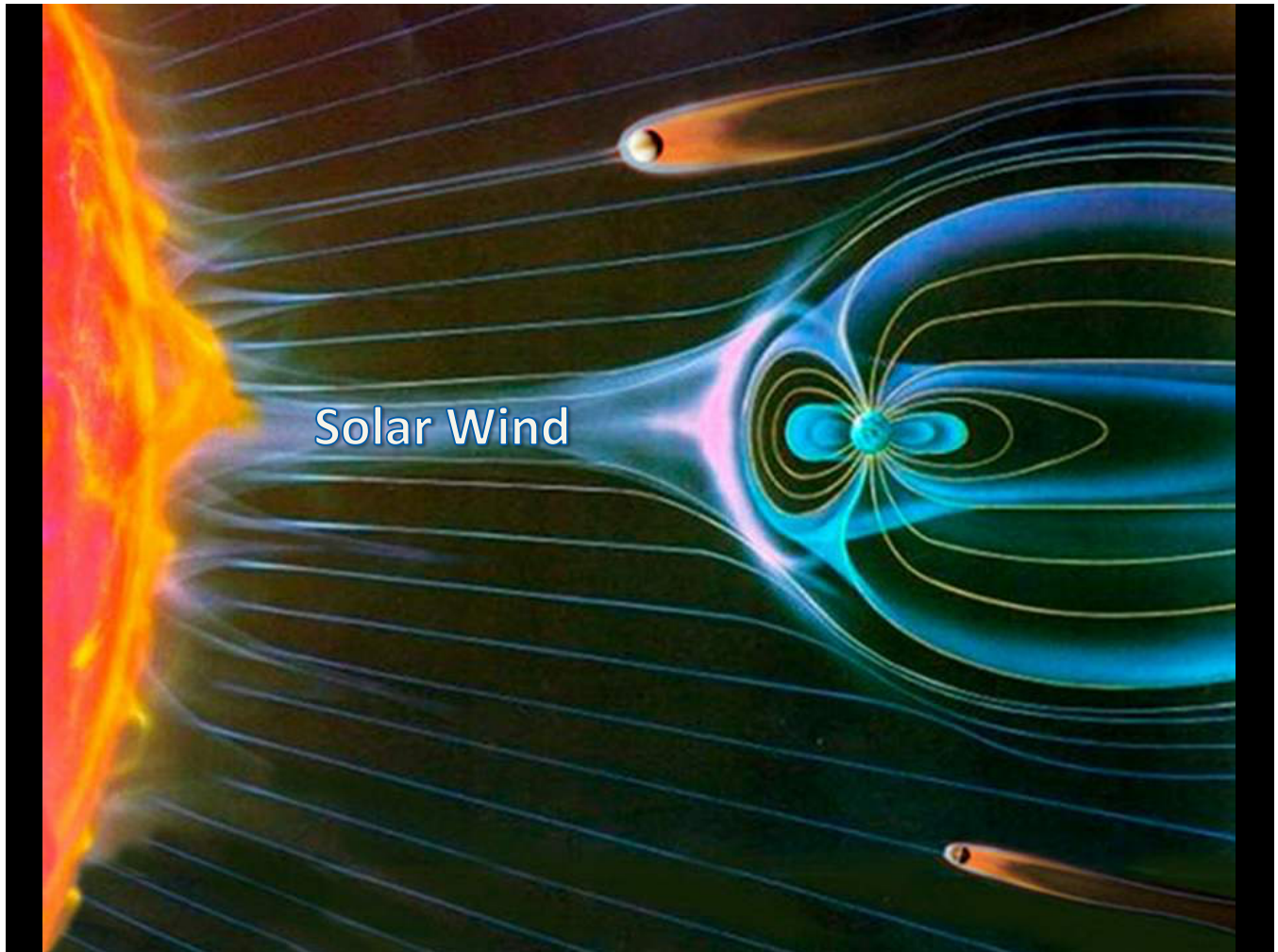




## Earth: Cross Section



SLIDE 12



## SLIDE 13



## A volcanic eruption in the Aleutian Islands of Alaska

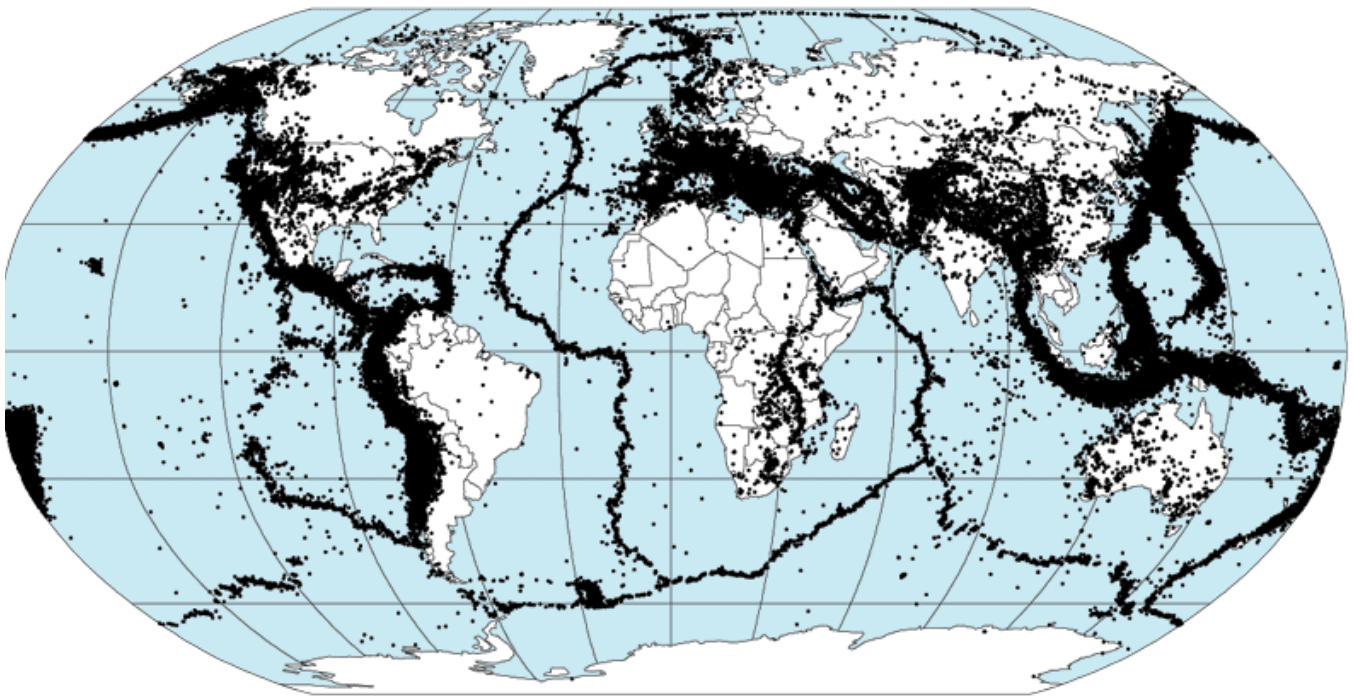


**SLIDE 14**

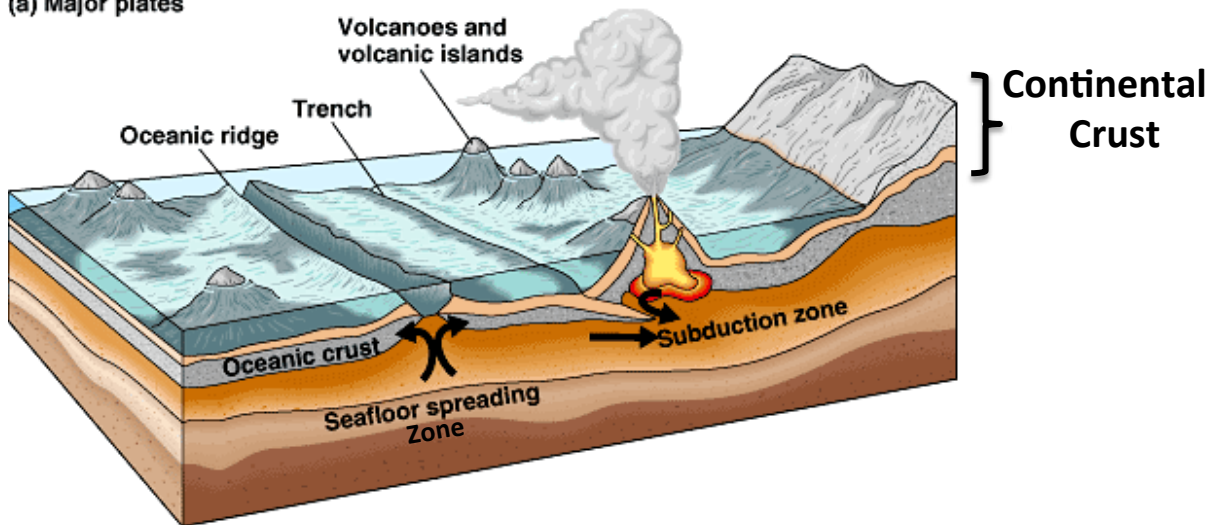
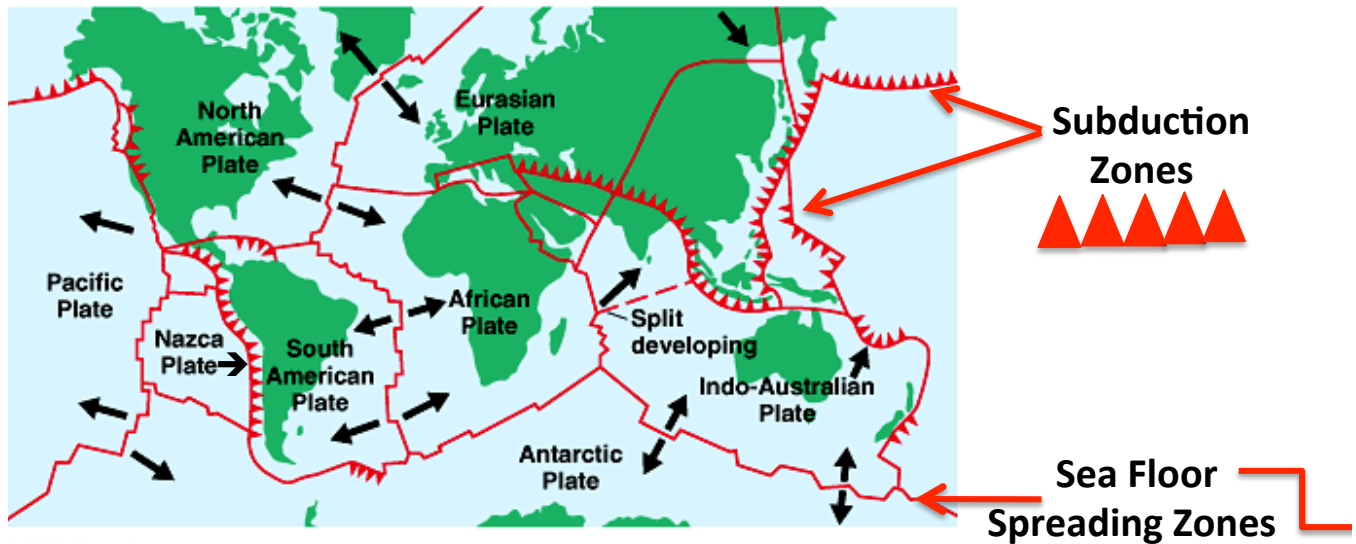


# Earthquake Activity

Preliminary Determination of Epicenters  
358,214 Events, 1963 - 1998



SLIDE 15

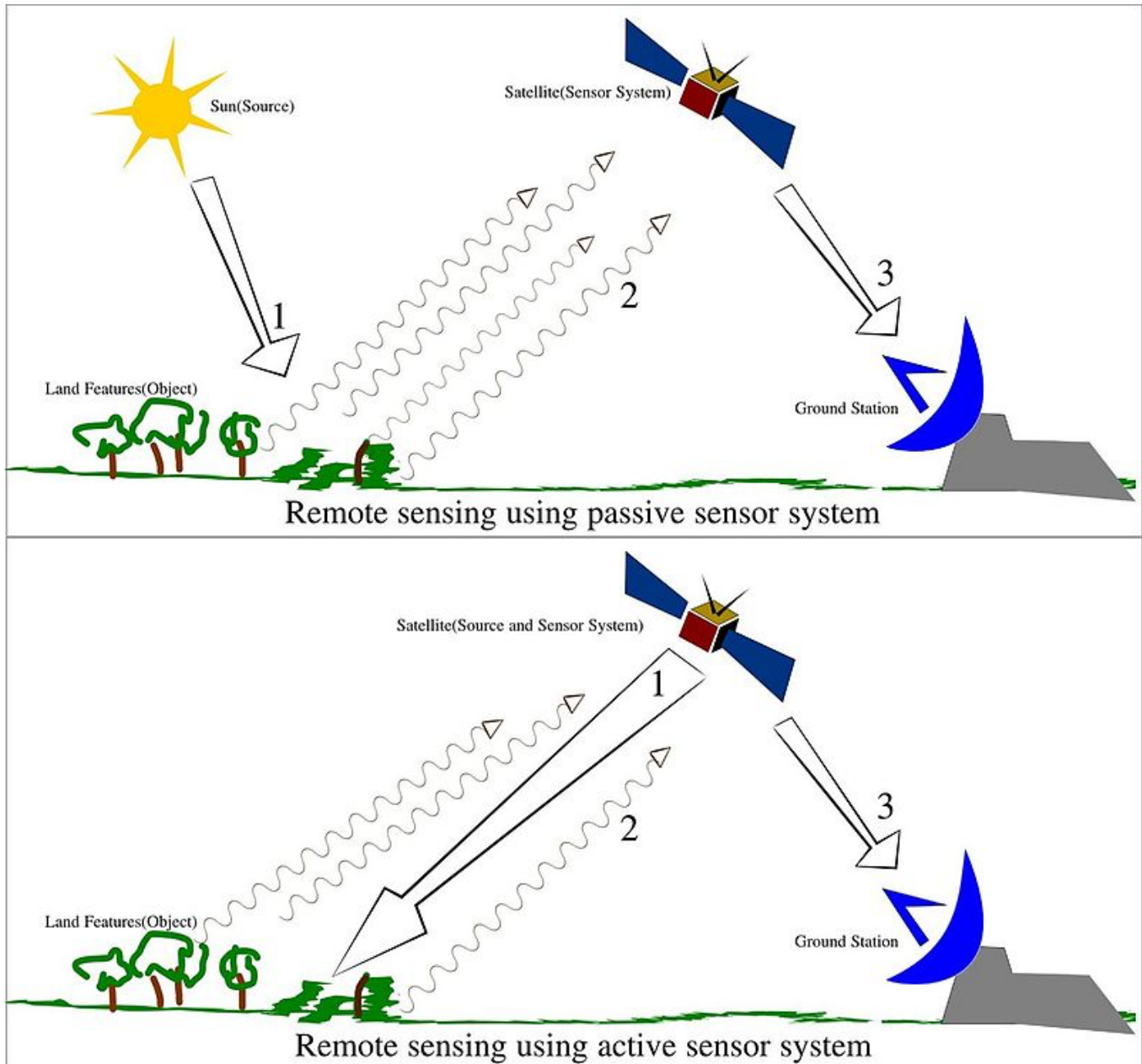


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## SLIDE 16

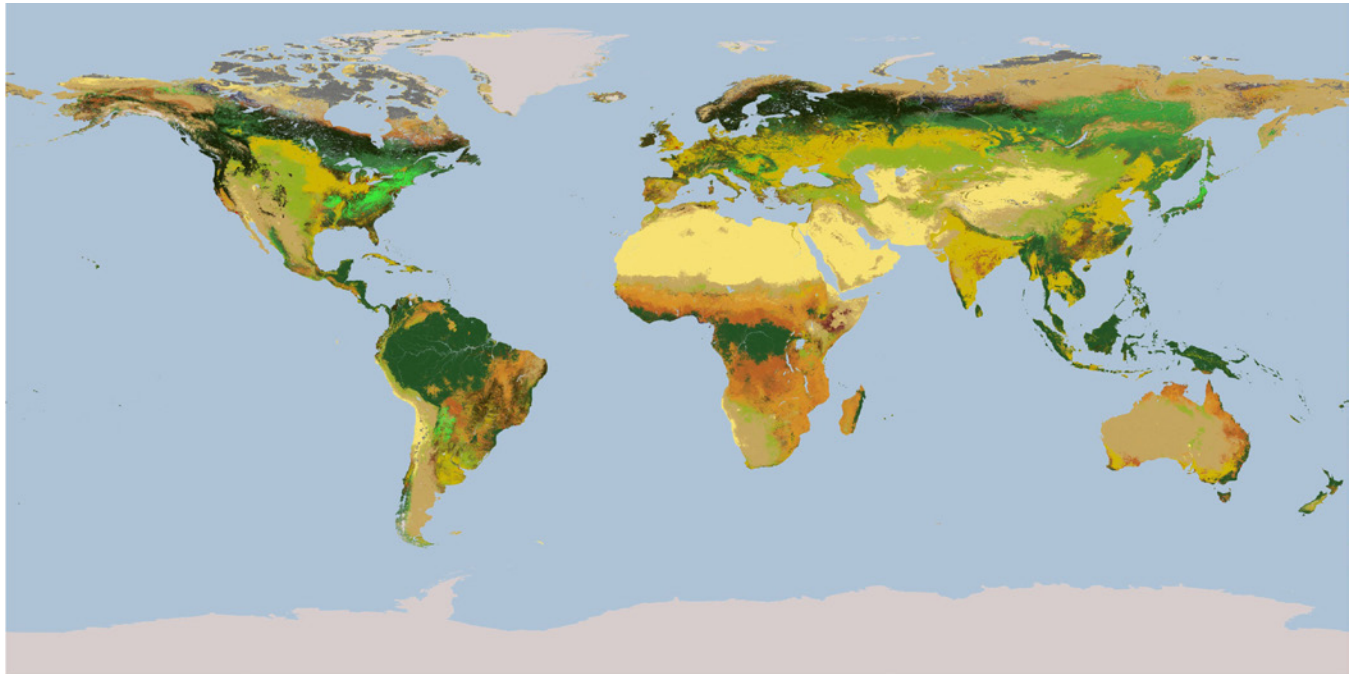




















# Types of Earth Remote-Sensing Systems



SLIDE 17

## NASA Land Cover Map Based on Spectral Characteristics



 0 Water	 6 Closed Shrublands	 12 Croplands
 1 Evergreen Needleleaf Forest	 7 Open Shrublands	 13 Urban and Built-Up
 2 Evergreen Broadleaf Forest	 8 Woody Savannas	 14 Cropland/Natural Veg. Mosaic
 3 Deciduous Needleleaf Forest	 9 Savannas	 15 Snow and Ice
 4 Deciduous Broadleaf Forest	 10 Grasslands	 16 Barren or Sparsely Vegetated
 5 Mixed Forests	 11 Permanent Wetlands	 17 Tundra

**SLIDE 18**

## The Amazon Tall Tower Observatory (ATTO) in the Amazon Rainforest conducts atmospheric research

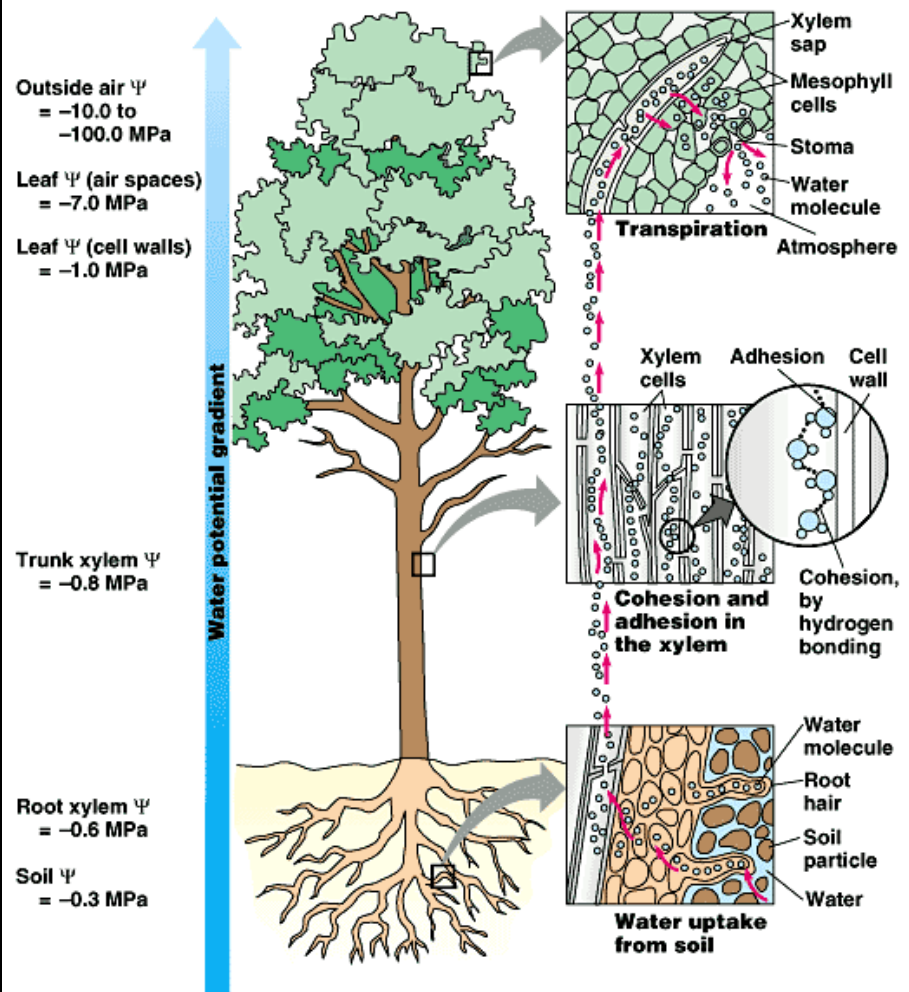


SLIDE 19





**Transpiration is the loss of water vapor through stomates in the lower epidermis of leaves. Transpiration pulls water and nutrients from the soil into the plant's roots, contributing to the process of photosynthesis.**



SLIDE 20



The Moon

## SLIDE 21



SLIDE 22

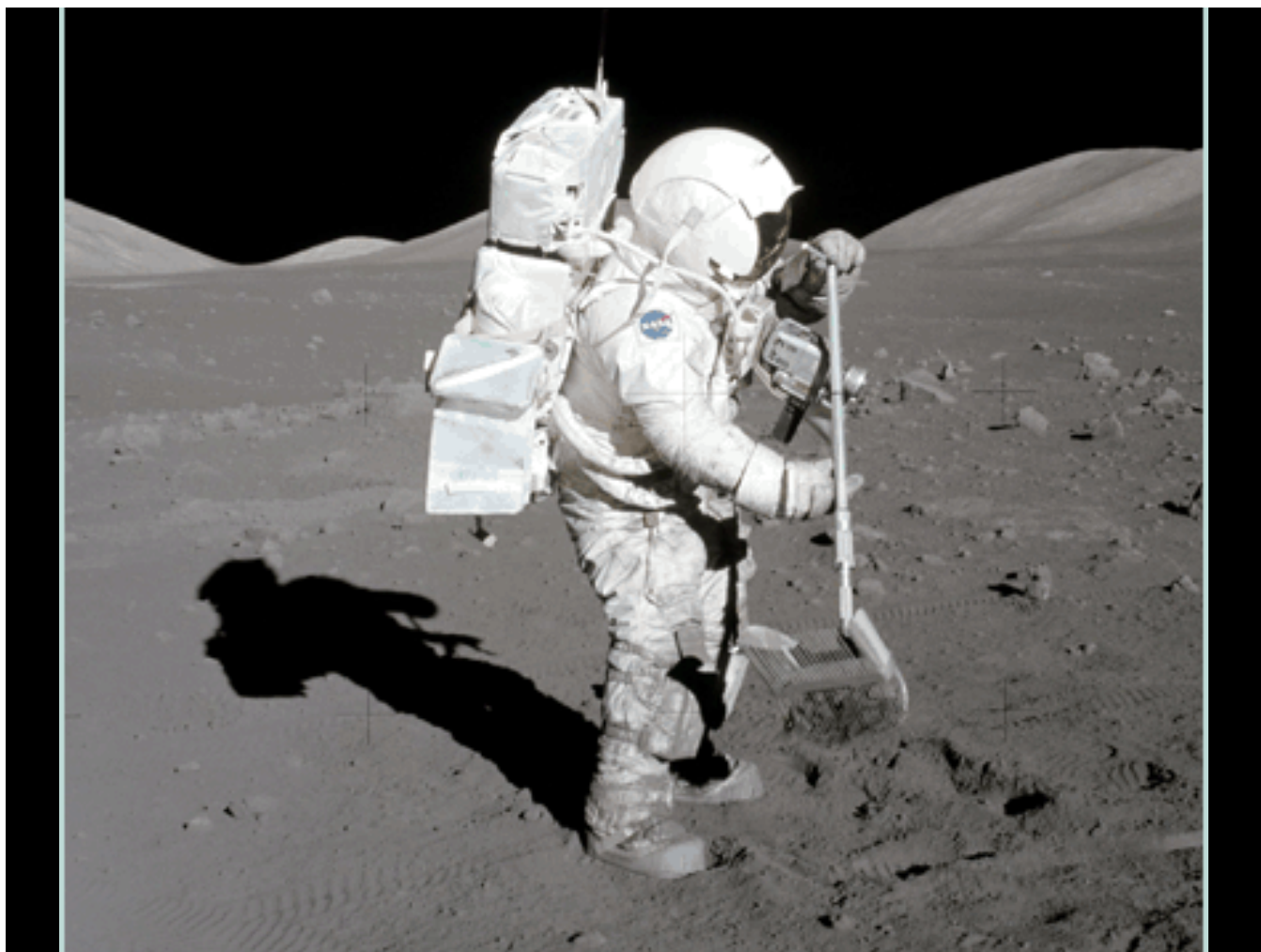




## The Apollo 11 Astronauts



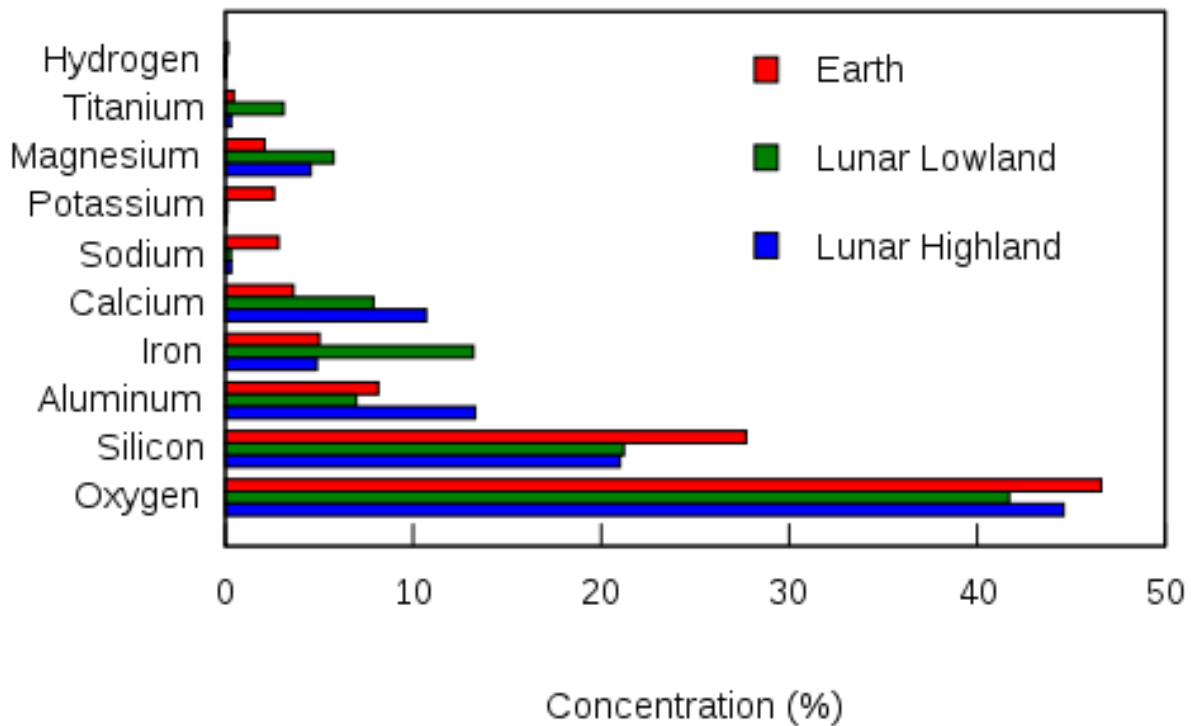
SLIDE 23



## SLIDE 24

# A Comparison of the Mineralogy of the Earth and Moon

Concentration of Elements on Lunar Highlands, Lunar Lowlands, and Earth



SLIDE 25

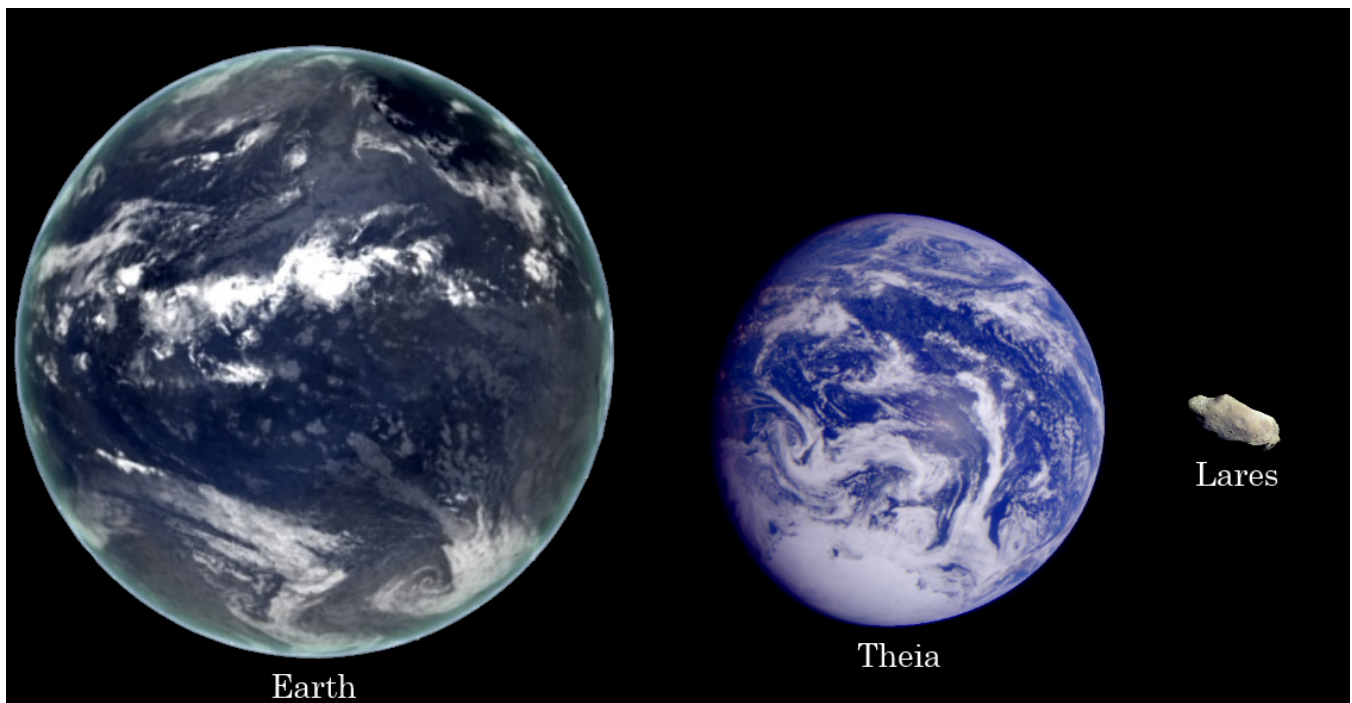


## The *Theia* Hypothesis



SLIDE 26

**A size comparison of the primitive Earth,  
the hypothesized Proto-Planet *Theia*, and  
the asteroid *Lares*.**



**SLIDE 27**





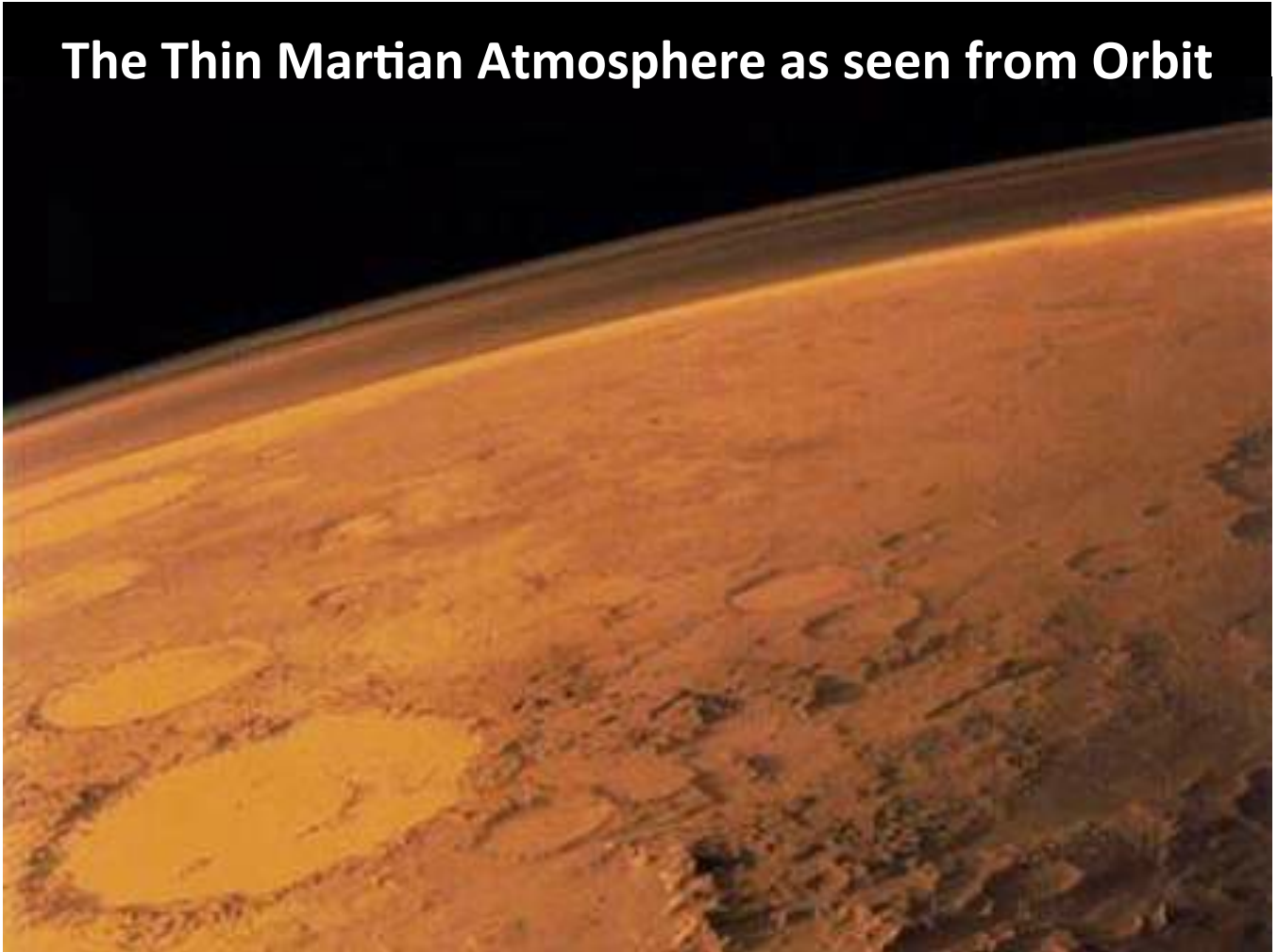
# Mars



SLIDE 28



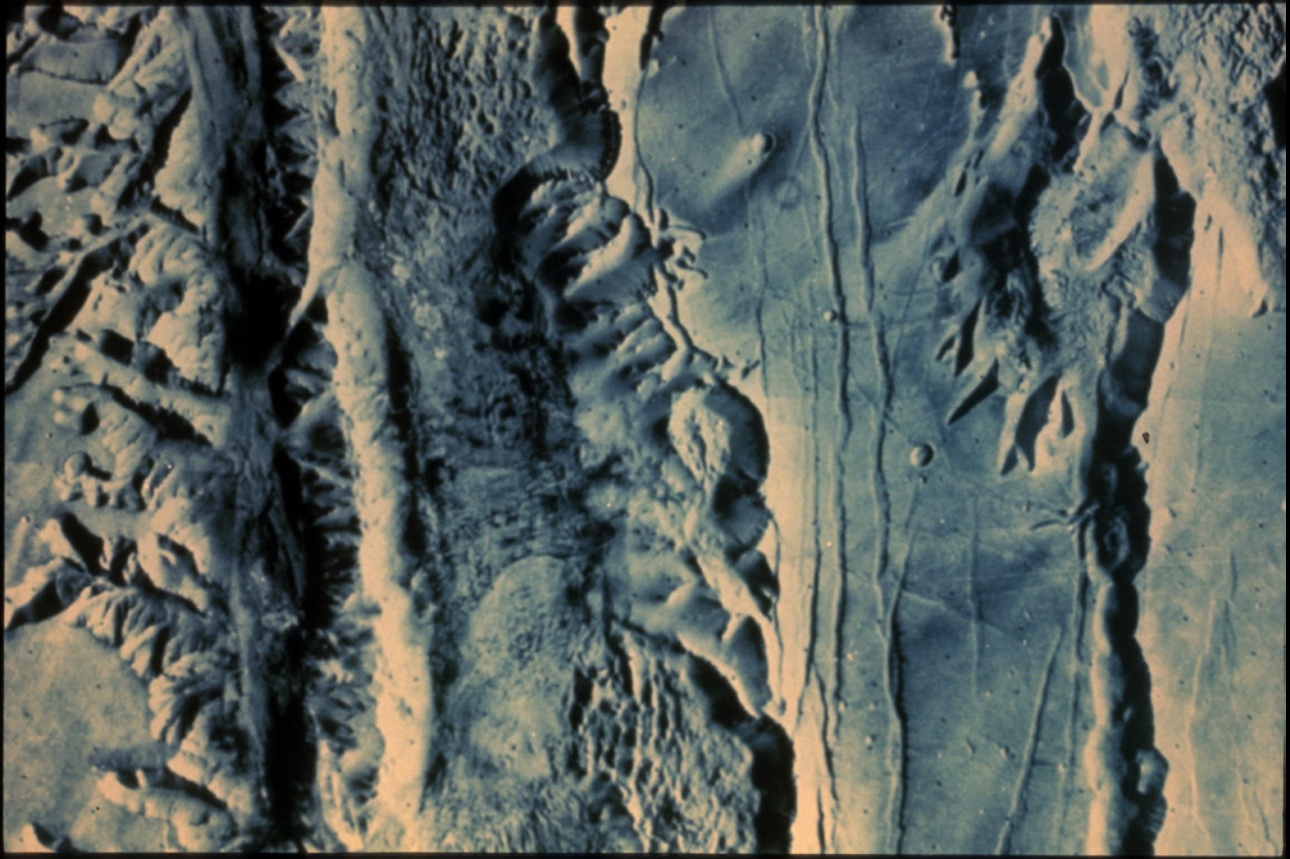
## The Thin Martian Atmosphere as seen from Orbit



SLIDE 29



***Valles Marinaris* is a great place to look for evidence of Liquid Water in the Past.**

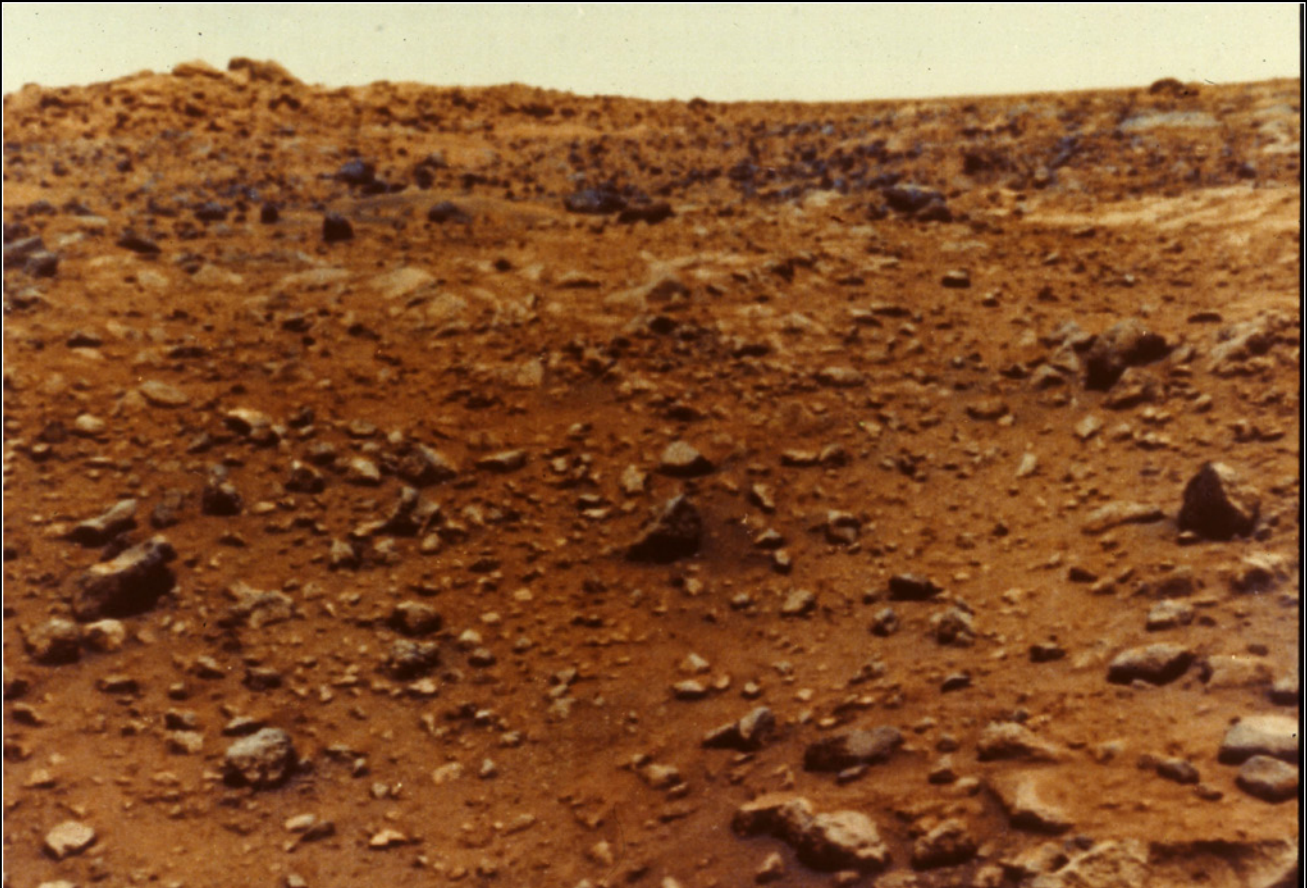


**SLIDE 30**





**Viking provided our first view of the Martian surface.**



**SLIDE 31**



## Opportunity

SLIDE 32



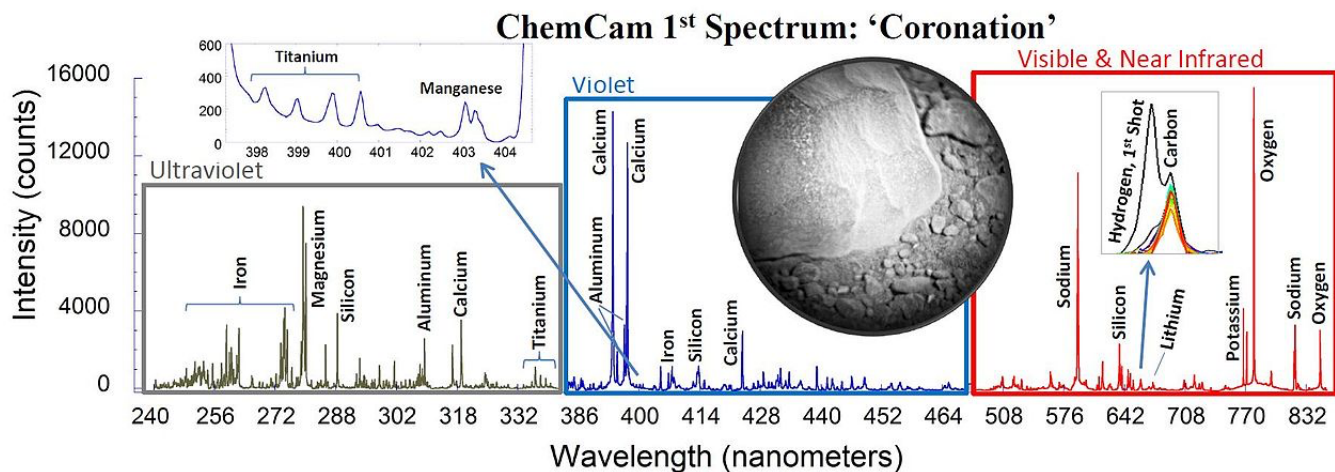


**NASA's Mars Rover  
"Curiosity" launched  
on Nov. 26, 2011,  
and landed on Aug.  
6, 2012. It carries a  
complete science lab  
that has analyzed  
many samples of the  
Mars "soil" and sub-  
surface.**



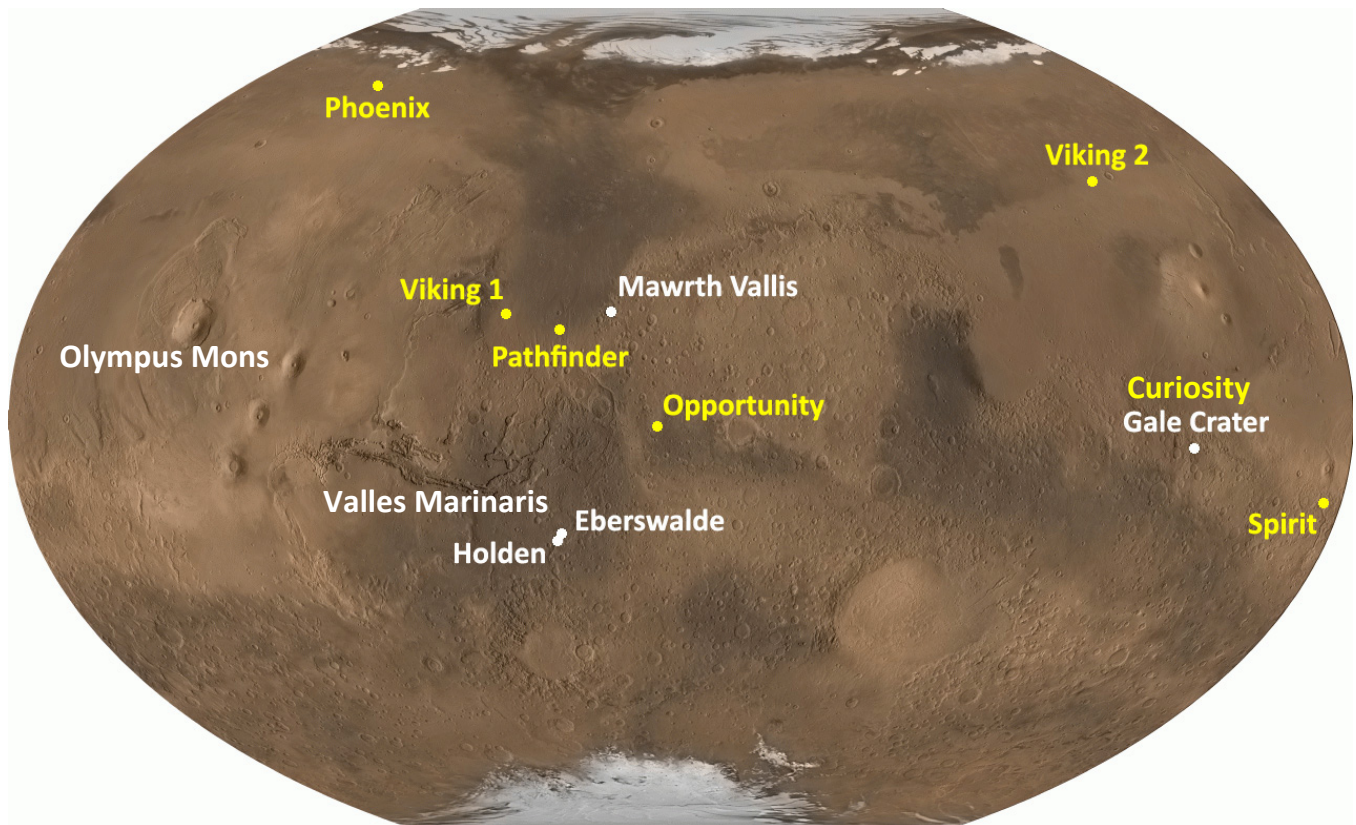
**SLIDE 33**

# Data from the laser spectrometer (ChemCam) mounted on the mast of *Curiosity*, giving the elemental composition of a Martian rock sample



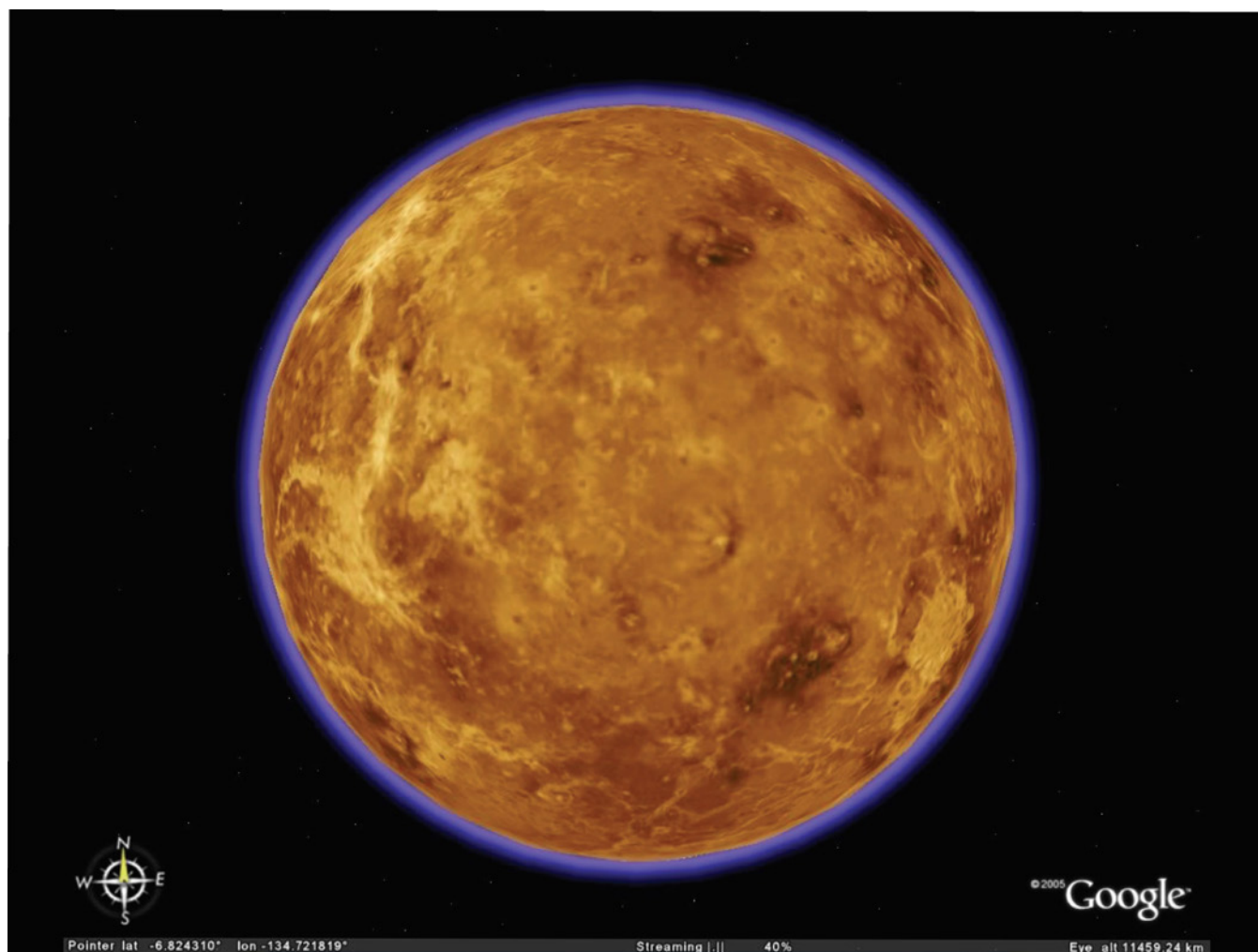
**SLIDE 34**

## A Global Map of Mars showing the location of NASA Landers



SLIDE 35





## SLIDE 36

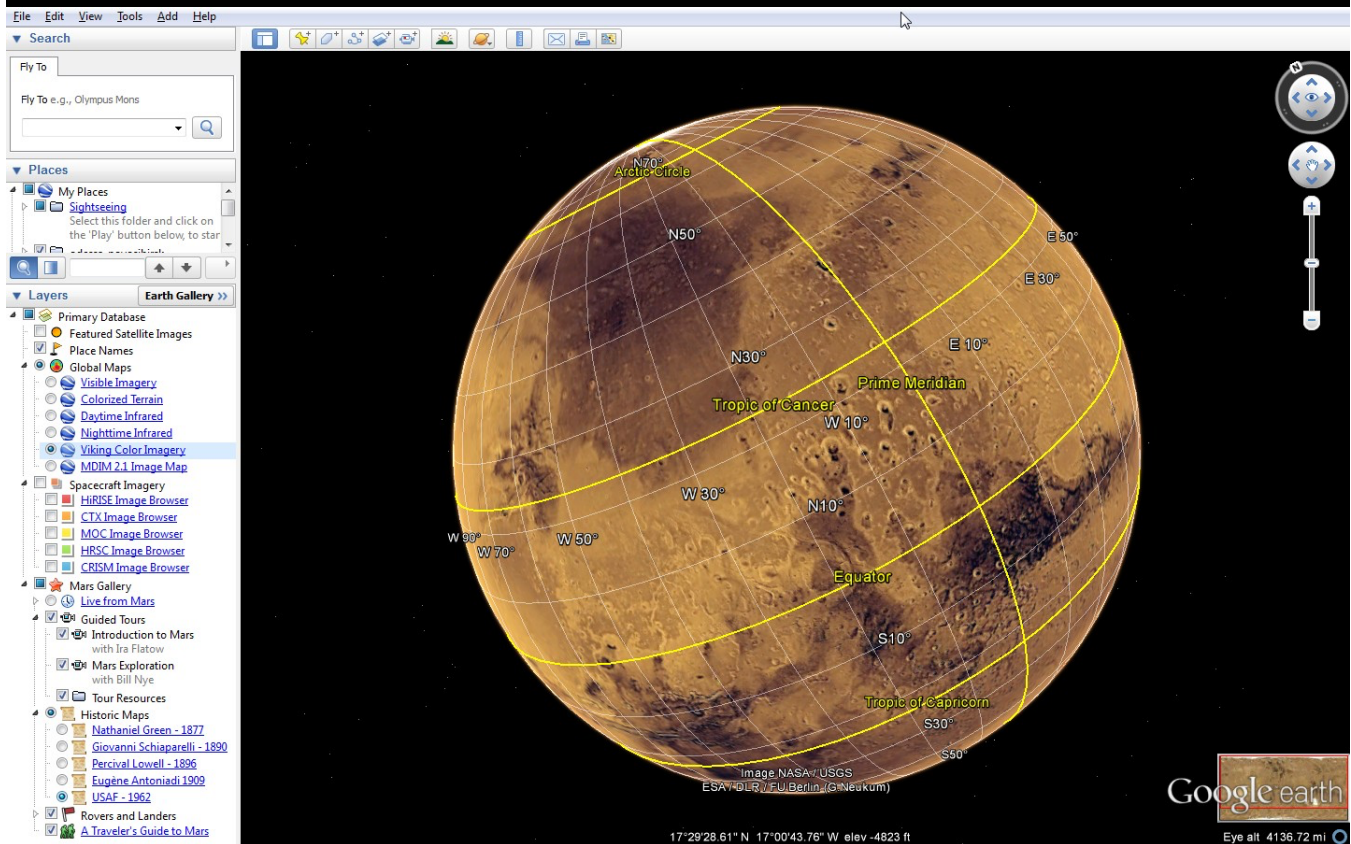


# Explore Google Earth



SLIDE 37

# Google Mars Activity to Explore the Surface of Mars



SLIDE 38

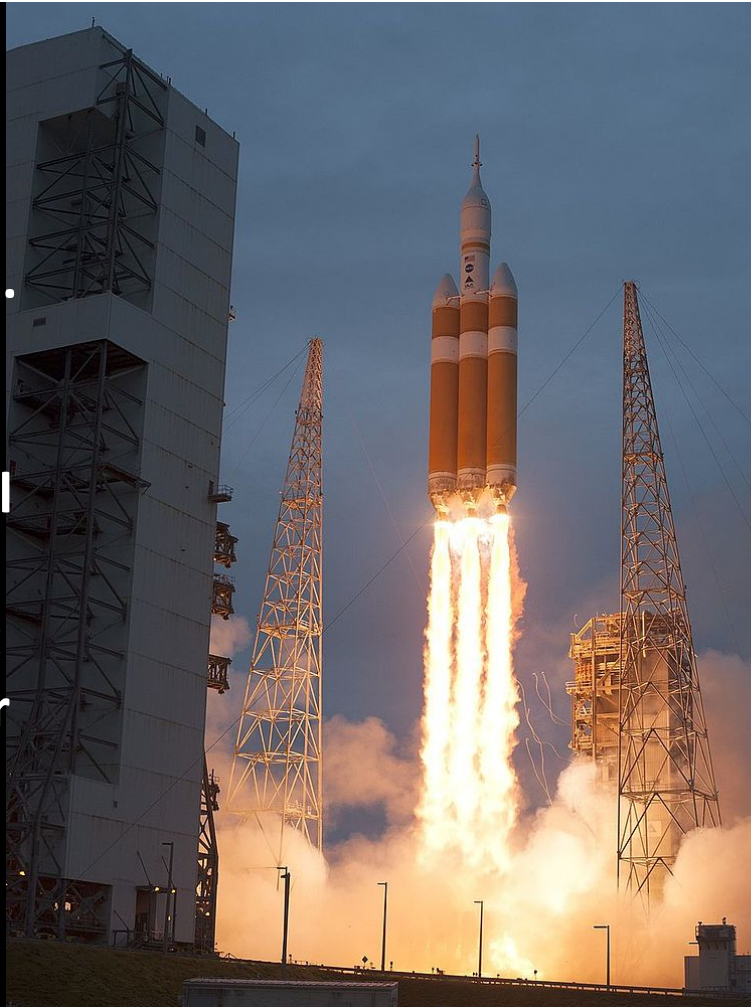




# Earth – Our Only Home

SLIDE 39

**Today, NASA is preparing the *Orion* Mission to Mars, scheduled for the 2030s. Here we see the Delta IV heavy rocket lifting off from Cape Canaveral carrying NASA's *Orion* Mars Exploration Flight Test (EFT) spacecraft for an initial orbital test flight on December 5, 2014.**



**SLIDE 40**