Space Weather and Potential Impact on Earth's Climate and Seismic activities

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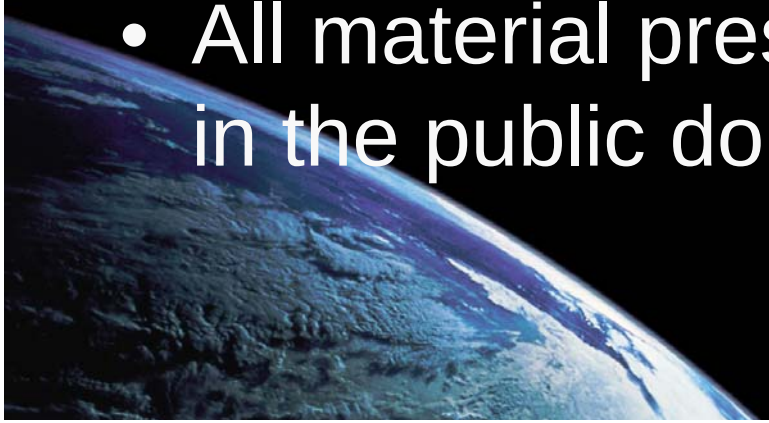
December 19, 2010

Notes

- This is a personal research and is NOT associated with any organization.
- This research focuses on the overview of the solar system and the connection between Earth, Sun and everything else surrounding the solar system.
- All material presented are freely available in the public domain.



Overview

- Introduction
  - Solar system and its dynamics
  - Milky way
  - Universe
- Climate change in the solar system
  - At the edge of the solar system
  - Inside the solar system
  - Impact on Earth’s Climate and Seismic activities
- Connection between natural disasters on Earth and space weather
- Galactic superwave theory

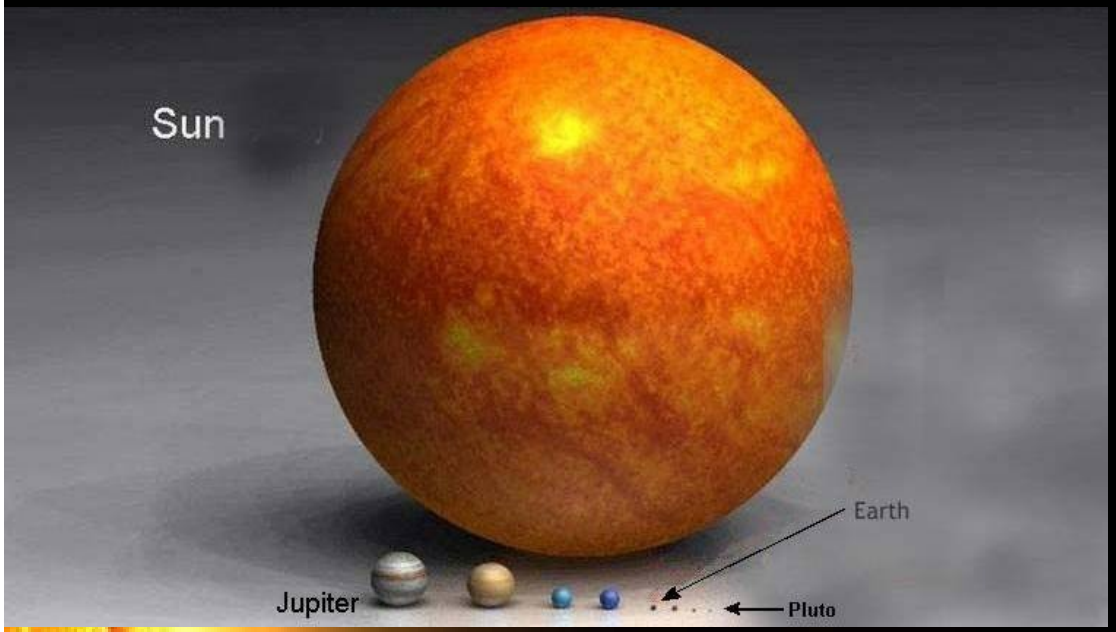
Solar System and Its Dynamic

Type : SBbc (barred spiral galaxy)
Number of stars : 100-400 billion stars
Mass : 5.8×10^{11} M☉
Diameter : 100,000 light years

- Solar system
- Milky way galaxy
- Universe

Source: Wikipedia

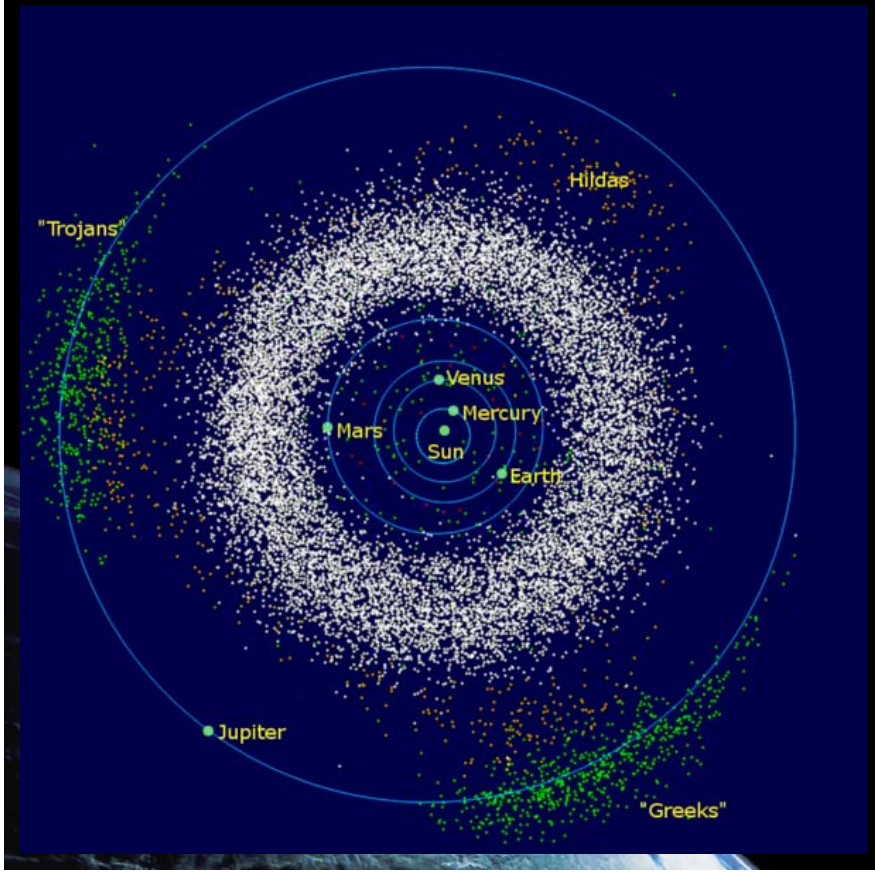
Solar System



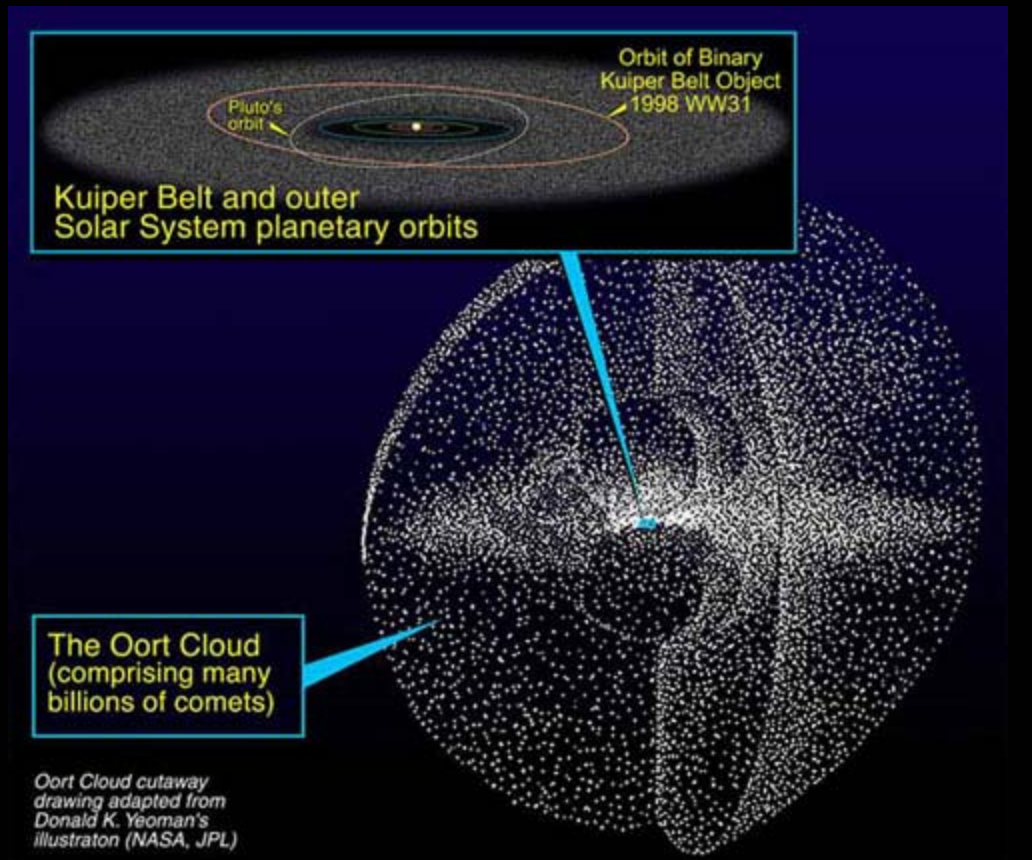
- Consists of eight major planets
- The sun contains ~99.86% of the total mass in the solar system

Solar System : Comets & Asteroids

Asteroids are mostly small Solar System bodies composed mainly of refractory rocky and metallic minerals.
The main asteroid belt occupies the orbit between Mars and Jupiter, between 2.3 and 3.3 AU from the Sun. It is thought to be remnants from the Solar System's formation that failed to coalesce because of the gravitational interference of Jupiter.

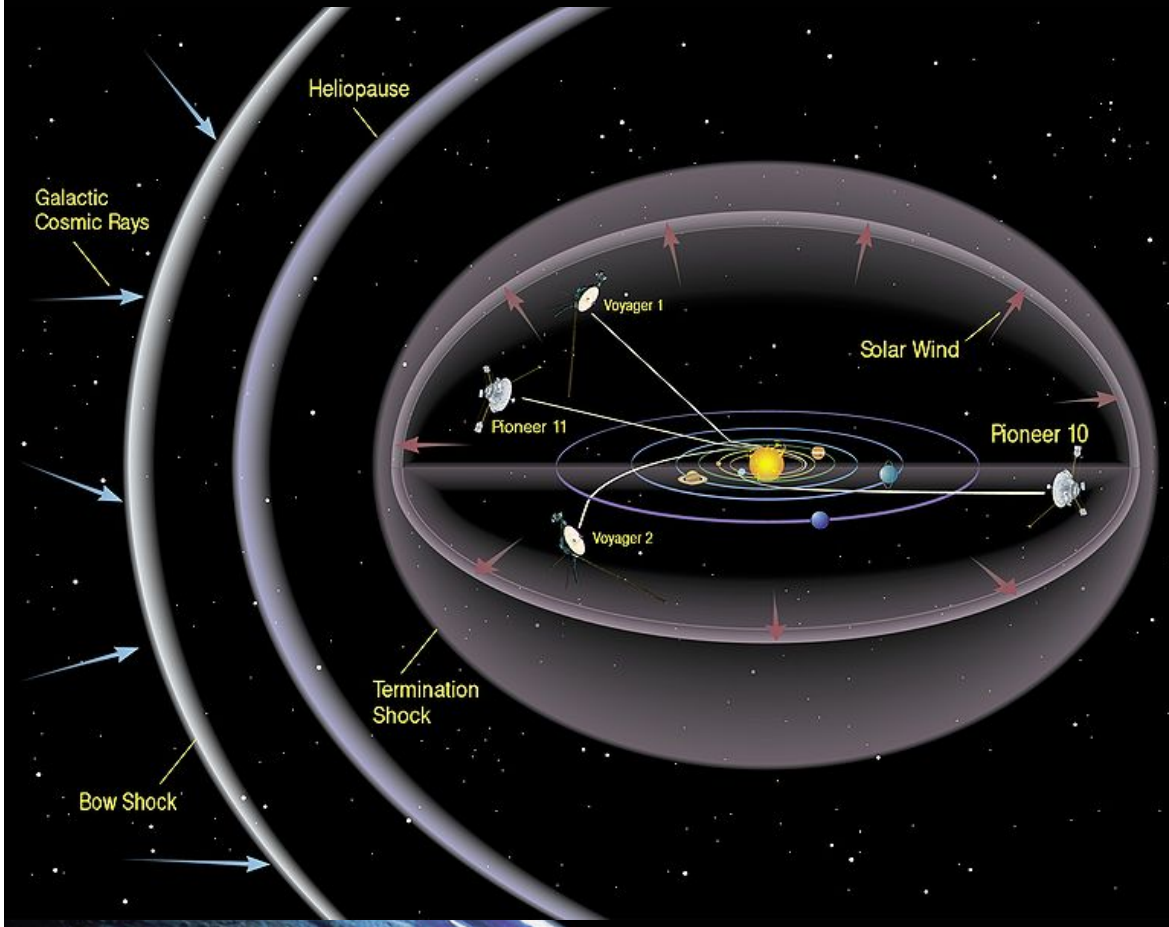


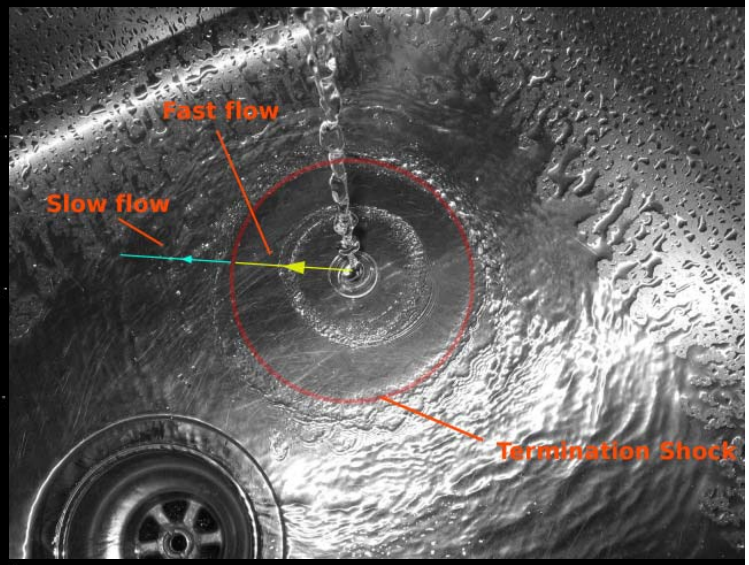
The Kuiper belt, the region's first formation, is a great ring of debris similar to the asteroid belt, but composed mainly of ice.



Oort cloud is a spherical cloud of up to a trillion icy objects that is believed to be the source for all long-period comets and to surround the Solar System at roughly 50,000 AU (around 1 light-year (LY)), and possibly to as far as 100,000 AU (1.87 LY).

Outer edge of the Solar System

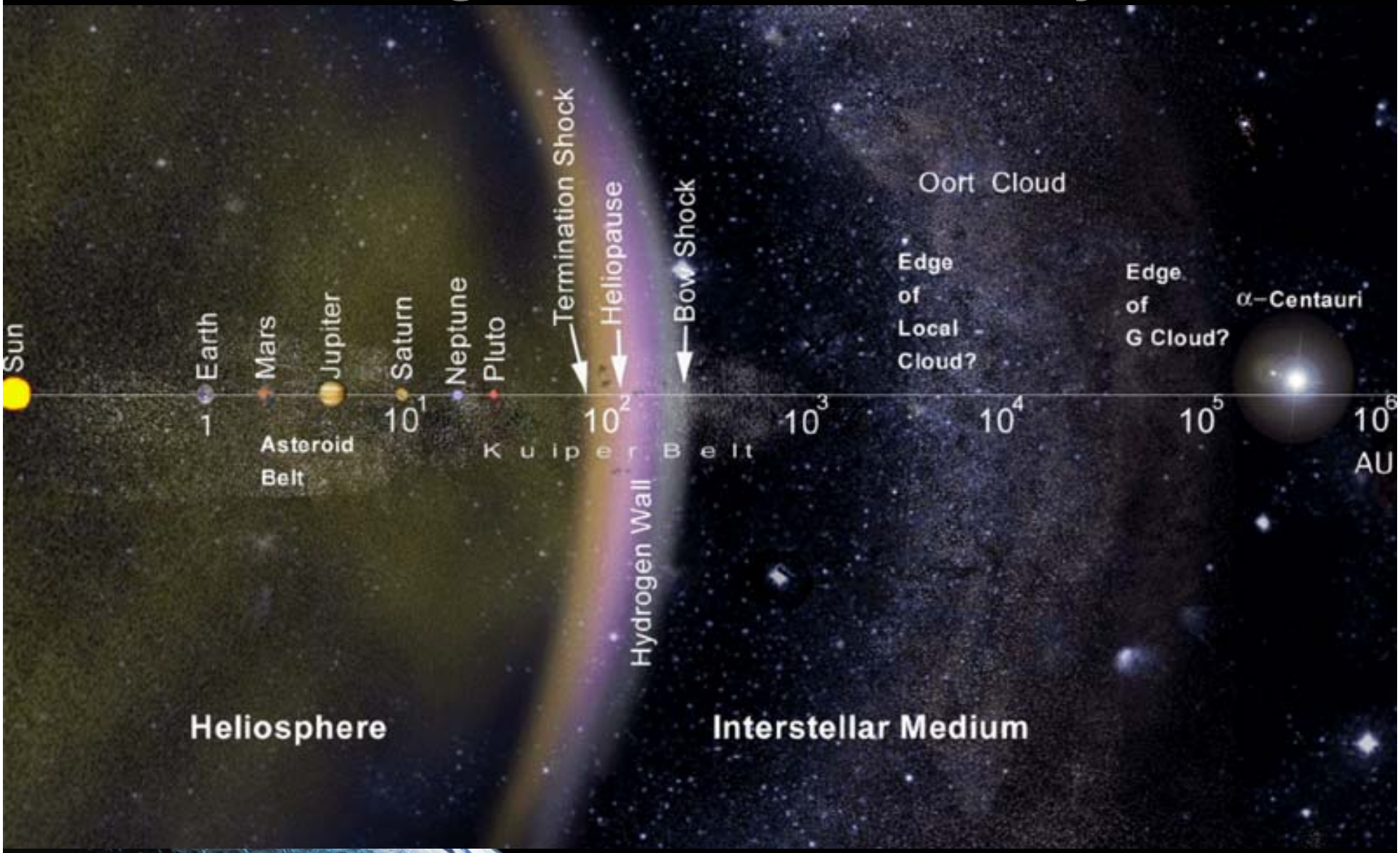




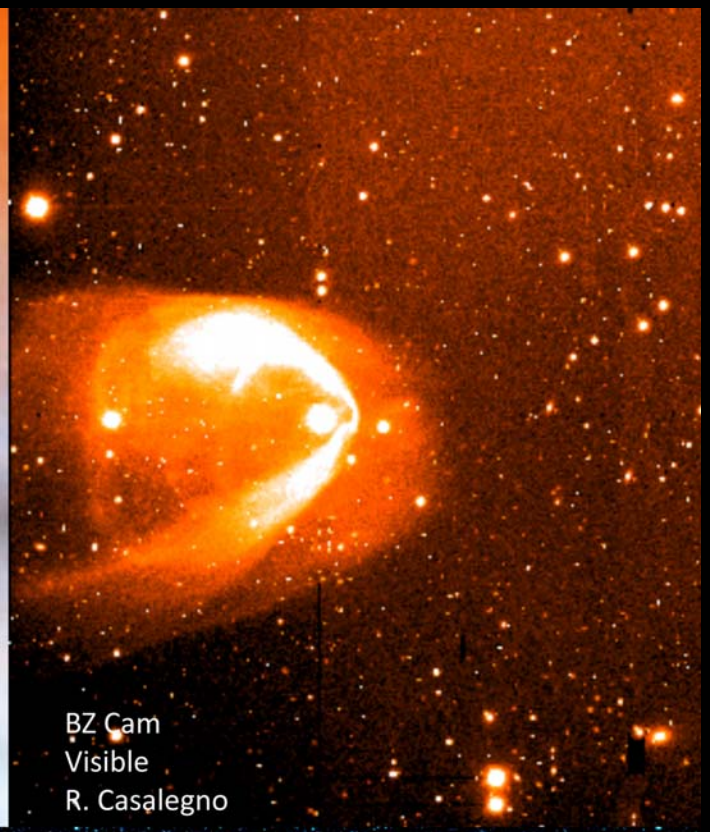
The **heliosphere** is a bubble in space "blown" into the interstellar medium (the hydrogen and helium gas that permeates the galaxy) by the solar wind.

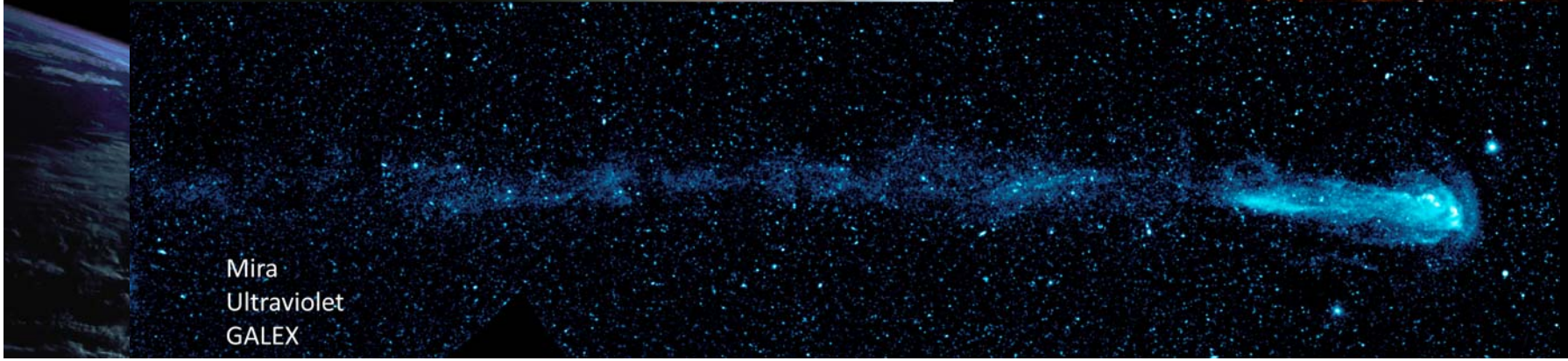
Outer edge of the Solar System (Animation)

Outer edge of the Solar System



Solar System View From the Outside





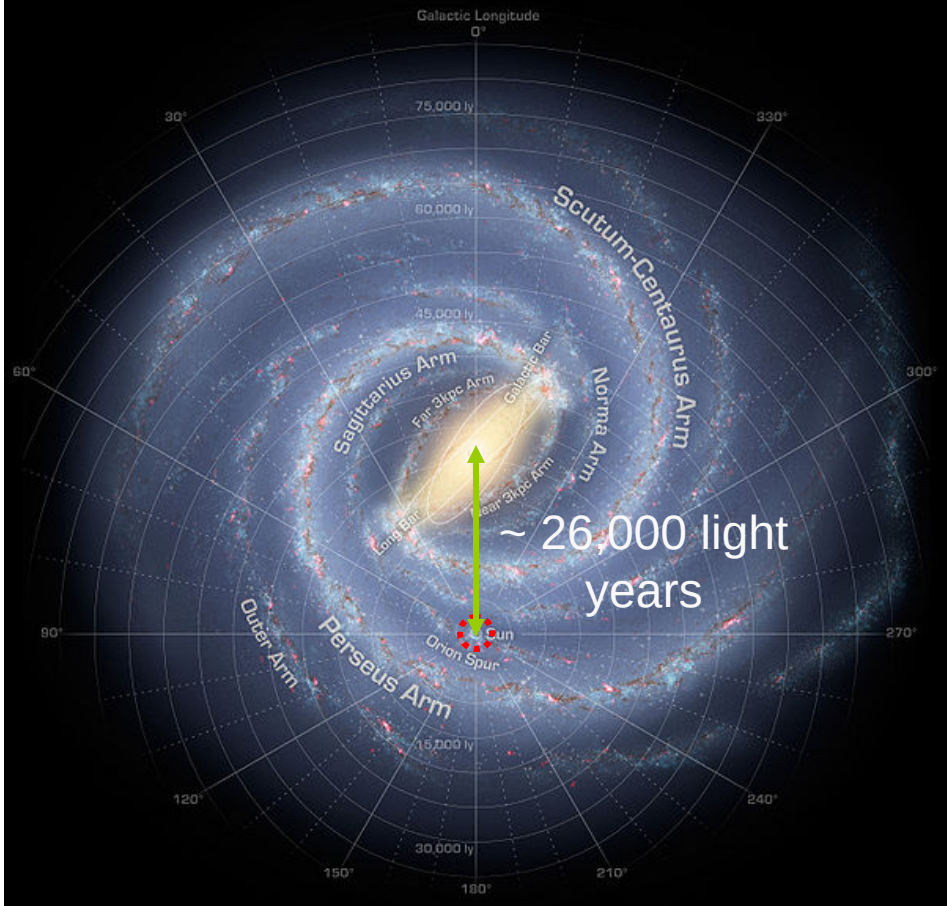
Galaxy

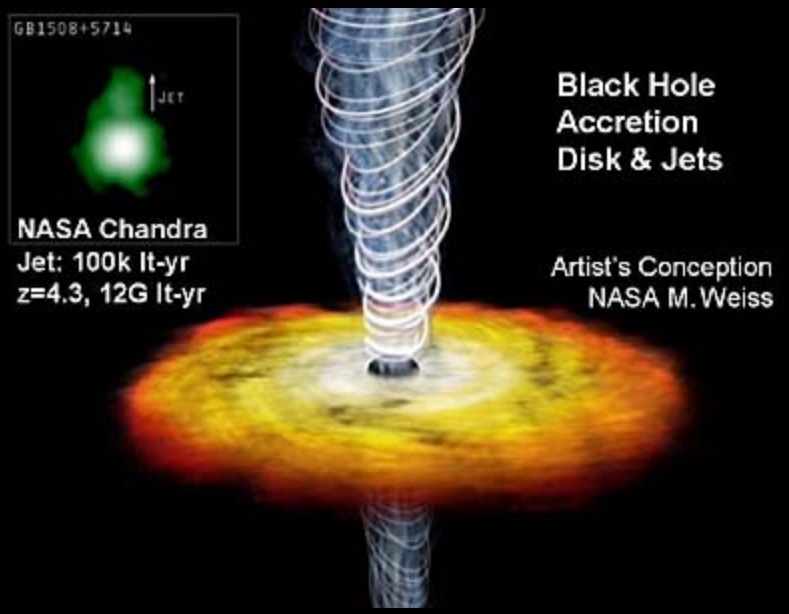
Solar System in Milky Way Galaxy

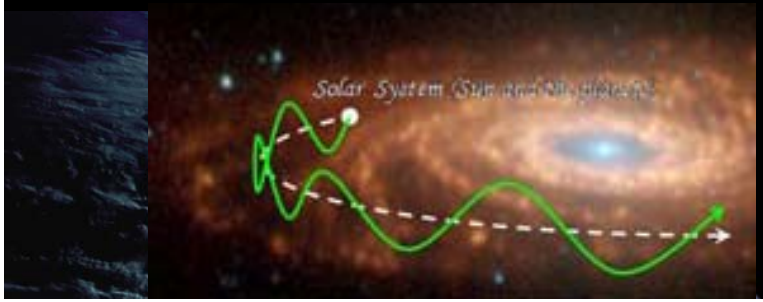
Traveling at the speed of about 155 miles (250 kilometers) per second, the Sun completes one revolution around the galactic center in about 220 million years.

Solar System Path Around Milky Way

Milky Way

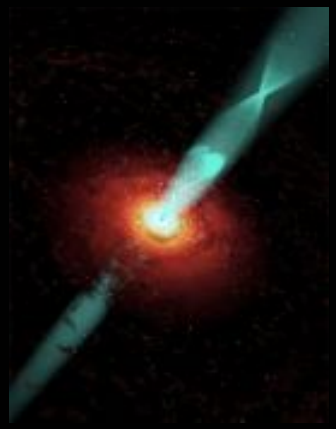

Galactic Longitude
0°
30°
330°
75,000 ly
60,000 ly
45,000 ly
60°
300°
Scutum-Centaurus Arm
Sagittarius Arm
Far 3kpc Arm
Galactic Bar
Norma Arm
Near 3kpc Arm
Long Bar
~ 26,000 light years
90°
270°
Outer Arm
Perseus Arm
Sun
Orion Spur
15,000 ly
120°
240°
30,000 ly
150°
210°
180°

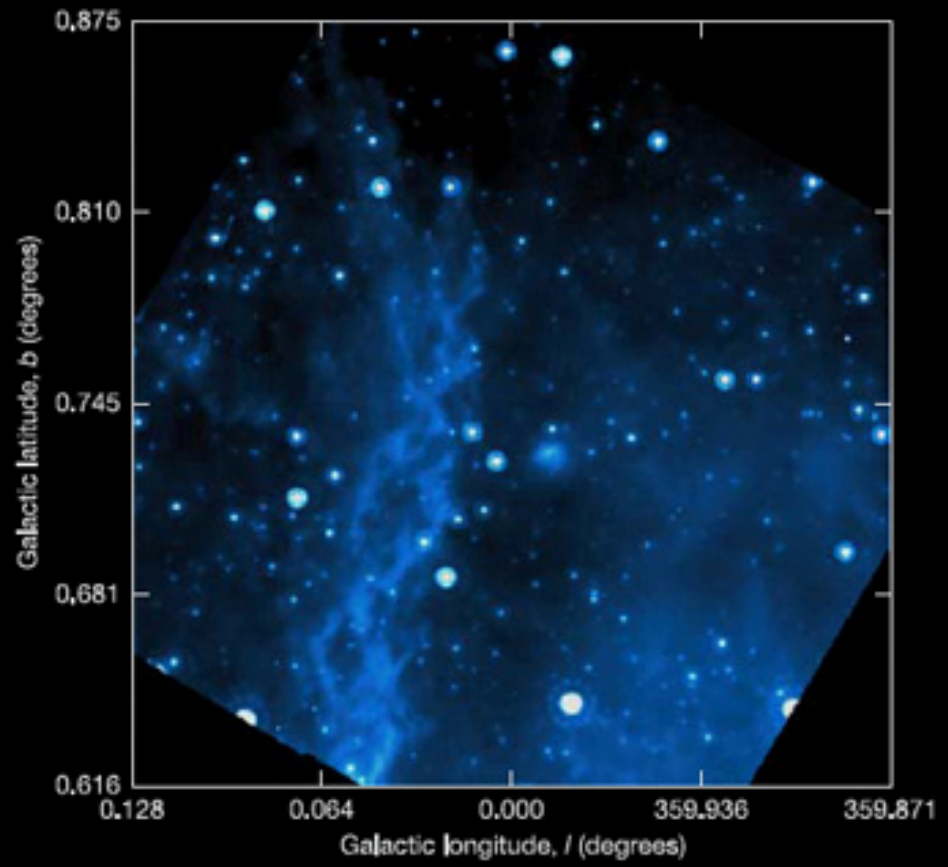

GB1508+5714
JET
NASA Chandra
Jet: 100k lt-yr
z=4.3, 12G lt-yr
Black Hole
Accretion
Disk & Jets
Artist's Conception
NASA M. Weiss

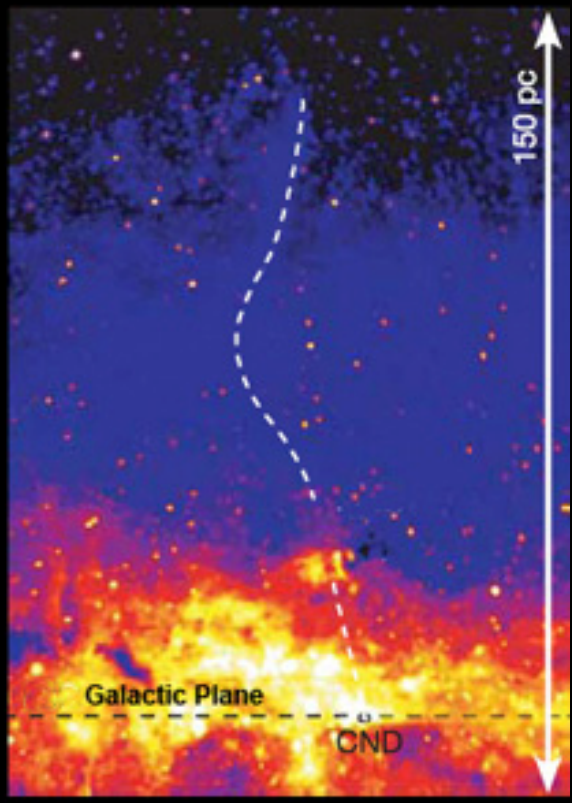

Solar System


SAGITTARIUS A

Jet Stream at the Center of the Milky Way





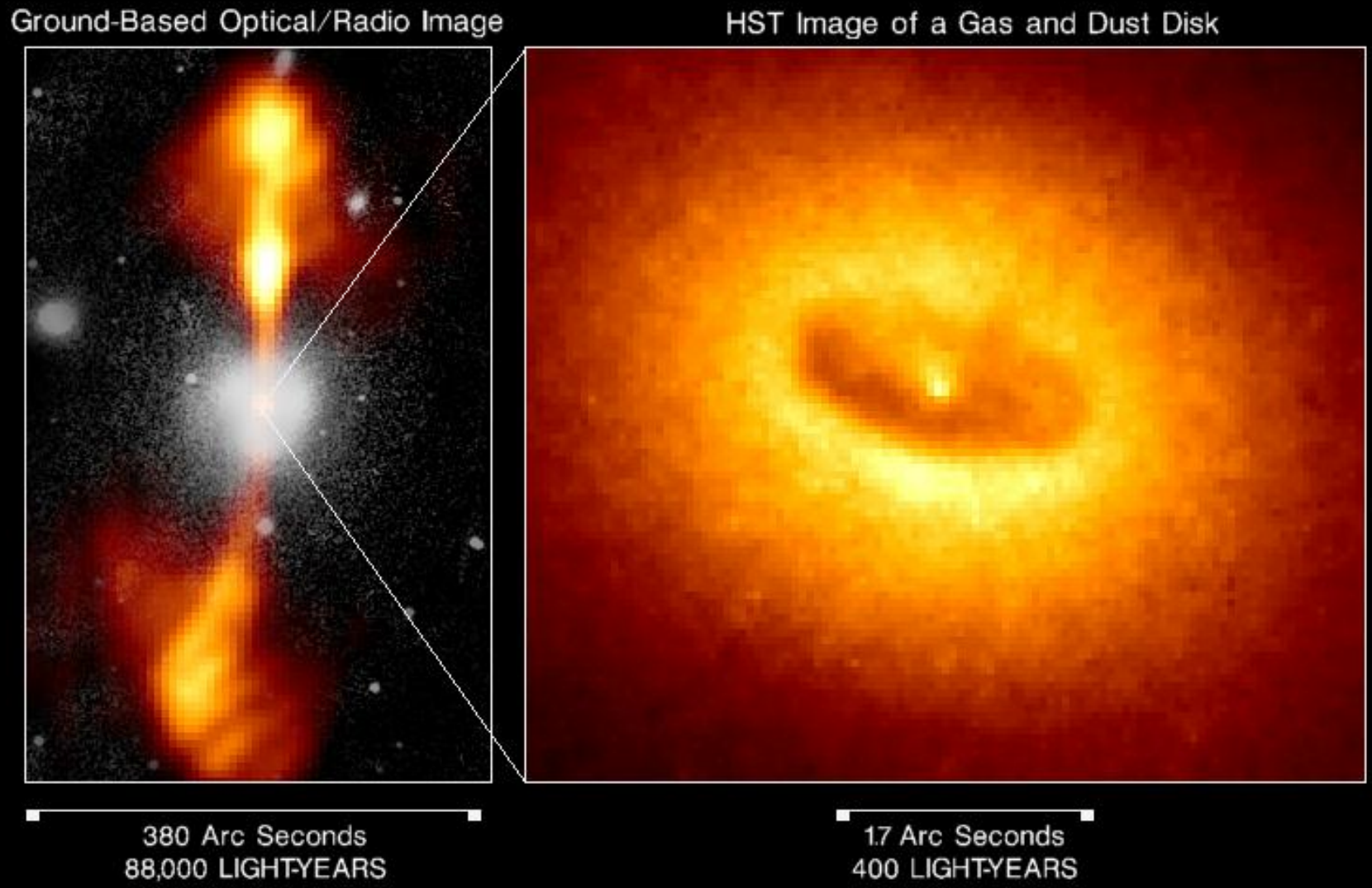


The Double Helix Nebula: a magnetic torsional wave propagating out of the Galactic centre, by Mark Morris, Keven Uchida, and Tuan Do

Core of Galaxy NGC 4261

Hubble Space Telescope

Wide Field / Planetary Camera



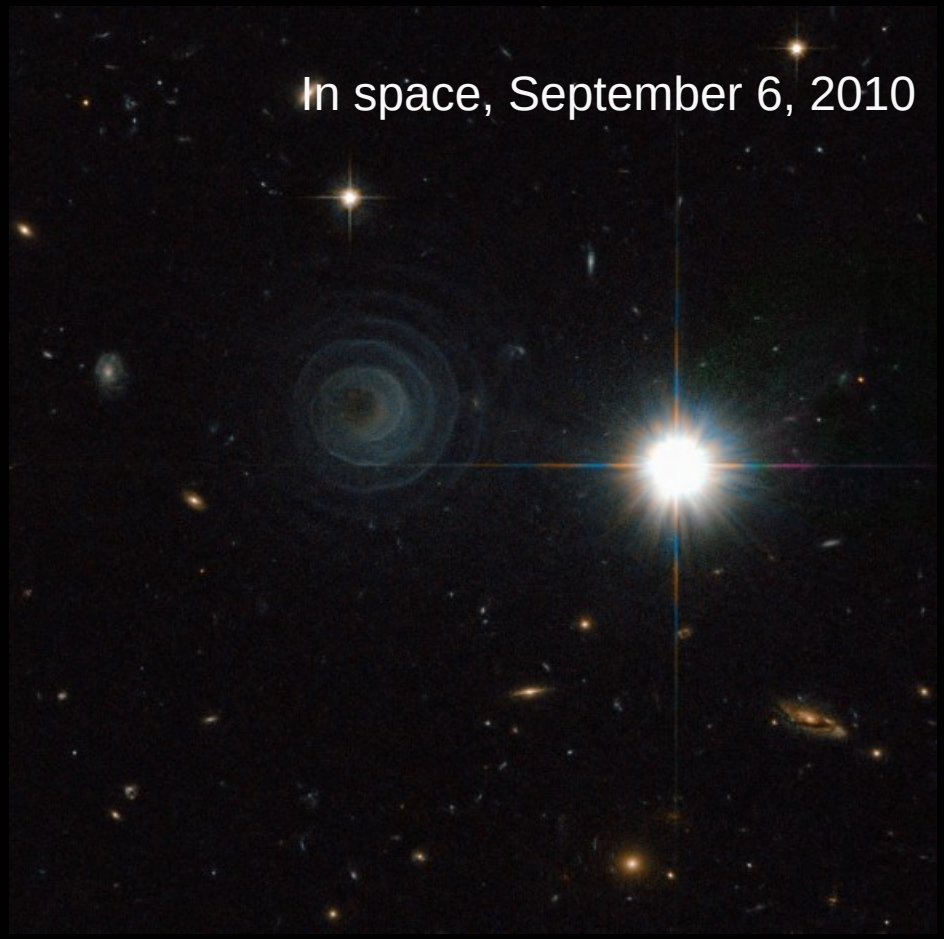
Milky Way Black Hole

Milky Way Simulation (By Ants)

On Earth, December 10, 2009

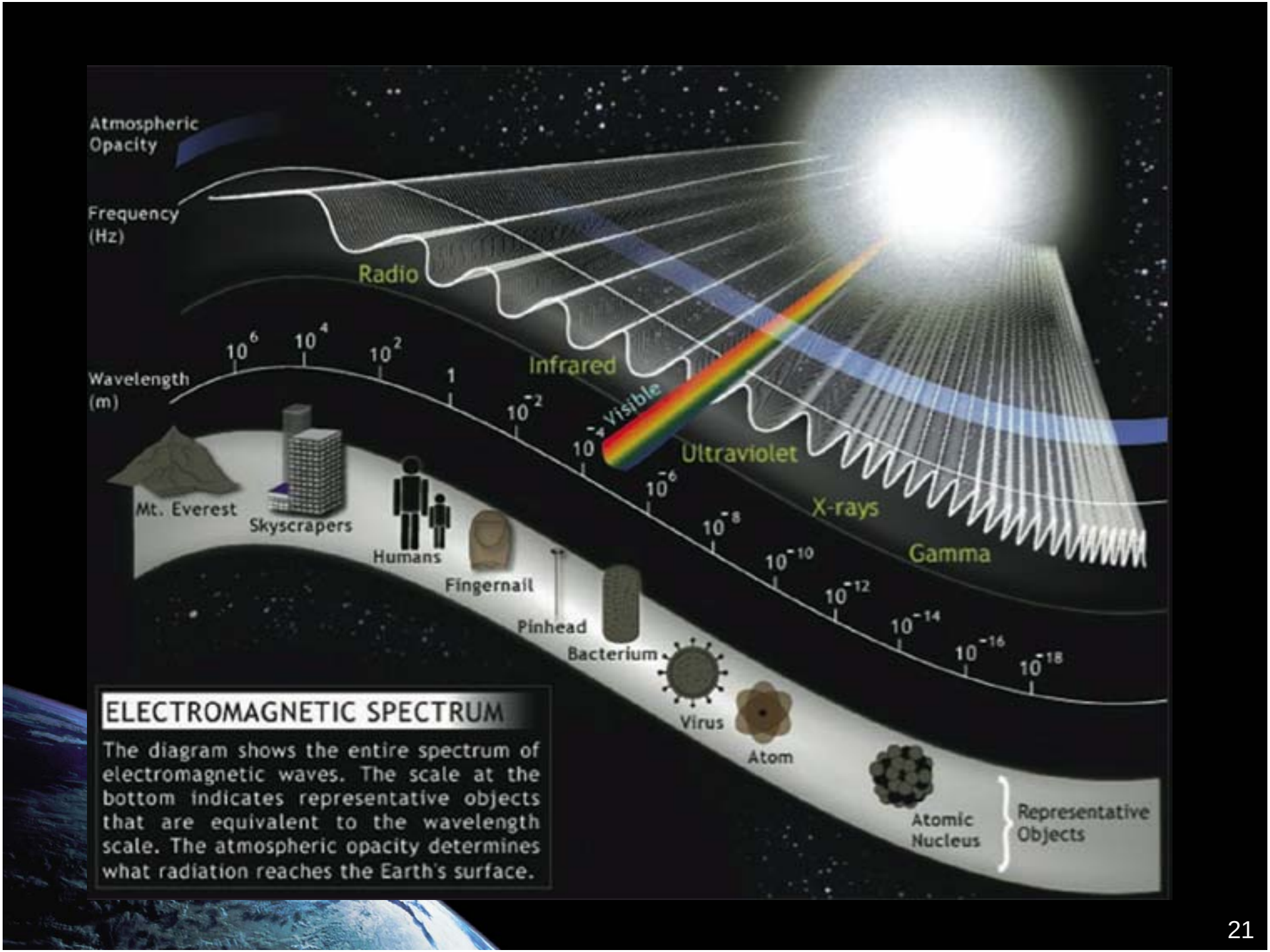
An Extraordinary Celestial Spiral. Credit: ESA/NASA & R. Sahai

In space, September 6, 2010

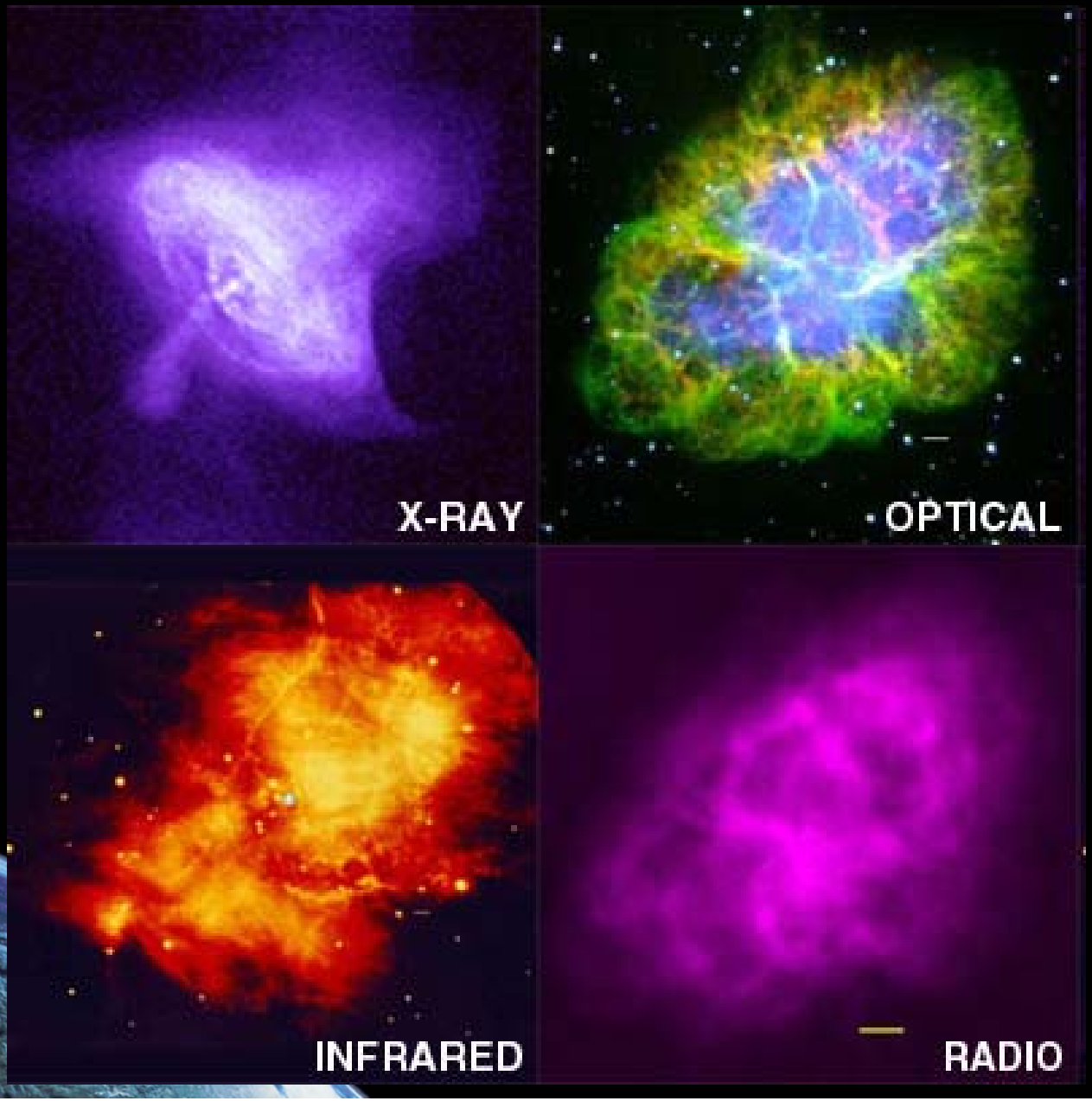


the formation of an unusual pre-planetary nebula in one of the most perfect geometrical spirals ever seen.

Exploration of the Universe

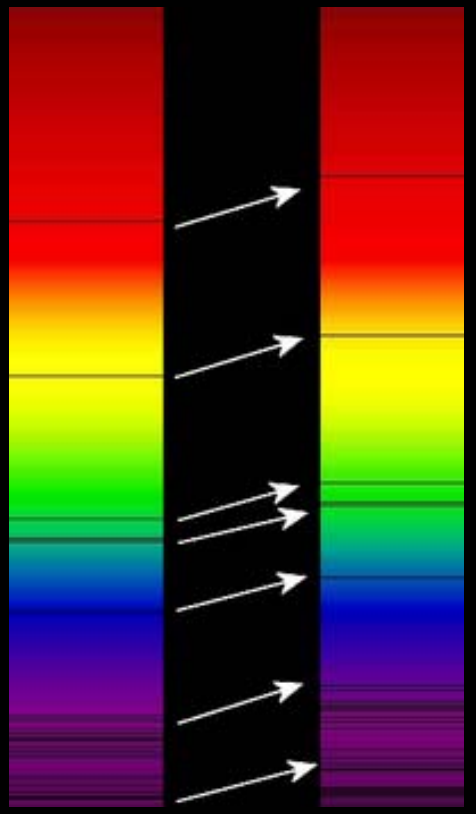

Atmospheric Opacity
Frequency (Hz)
Radio
Infrared
Visible
Ultraviolet
X-rays
Gamma
Wavelength (m)
10^{6}
10^{4}
10^{2}
1
10^{-2}
10^{-4}
10^{-6}
10^{-8}
10^{-10}
10^{-12}
10^{-14}
10^{-16}
10^{-18}
Mt. Everest
Skyscrapers
Humans
Fingernail
Pinhead
Bacterium
Virus
Atom
Atomic Nucleus
Representative Objects
ELECTROMAGNETIC SPECTRUM
The diagram shows the entire spectrum of electromagnetic waves. The scale at the bottom indicates representative objects that are equivalent to the wavelength scale. The atmospheric opacity determines what radiation reaches the Earth's surface.

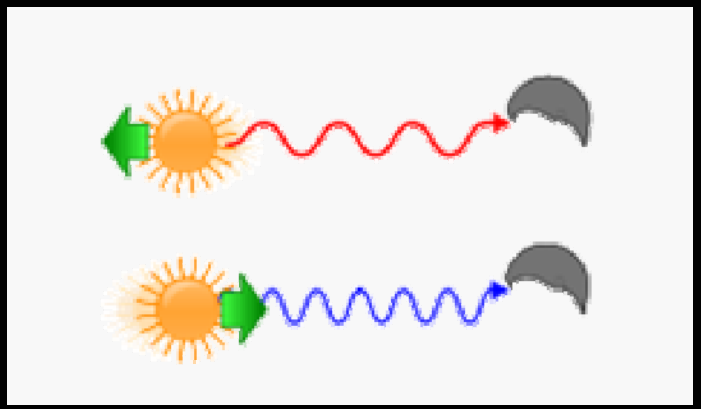
Nebula at four different frequency spectrums



Redshift

In physics and astronomy, redshift occurs when electromagnetic radiation—usually visible light—emitted or reflected by an object is shifted towards the (less energetic) red end of the electromagnetic spectrum due to the Doppler effect or other gravitationally-induced effects. More generally, redshift is defined as an increase in the wavelength of electromagnetic radiation received by a detector compared with the wavelength emitted by the source. This increase in wavelength corresponds to a drop in the frequency of the electromagnetic radiation. Conversely, a decrease in wavelength is called blue shift.

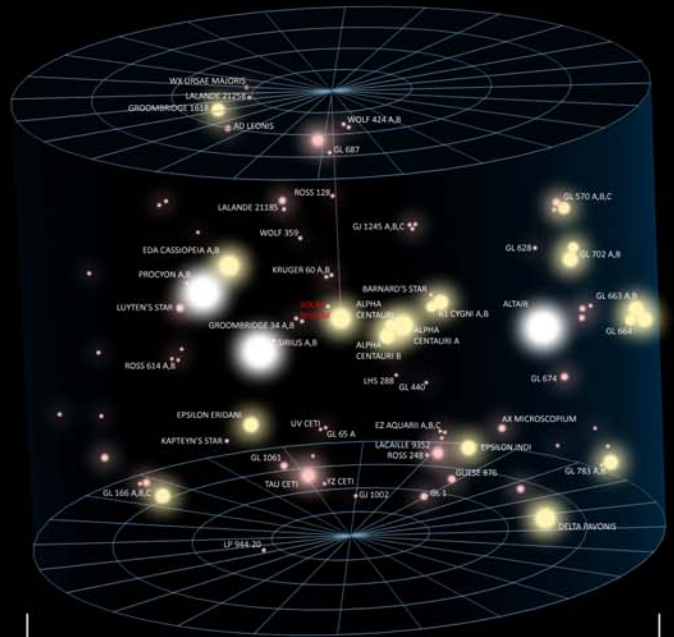




Milky Way

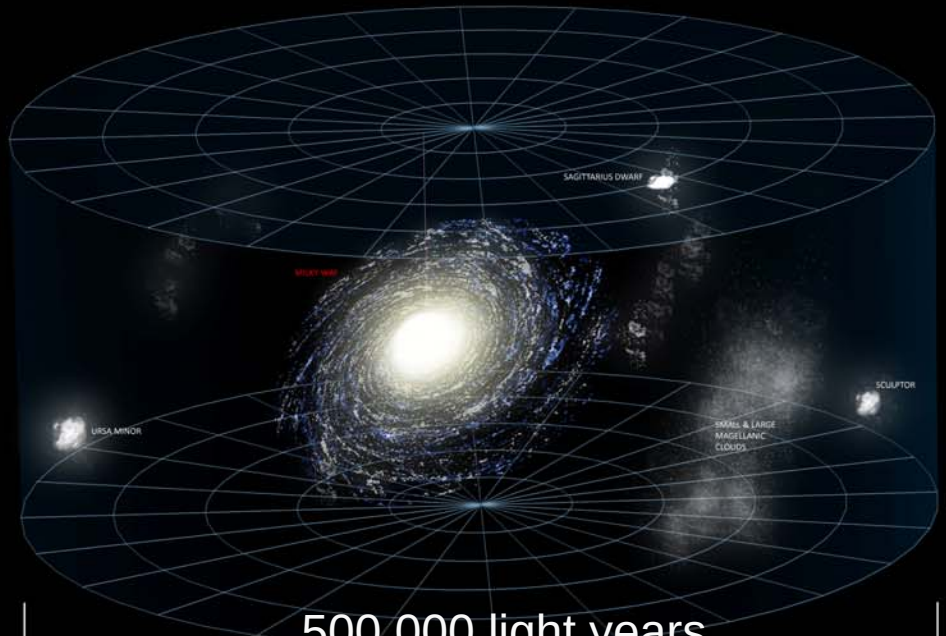
Visible spectrum of Milky way

SUN'S NEIGHBORHOOD



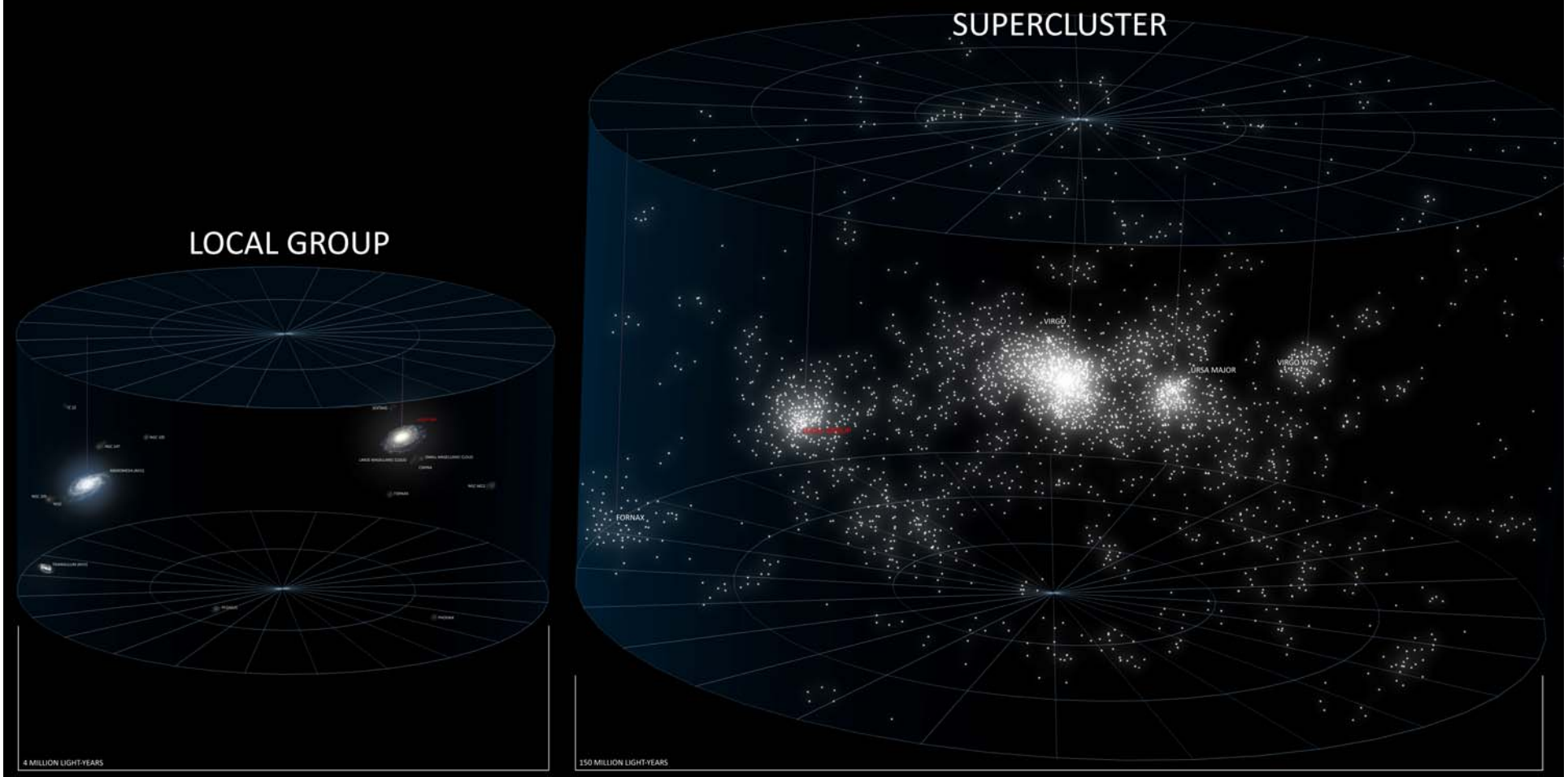
40 light years

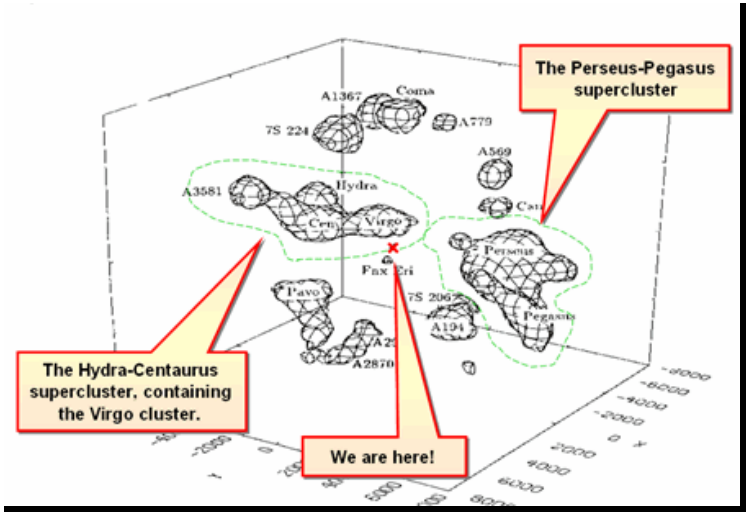
GALACTIC REALM



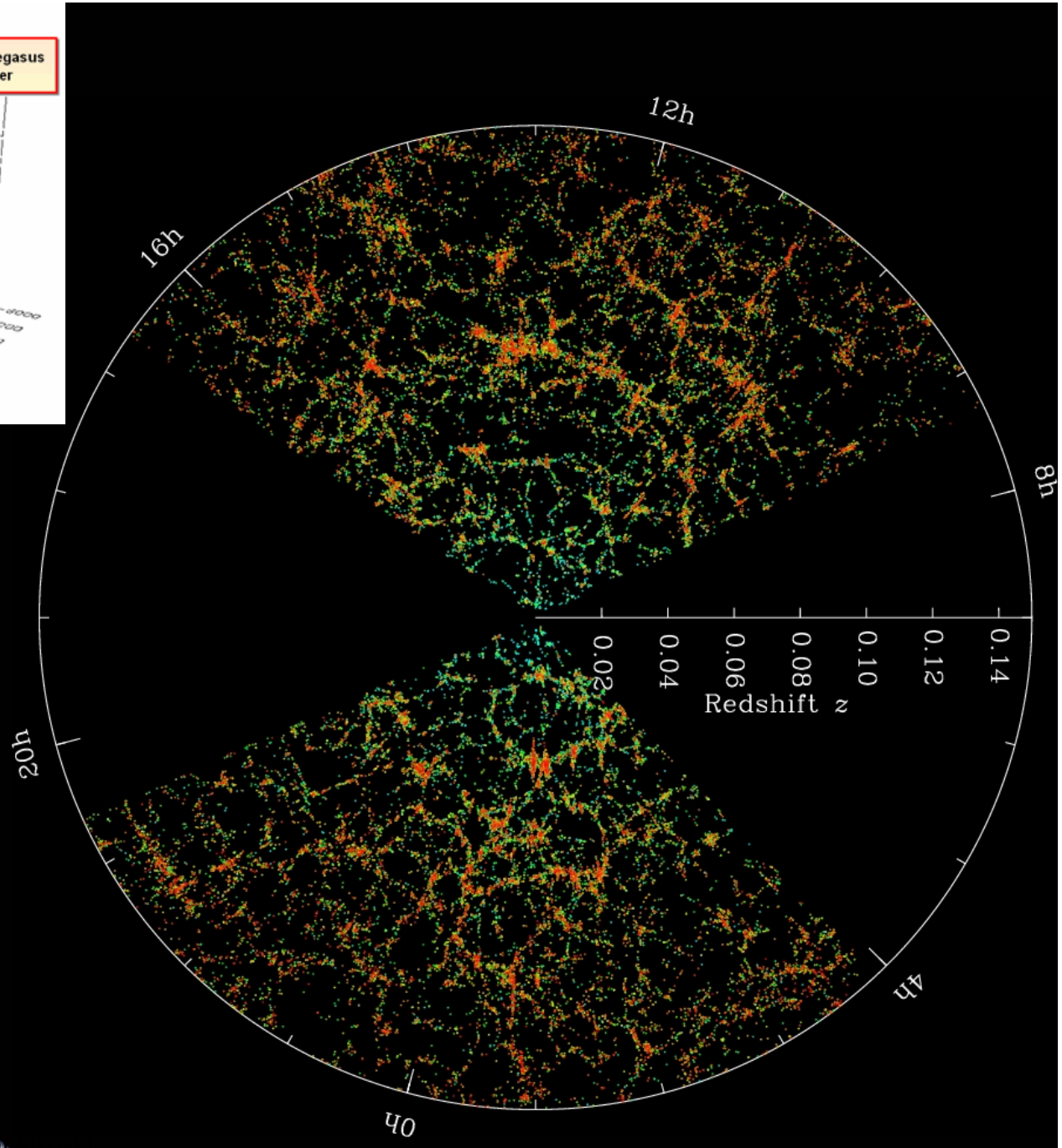
500,000 light years

Zoom out even more



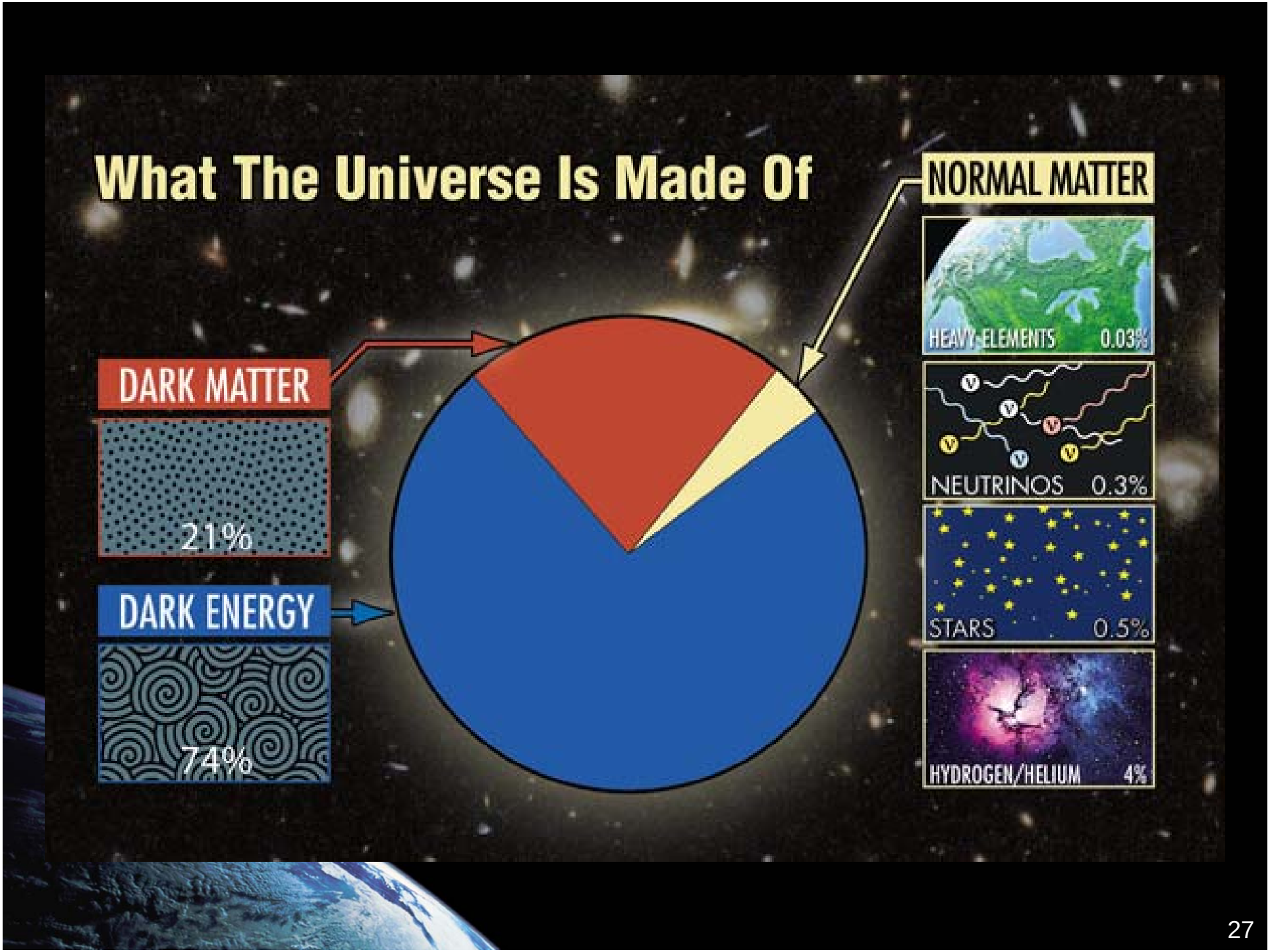


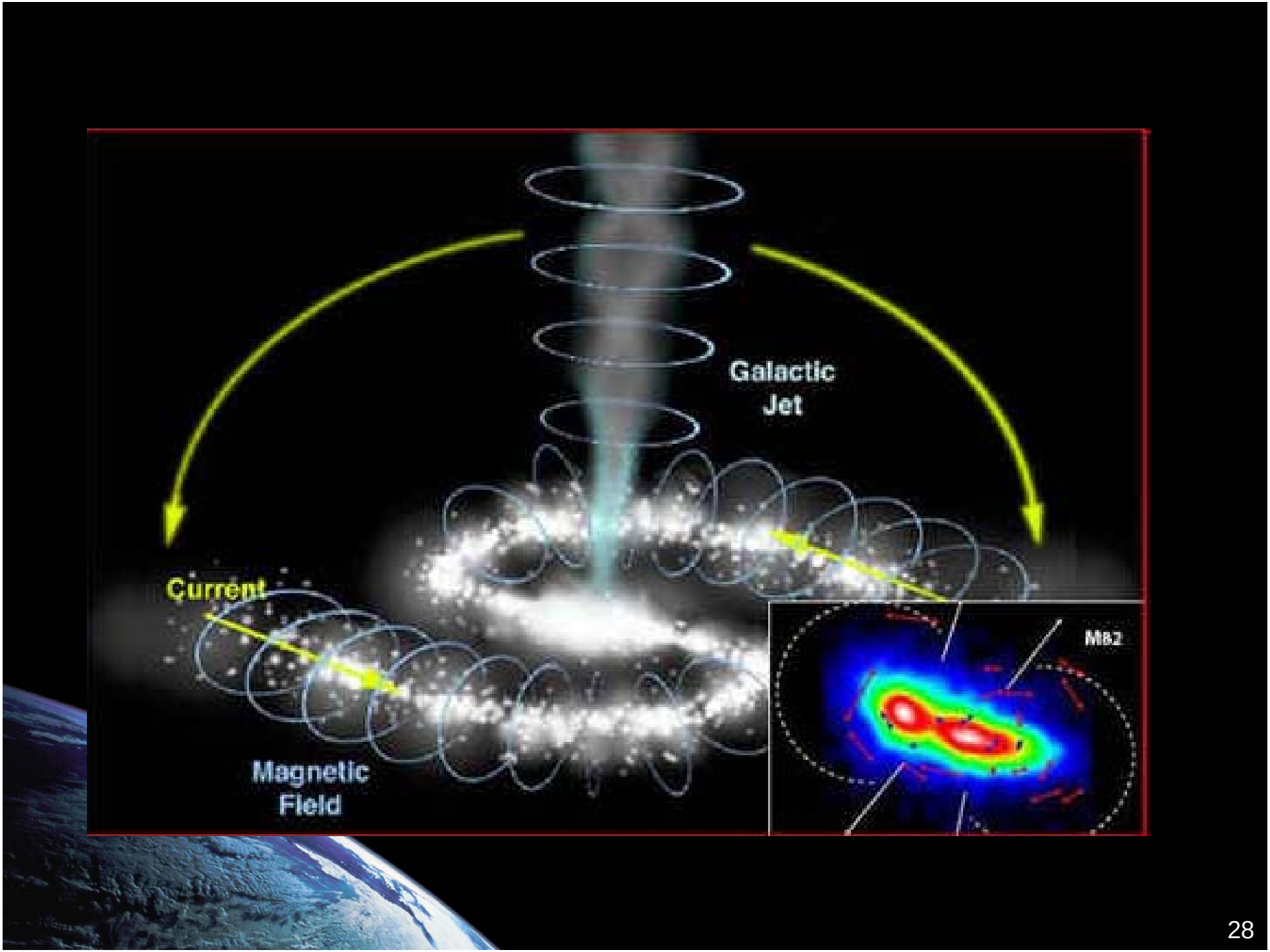
Large scale structure in the northern equatorial slice of the SDSS main galaxy redshift sample. The slice is 2.5 degrees thick, and galaxies are color-coded by luminosity.



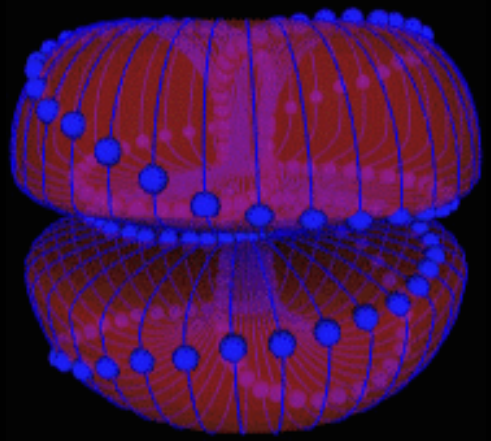
ital Sky Survey (3-D Visualization of Visible Uni

Sloan Digital Sky Survey


What The Universe Is Made Of
NORMAL MATTER
HEAVY ELEMENTS 0.03%
NEUTRINOS 0.3%
STARS 0.5%
HYDROGEN/HELIUM 4%
DARK MATTER
21%
DARK ENERGY
74%


Galactic
Jet
Current
Magnetic
Field
M82

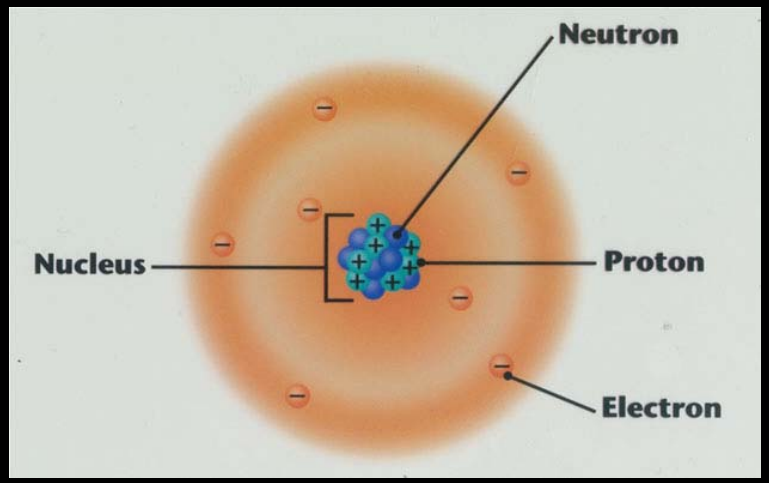
Schwarzschild Proton



The nucleari of the atom is a black hole proton attached together by gravitational force – orbiting each other at the speed of light.

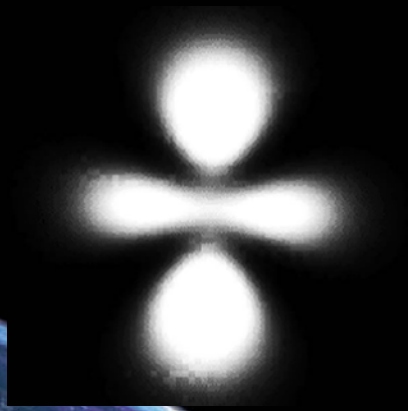
Schwarzschild Proton describes the nuclei of an atom as a mini black hole, where protons are attracted to each other by gravitation rather than some mysterious undefined “strong force.” This radical new view of the quantum world produces a unification of the forces and appropriately predicts measured values for the nucleon of atoms.

Atom



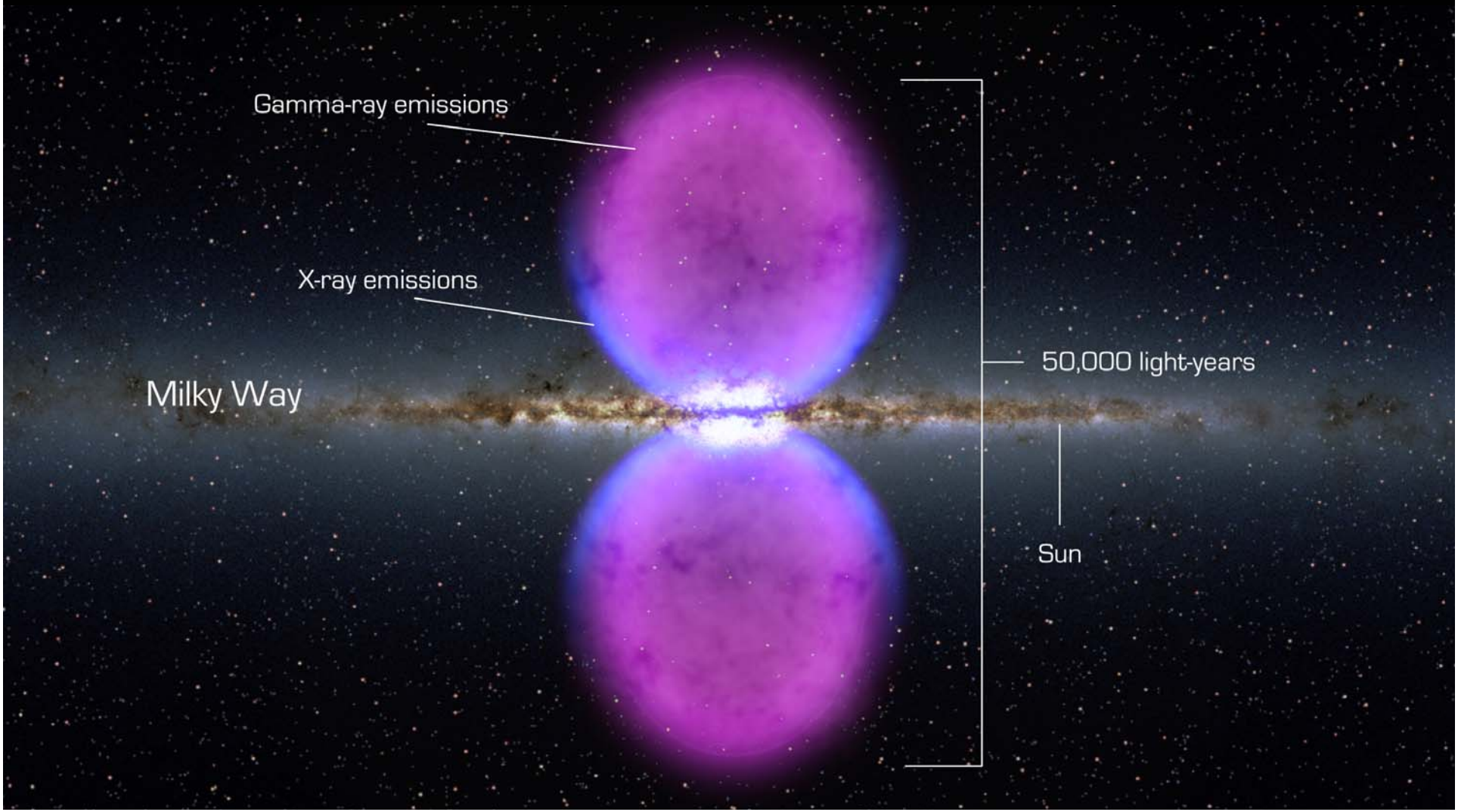
- Solar System Model-Ernest Rutherford discovered that the atom is mostly empty space with a dense positively charged nucleus surrounded by negative electrons.

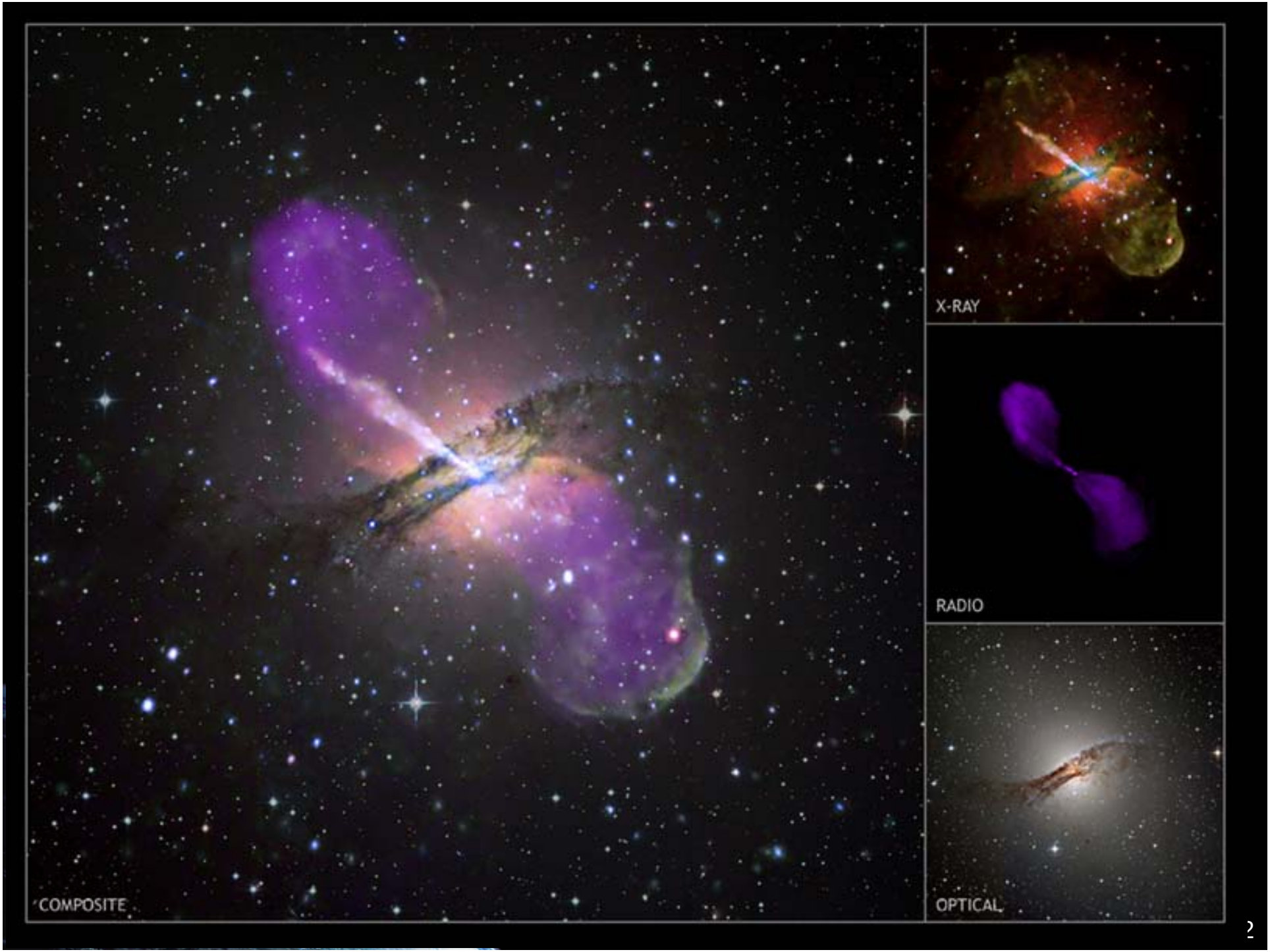
- Neutron : a subatomic particle with no net electric charge and a mass slightly larger than that of a proton.



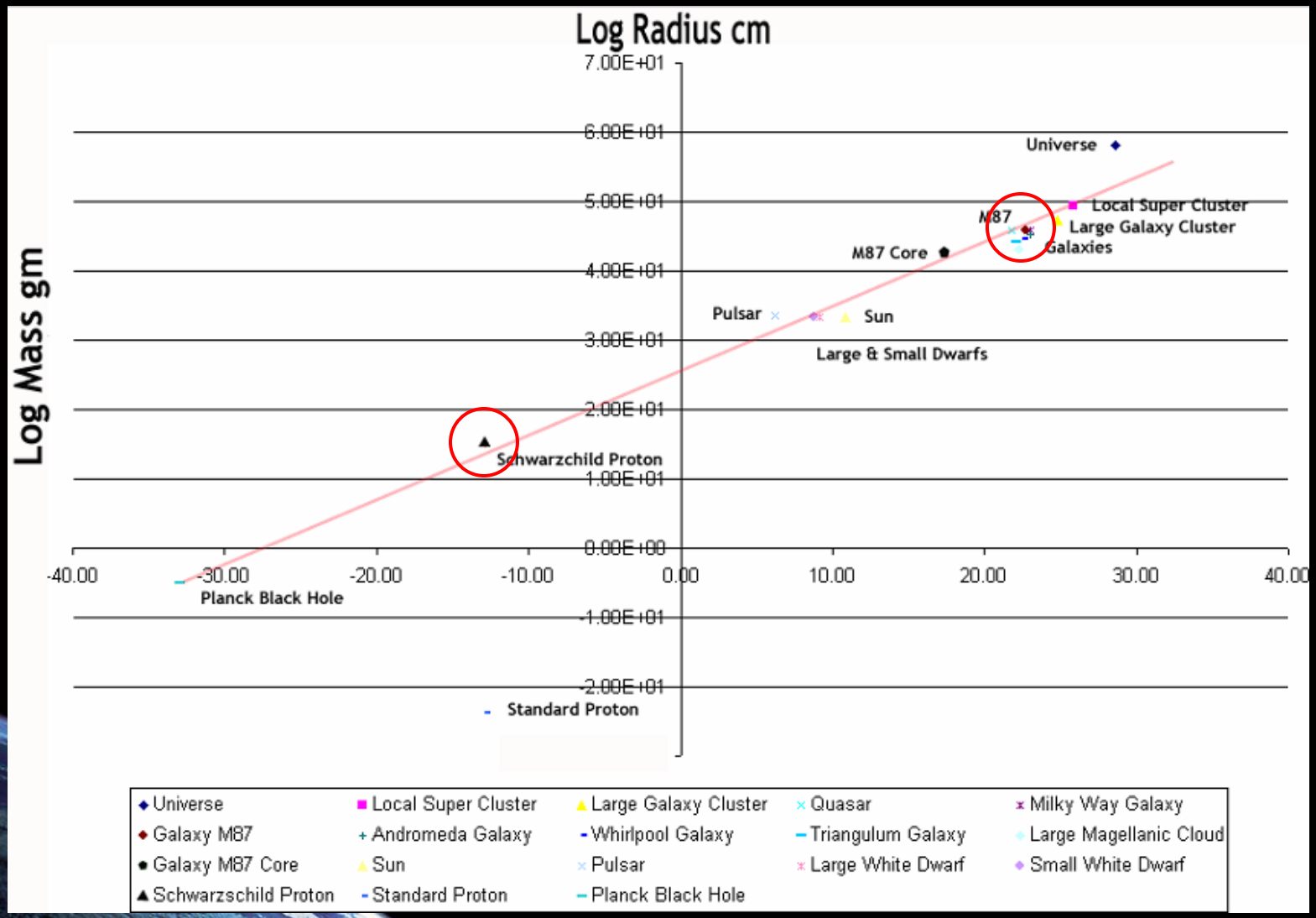
the regions or clouds in which electrons would most likely be found.

Our Milky Way




COMPOSITE
X-RAY
RADIO
OPTICAL

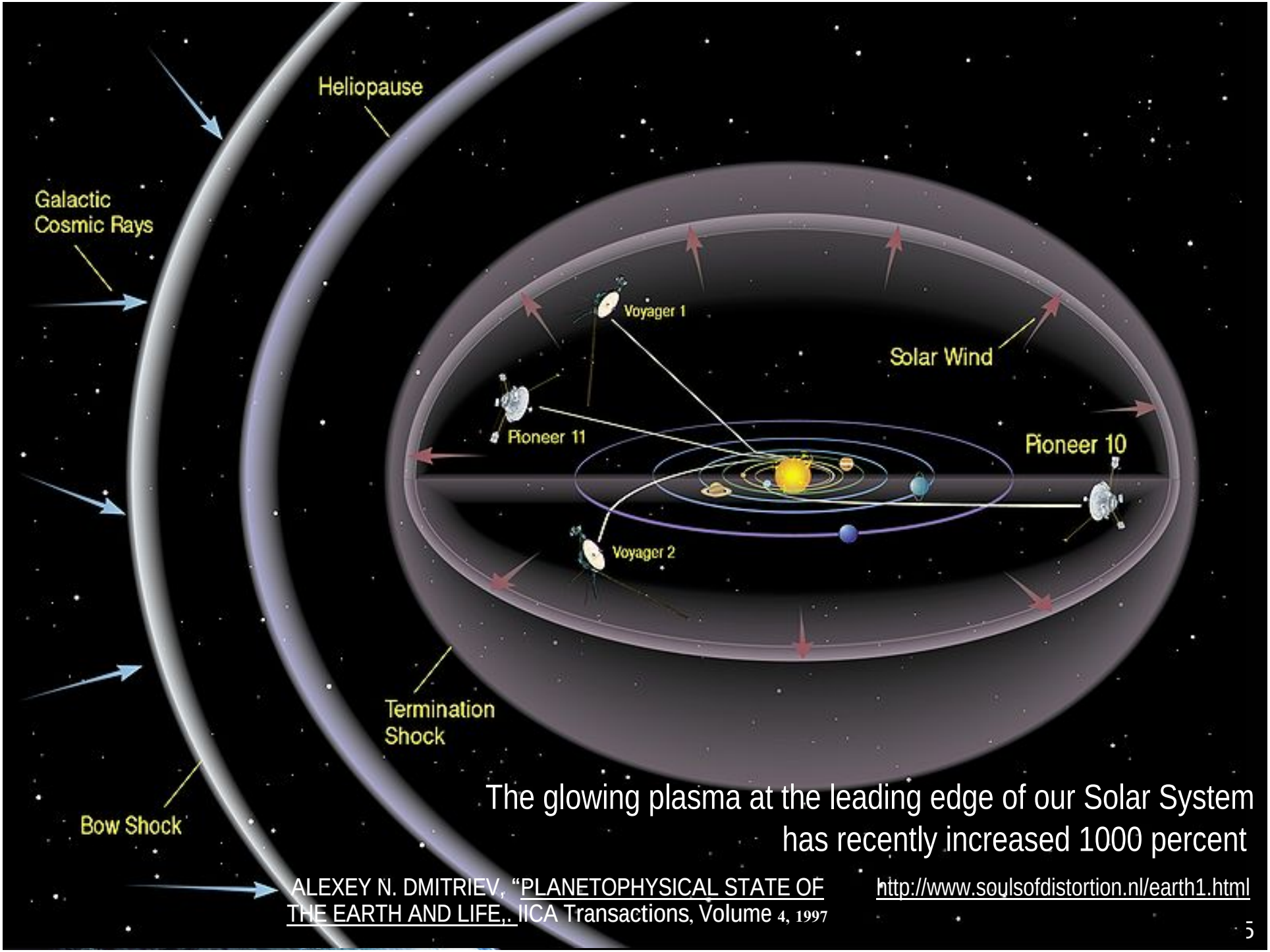
A scaling law for Organized Matter of Mass VS Radius



The universe is self replicating itself !

Climate Change in Our Solar System

- At the edge of the solar system
- Changes at the Sun
- Changes inside the solar system



The glowing plasma at the leading edge of our Solar System has recently increased 1000 percent

ALEXEY N. DMITRIEV, "PLANETOPHYSICAL STATE OF THE EARTH AND LIFE,. IICA Transactions, Volume 4, 1997

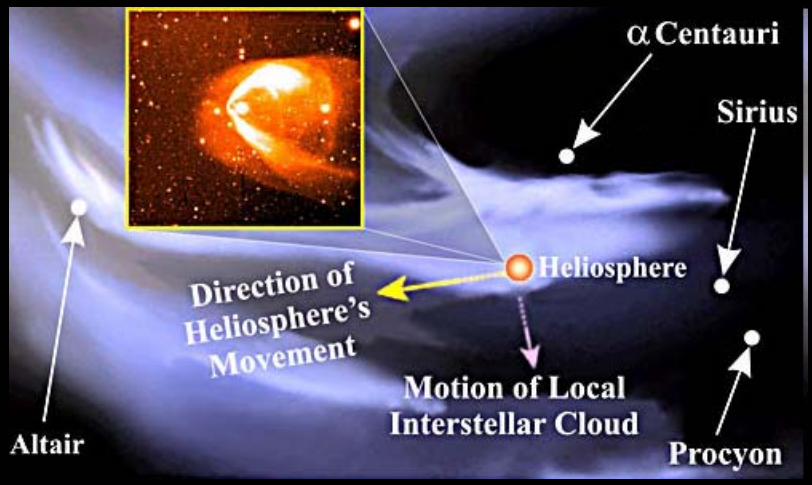
http://www.soulsofdistortion.nl/earth1.html

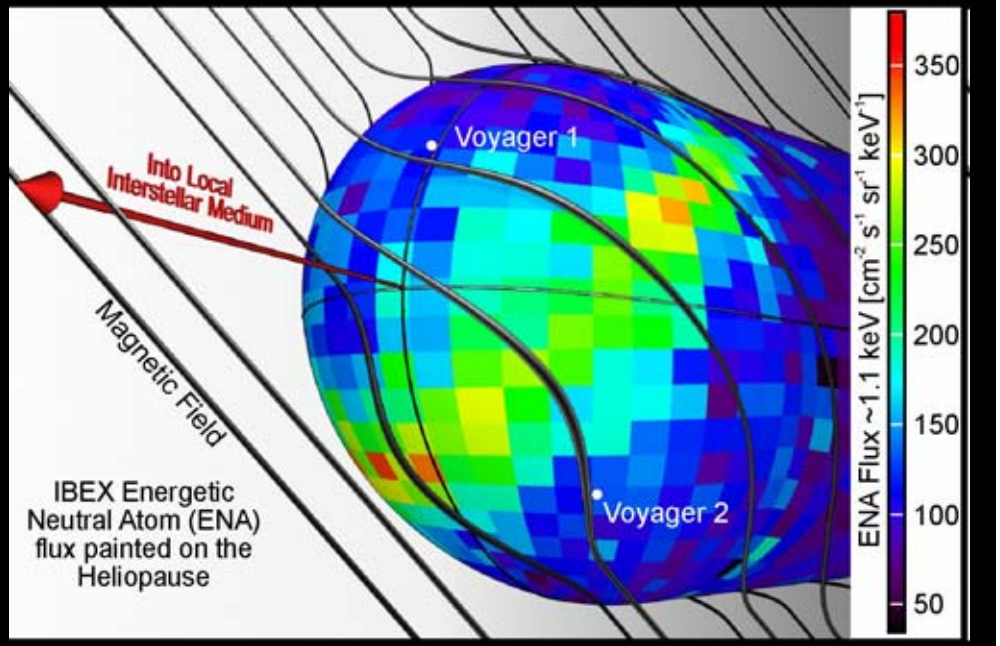
ALEXEY N. DMITRIEV Paper Summary

- Current Planet-to-Physical alterations of the Earth are becoming irreversible. Strong evidence exists that these transformations are being caused by highly charged material and energetic non-uniformity's in anisotropic interstellar space which have broken into the interplanetary area of our Solar System.
- This "donation" of energy is producing hybrid processes and excited energy states in all planets, as well as the Sun.

Giant Ribbon Discovered at the Edge of the Solar System

At the boundary of our Solar System, the interactions between solar wind particles and interstellar medium particles create Energetic Neutral Atoms (ENAs), particles with no charge that move very fast.

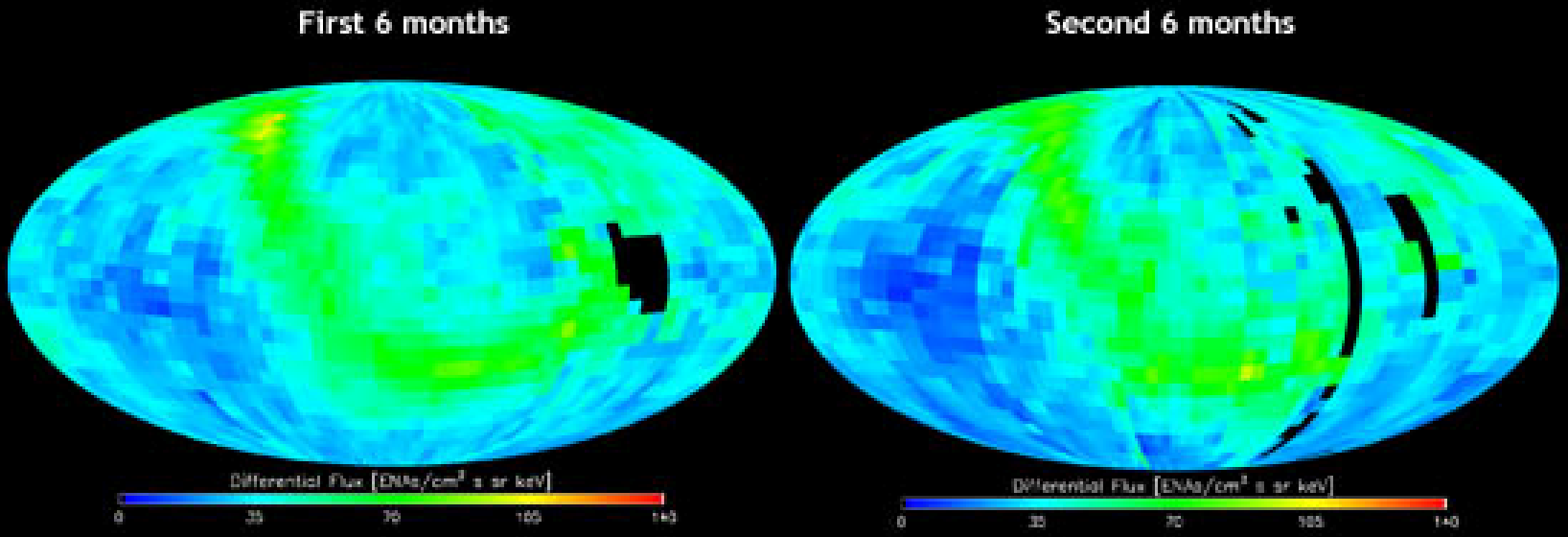




Although scientists knew that their models would be tested by the IBEX measurements, the existence of the ribbon is "remarkable" says Geoffrey Crew, a Research Scientist at MIT and the Software Design Lead for IBEX. "It suggests that the galactic magnetic fields are much stronger and exert far greater stresses on the heliosphere than we previously believed." - Sciencedaily.com

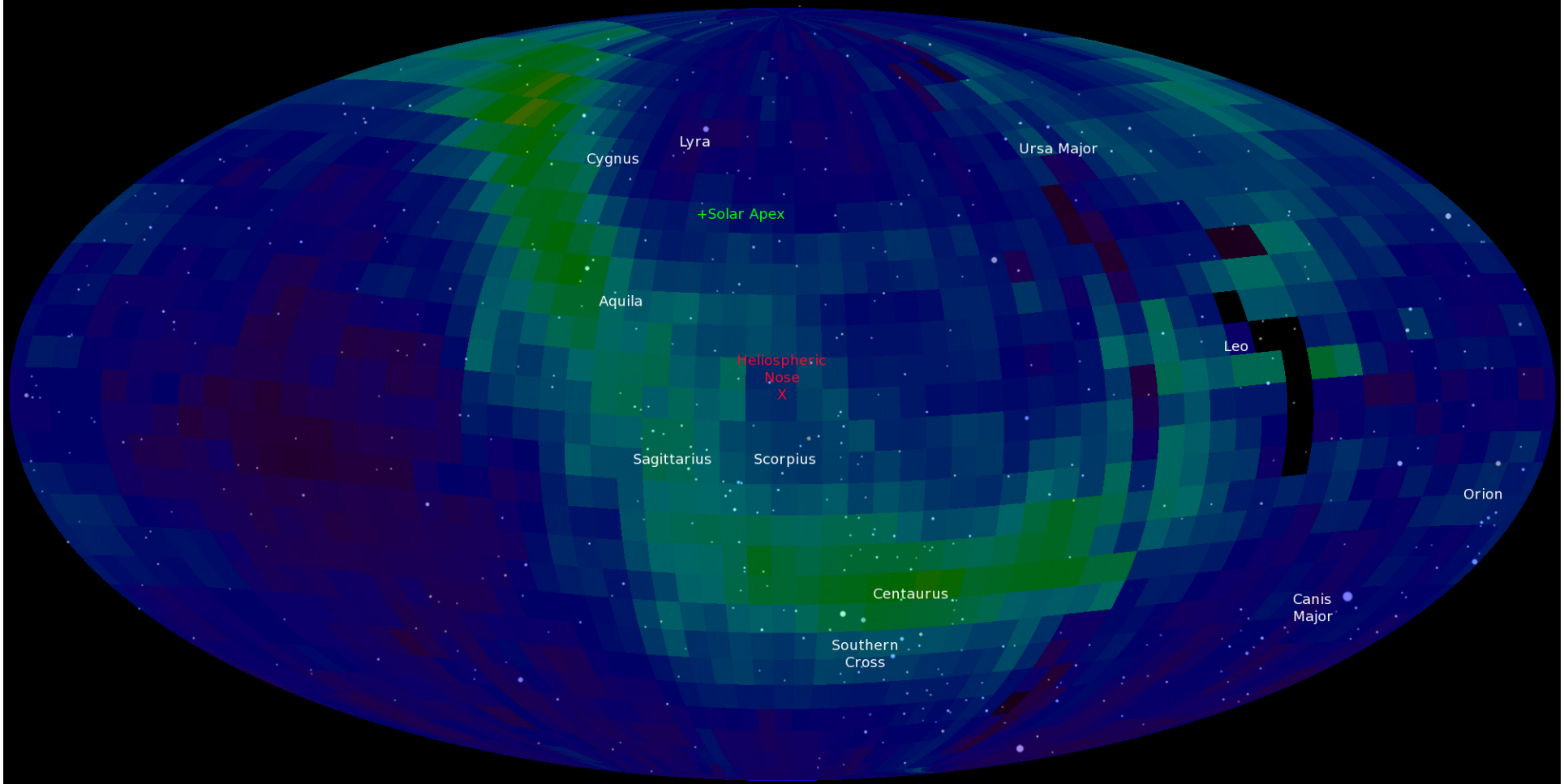
IBEX Measurement

~1.74 keV



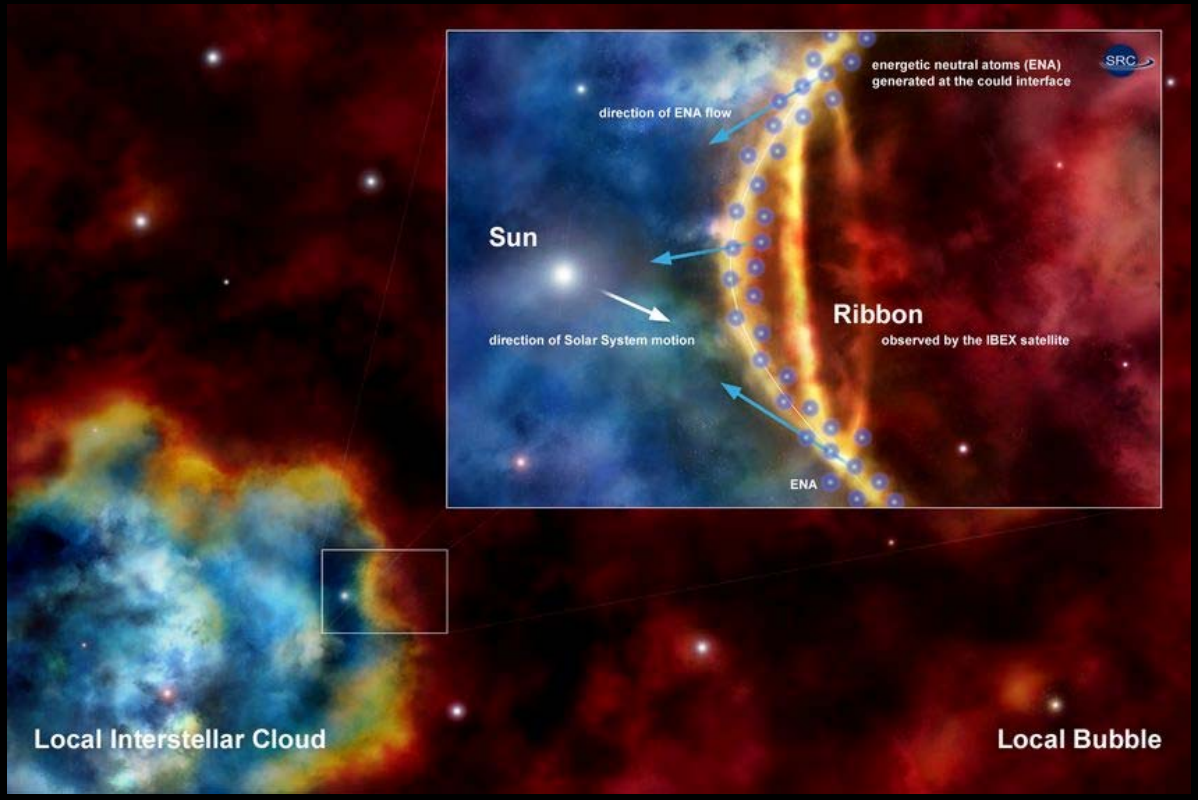
Overall, the intensity of ENAs has dropped 10% to 15%, and the hotspot has diminished and spread out along the ribbon.

The Ribbon observed by the Interstellar Boundary Explorer (IBEX) Mission



http://www.nasa.gov/mission_pages/ibex/telecon_20100929.html

The IBEX Ribbon: Are we in for a new era in the Sun's voyage through the Galaxy?



Scientists suggest that the Ribbon of enhanced emissions of Energetic Neutral Atoms, discovered last year by a NASA Small Explorer satellite IBEX, could be explained by a geometric effect coming up because of approach of the Sun to the boundary between the Local Cloud of interstellar gas and another cloud of a very hot gas called the Local Bubble. If this hypothesis is correct, IBEX is catching matter from a hot neighboring interstellar cloud, which the Sun might enter in a **hundred years**.

http://www.physorg.com/news194079881.html

NASA Confirms Solar System is unexpectedly passing through Galactic Clouds

VOYAGER MAKES AN INTERSTELLAR DISCOVERY

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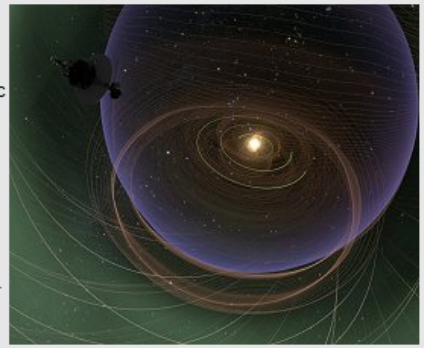
December 23, 2009: The solar system is passing through an interstellar cloud that physics says should not exist. In the Dec. 24th issue of *Nature*, a team of scientists reveal how NASA's Voyager spacecraft have solved the mystery.

"Using data from Voyager, we have discovered a strong magnetic field just outside the solar system," explains lead author Merav Opher, a NASA Heliophysics Guest Investigator from George Mason University. "This magnetic field holds the interstellar cloud together and solves the long-standing puzzle of how it can exist at all."



Right: Voyager flies through the outer bounds of the heliosphere en route to interstellar space. A strong magnetic field reported by Opher et al in the Dec. 24, 2009, issue of Nature is delineated in yellow. Image copyright 2009, The American Museum of Natural History. [larger image]

The discovery has implications for the future when the solar system will eventually bump into other, similar clouds in our arm of the Milky Way galaxy.

Astronomers call the cloud we're running into now the Local Interstellar Cloud or "Local Fluff" for short. It's about 30 light years wide and contains a wispy mixture of hydrogen and helium atoms at a temperature of 6000 C. The existential mystery of the Fluff has to do with its surroundings. About 10 million years ago, a cluster of supernovas exploded nearby, creating a giant bubble of million-degree gas. The Fluff is completely surrounded by this high-pressure supernova exhaust and should be crushed or dispersed by it.

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"The observed temperature and density of the local cloud do not provide enough pressure to resist the 'crushing action' of the hot gas around it," says Opher.

So how does the Fluff survive? The Voyagers have found an answer.

"Voyager data show that the Fluff is much more strongly magnetized than anyone had previously suspected—between 4 and 5 microgauss*," says Opher. "This magnetic field can provide the extra pressure required to resist destruction."

http://science.nasa.gov/science-news/science-at-nasa/2009/23dec_voyager/

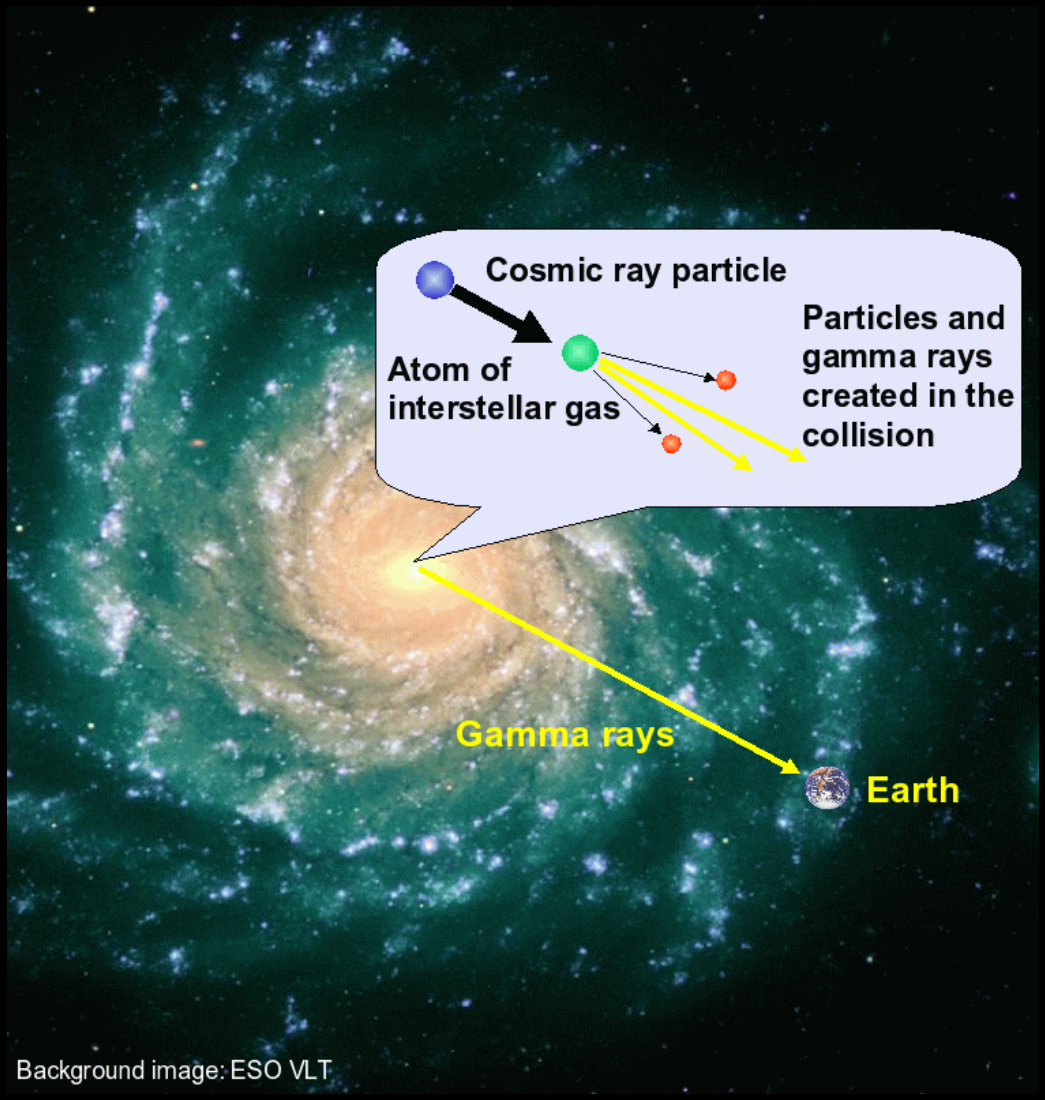
The fact that the Fluff is strongly magnetized means that other clouds in the galactic neighborhood could be, too.

Eventually, the solar system will run into some of them, and their strong magnetic fields could compress the heliosphere even more than it is compressed now.

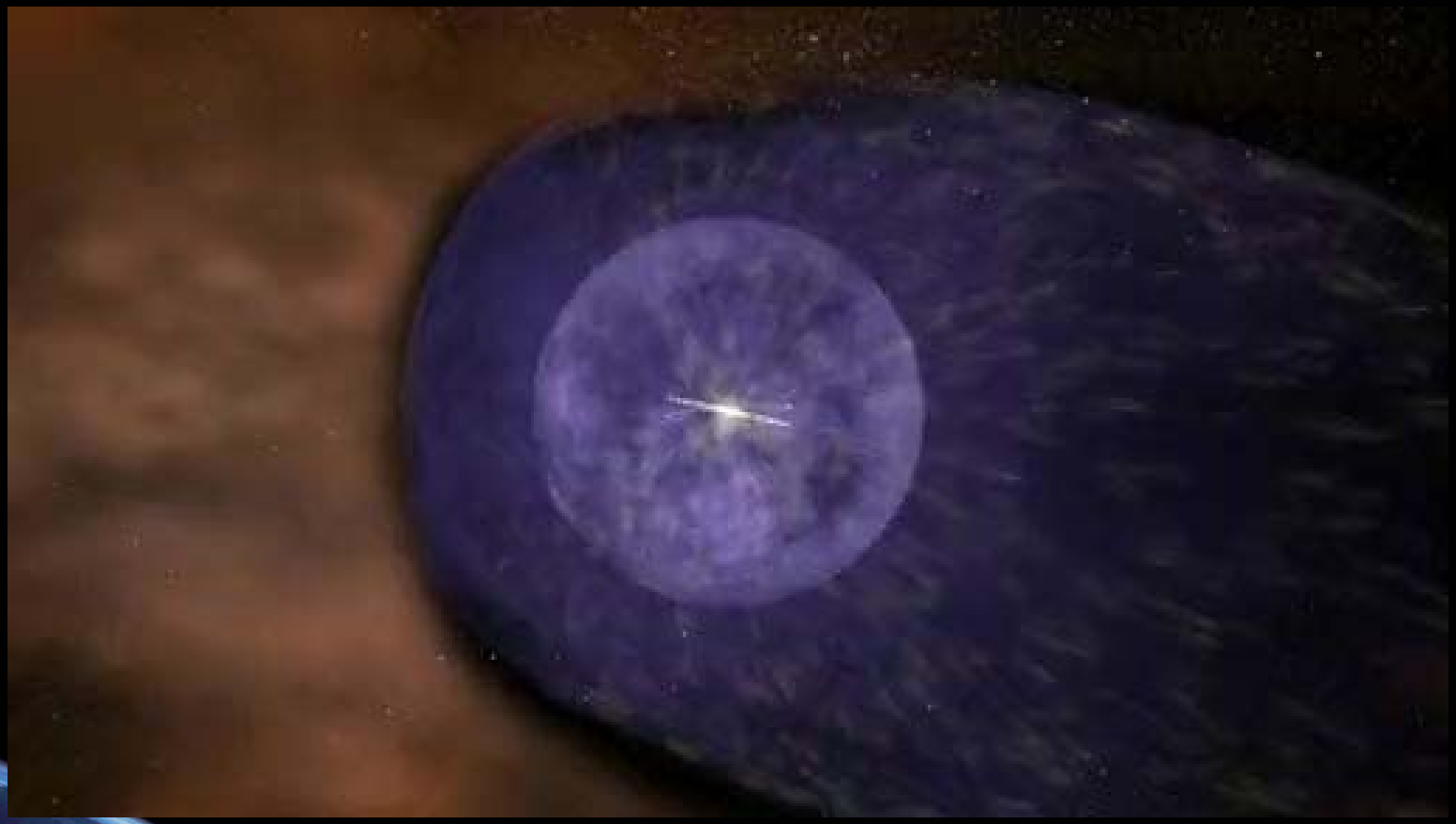
Additional compression could allow more cosmic rays to reach the inner solar system, possibly affecting terrestrial climate and the ability of astronauts to travel safely through space.

What is Cosmic ray?

- Cosmic rays are energetic particles originating from outer space that impinge on Earth's atmosphere.
  - 89% of all the incoming cosmic ray particles are simple protons, with
  - nearly 10% being helium nuclei (alpha particles), and
  - slightly under 1% are heavier elements;
  - electrons (beta particles) constitute about 1% of galactic cosmic rays.

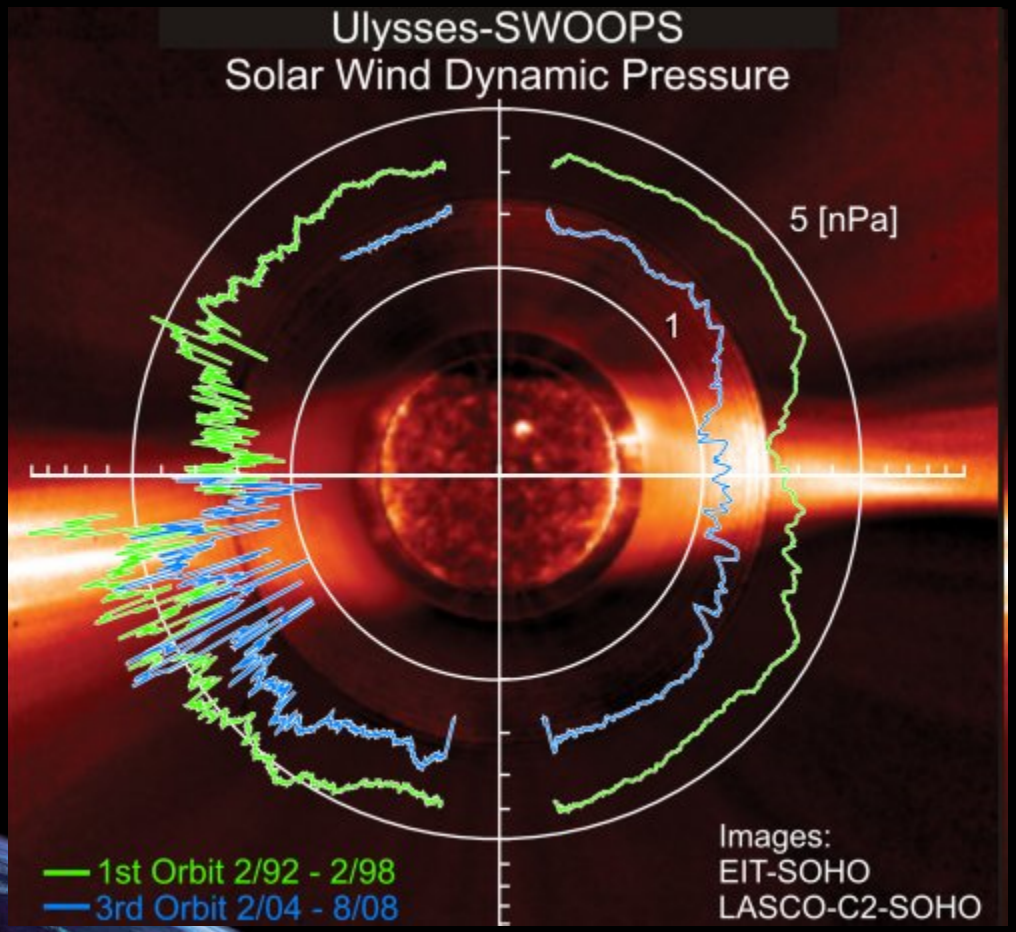


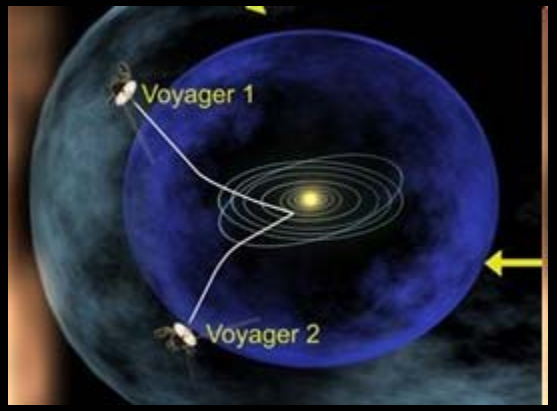
Heliosphere Compression



- **When the boundaries shrink in size and the solar wind becomes weaker, galactic cosmic rays have a much easier time gaining access into the inner solar system. In contrast, when the solar wind becomes more powerful, the boundaries inflate and galactic cosmic rays have a harder time penetrating into the solar system.**

Solar Wind Loses Power, Hits 50-year Low

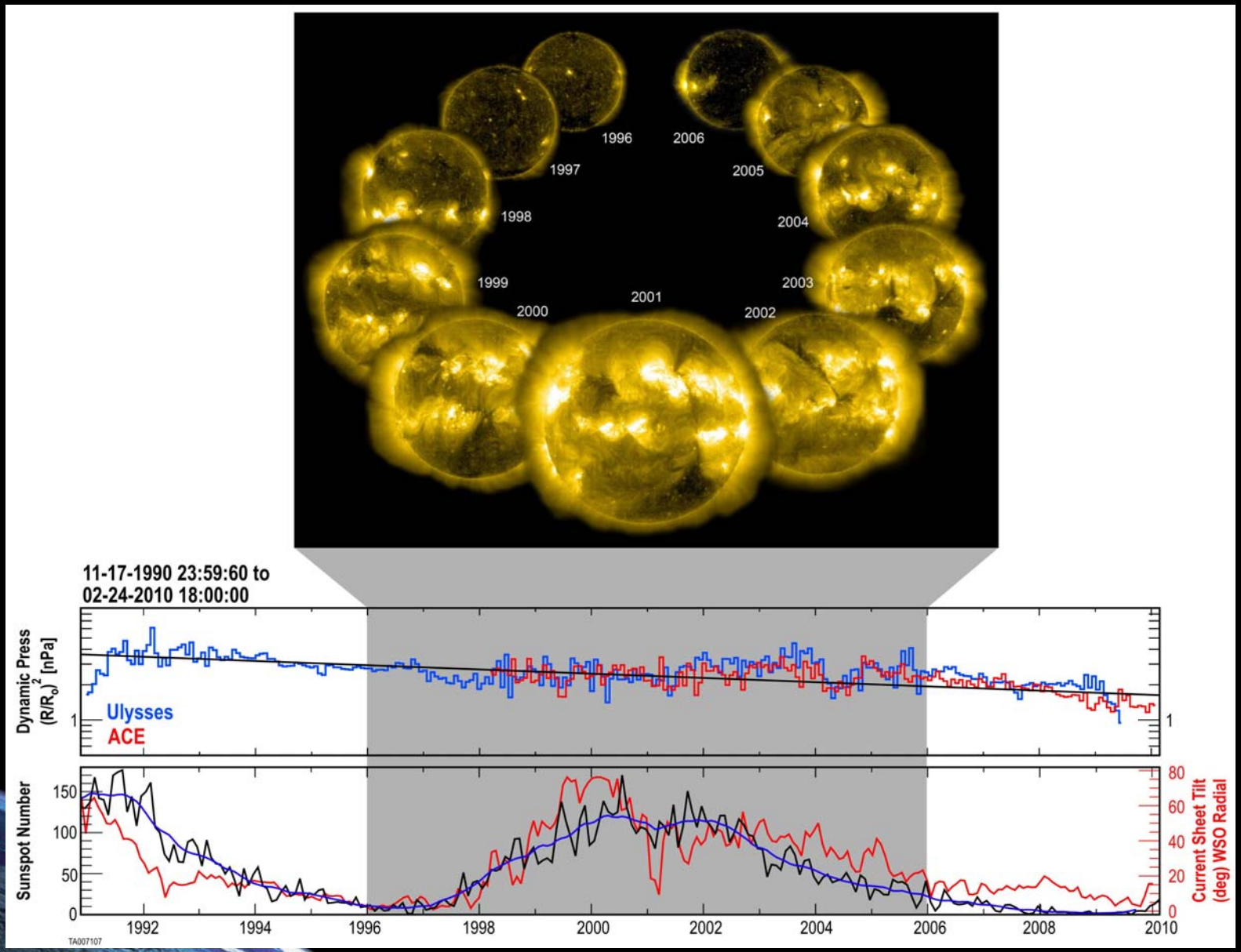




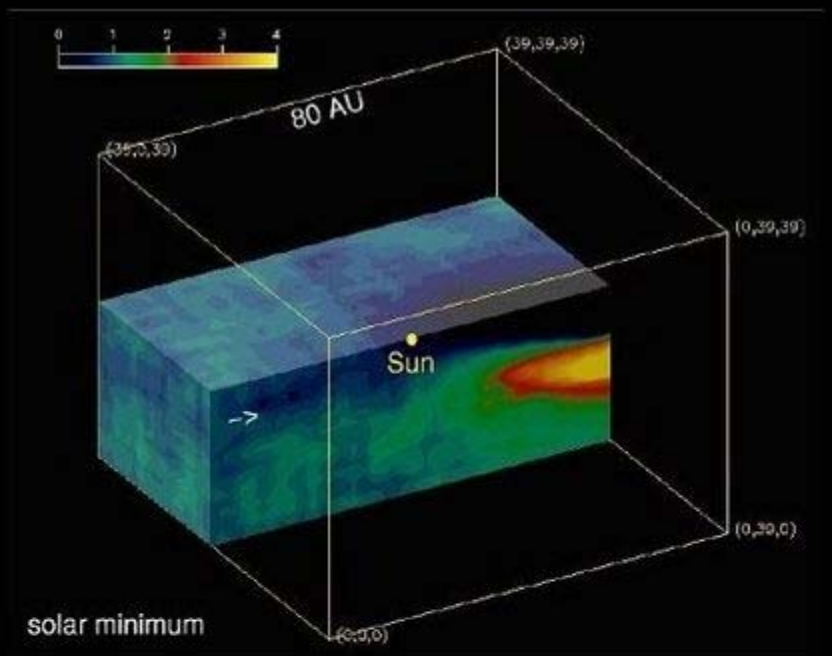
There has been a sharp decline in the sun's interplanetary magnetic field (IMF) down to only 4 nanoTesla (nT) from typical values of 6 to 8 nT," he says. "This record-low IMF undoubtedly contributes to the record-high cosmic ray fluxes."

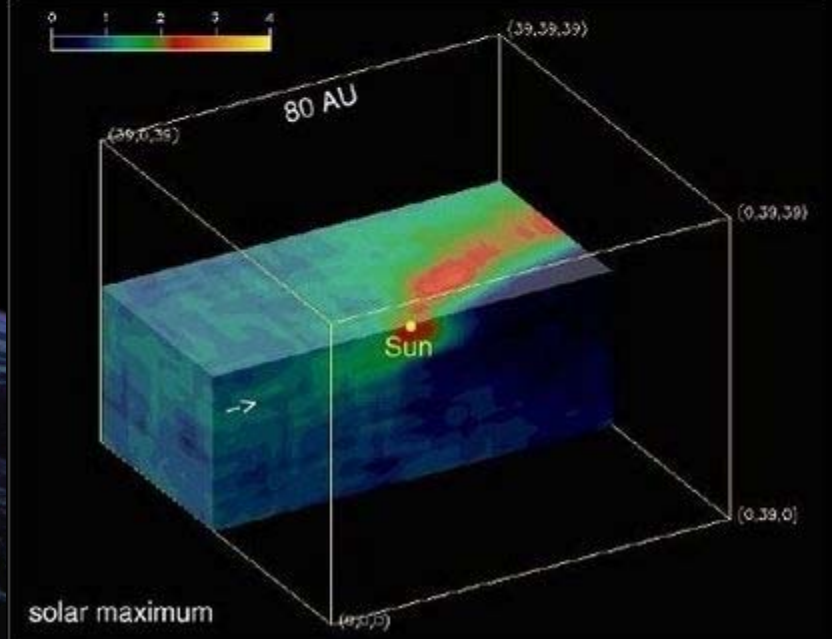
Global measurements of solar wind pressure by Ulysses. Green curves trace the solar wind in 1992-1998, while blue curves denote lower pressure winds in 2004-2008.

Solar Cycle



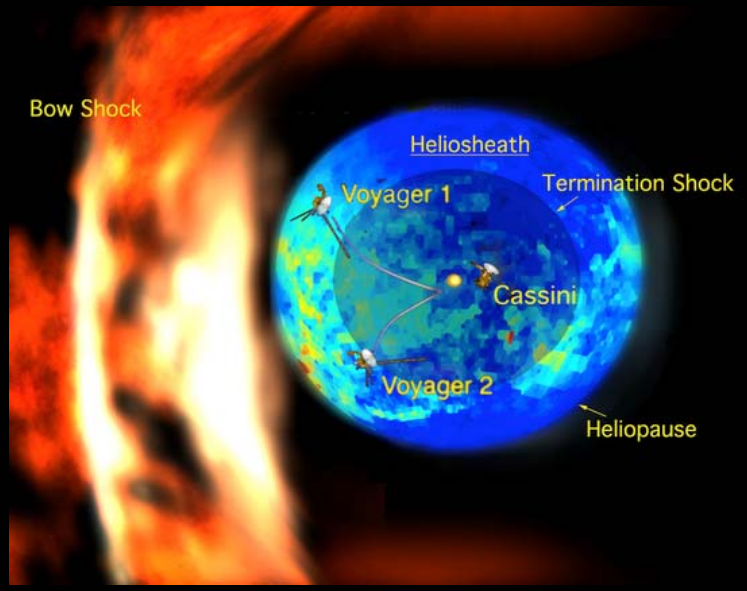
Measurements from the ACE and Ulysses spacecraft show that the force exerted by solar wind is literally falling with time.

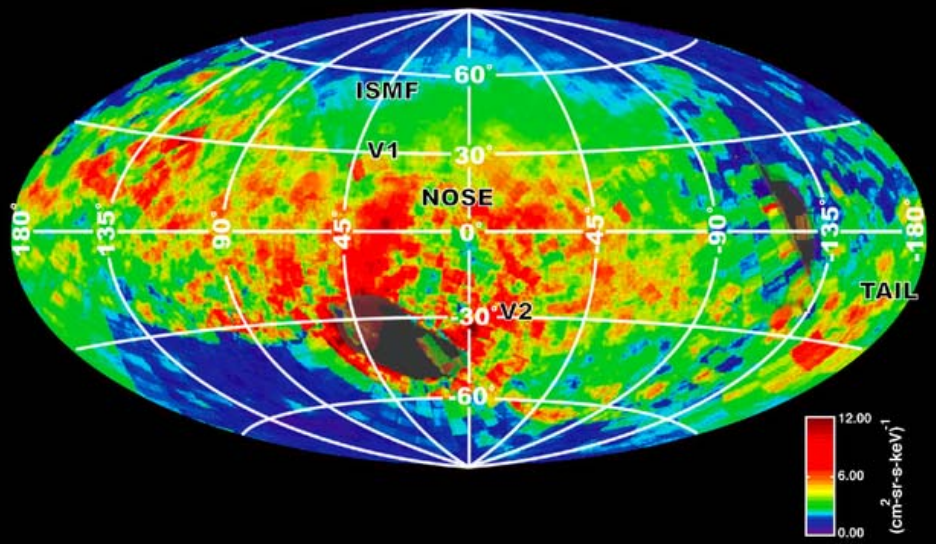




Red and yellow areas depict high concentrations of galactic dust in our solar system. During limited solar activity (top picture) most interstellar dust can be found above or below the Sun, while at the solar maximum (bottom picture) **the dust is concentrated close to the Sun in the plane of the planets orbits**.

Cassini Measurement of ENA





NASA's Cassini spacecraft created this image of the bubble around our solar system based on emissions of particles known as energetic neutral atoms. These particles are emitted from the boundary of the heliosphere, our sun's region of influence, as solar wind interacts with the interstellar medium.

http://www.sflorg.com/cassini/missionnews/casmn111909_01.html

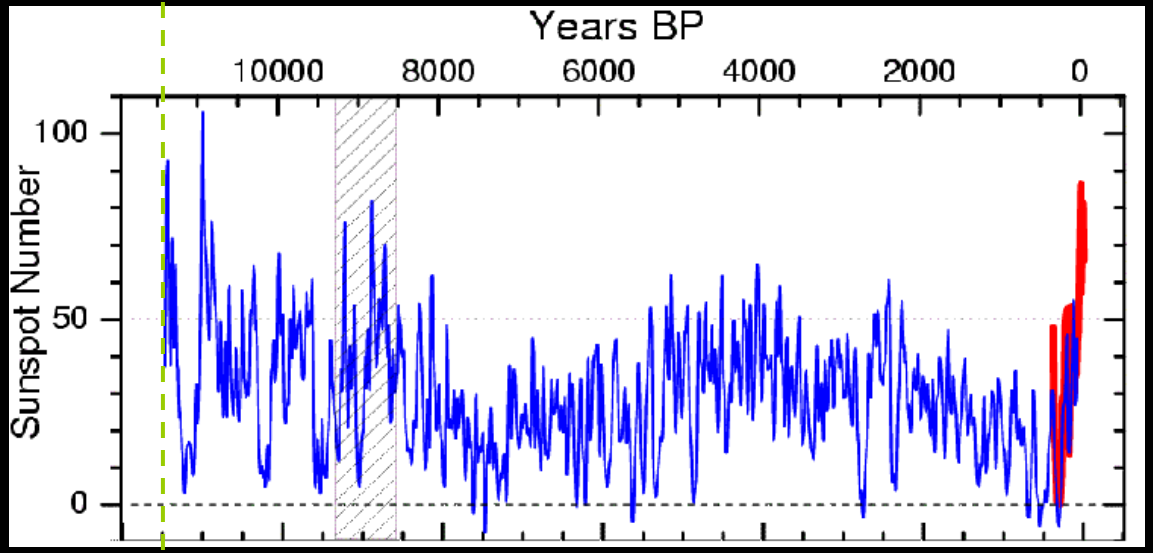
Solar System Crossing Galactic Plane

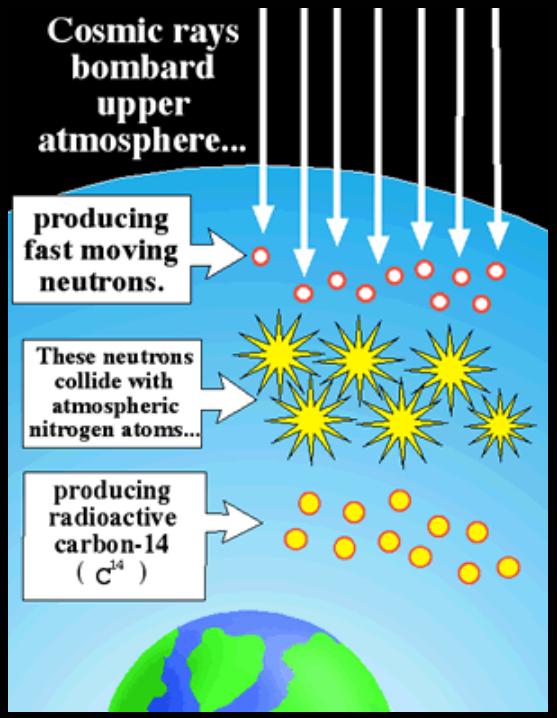
Comet Strikes Increase as We Pass Through the Galactic Plane

- Researchers at the Cardiff Centre of Astrobiology have built a computer model of the SolarSystem's journey around the Milky Way. Instead of making a perfectly flat orbit around the galaxy's centre, it actually bounces up and down. At times it can rise right up out of the galactic plane – getting 100 light years above – and then dip down below it. They calculated that we pass through the plane every 35 to 40 million years.
- This time period seems to match dangerous periods of impacts on Earth. According to the number and age of craters on Earth, we seem to suffer increased impacts every 36 million years. Uh oh, that's a match
- According to their calculations, the Solar System will be passing through the galactic plane in the near future, and should see an increased risk of impact. Our risk of impact could increase 10-fold.

http://www.universetoday.com/14082/comet-strikes-increase-as-we-pass-through-the-galactic-plane/

The Sun is more active now than over the last 8000 years





$$n + \mathrm{N}^{14} \rightarrow p + \mathrm{C}^{14}$$

The Sun's magnetic field increased by 230 percent since 1901.

Reconstructed sunspot activity (10 year average) for the last 11,400 years based on C-14 data (blue curve) and the directly observed historical sunspot data since 1610 (red curve). The reliable C-14 data ends around the year 1900 so that the sharp increase in sunspot activity in the 20th century does not appear in the graph. The reconstruction shows clearly that a comparable period of high sunspot activity previously existed over 8000 years ago.

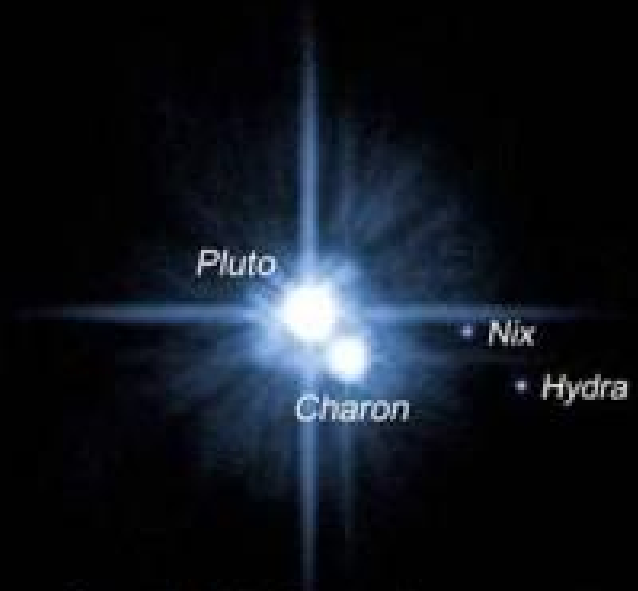
http://www.mpg.de/english/illustrationsDocumentation/documentation/pressReleases/2004/pressRelease20041028/

Summary

- Solar system is crossing through the galactic plane.
- Solar system is also entering local interstellar clouds with strong magnetic field and hot gases.
- Heliosphere is compressing as the solar system enters allowing more comic ray (or other highly charged particles) and dusts to enter the solar system.
- Compression produces energetic non-uniformity's in anisotropic interstellar space.
- ENA roughly along the galactic plane varies by 10% during the last six months.

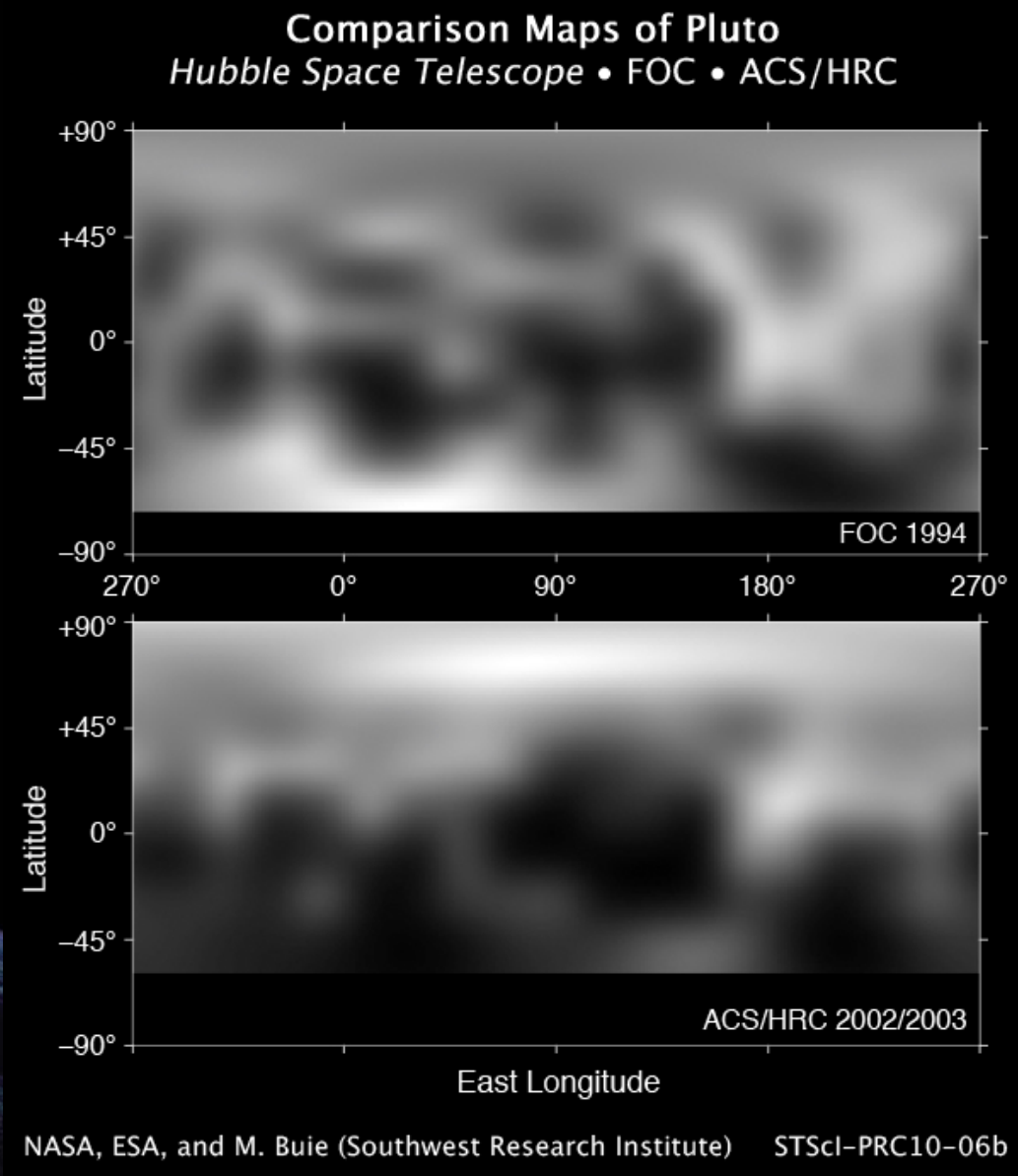
Changes in Our Solar System

Pluto: 300% increase in atmospheric pressure, even as Pluto recedes further from the Sun.



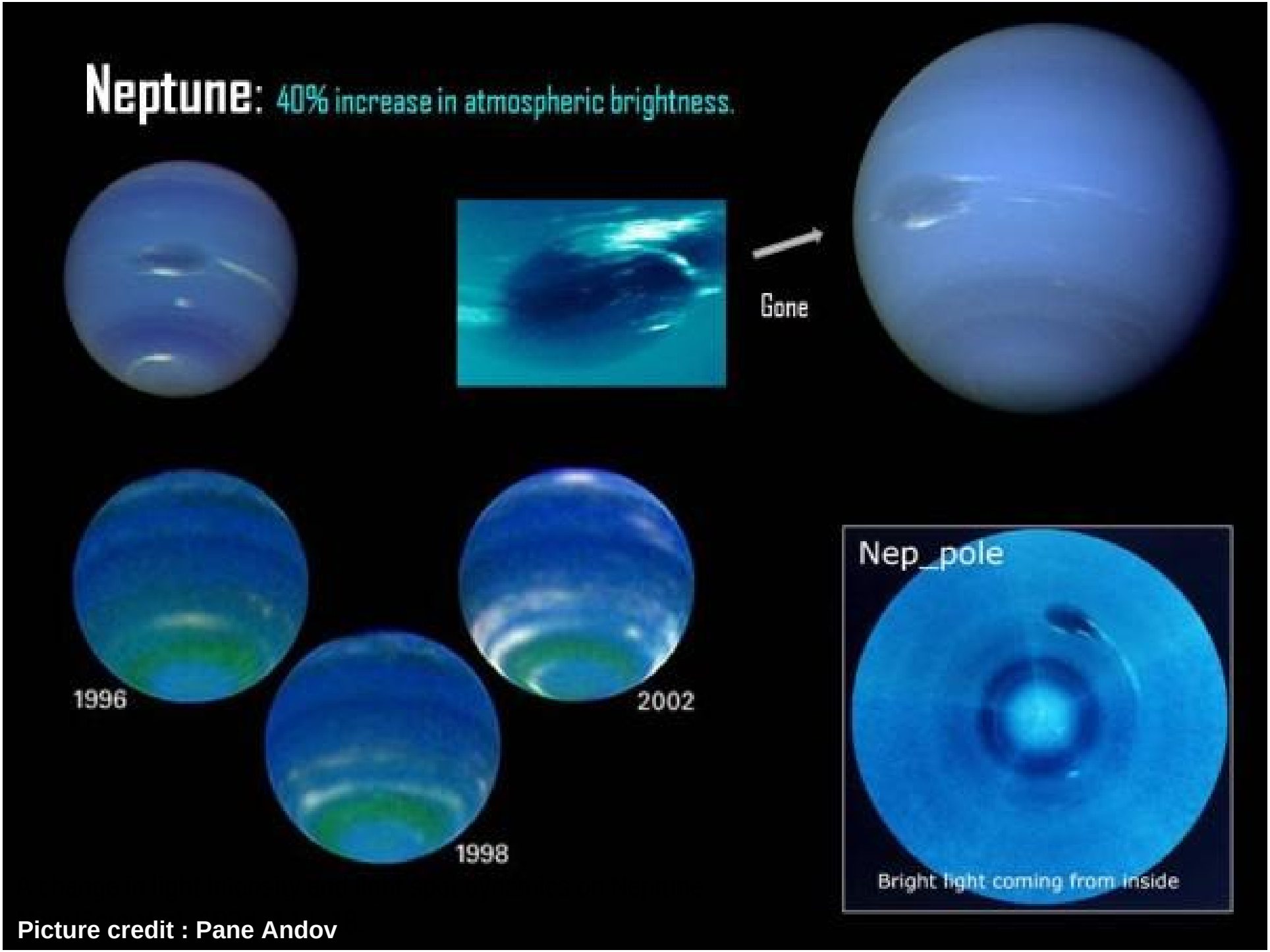
Distant Worlds: Pluto and its moons are so distant and so small, even the Hubble Space Telescope can't get clear resolution of them.

Picture credit : Pane Andov

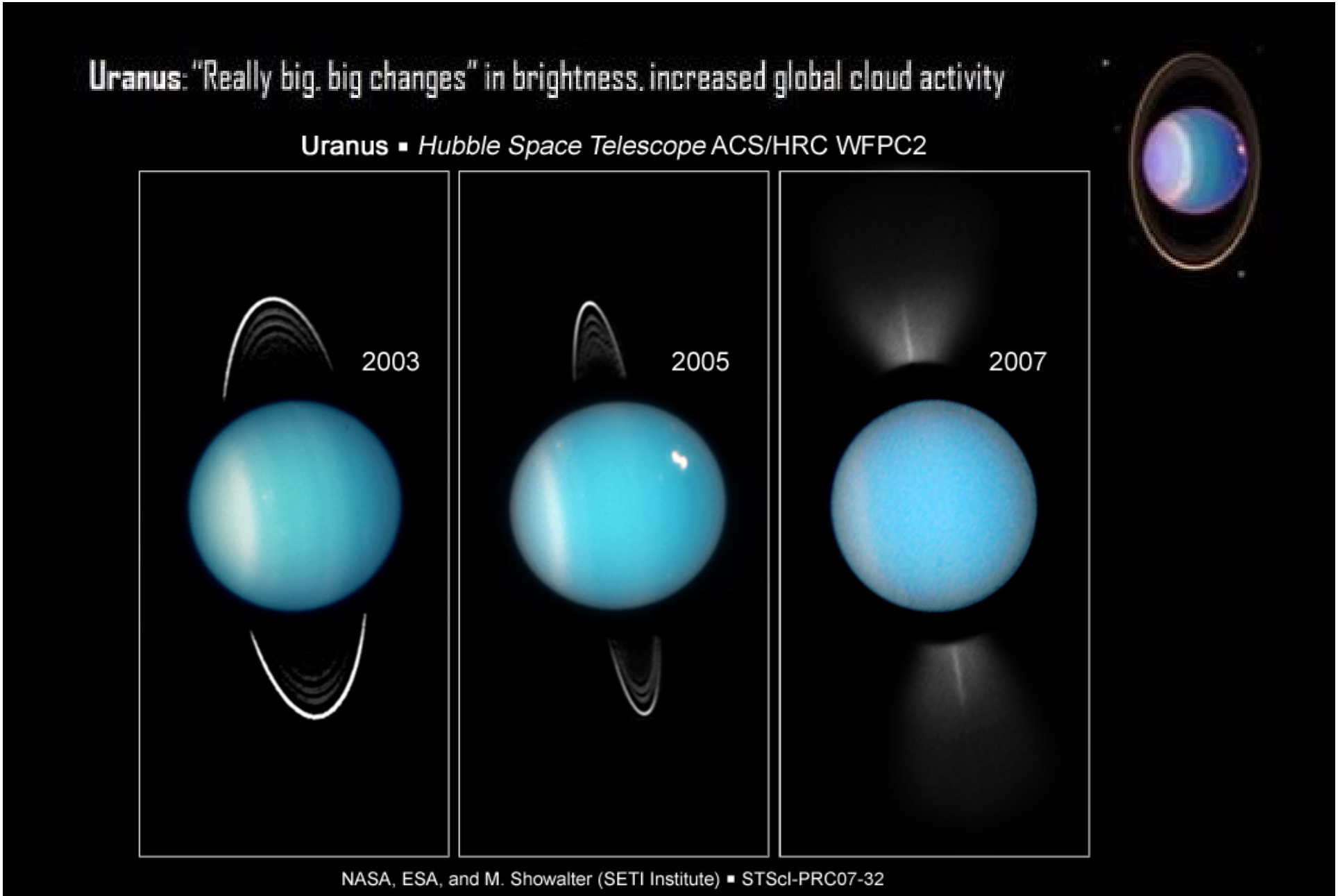


- A comparison of the maps shows that Pluto's brightness has changed between 1994 and 2003. The northern pole is brighter and the southern hemisphere is darker. Summer is approaching Pluto's north pole, and this may cause surface ices to melt and refreeze in the colder shadowed portion of the planet.

http://hubblesite.org/newscenter/archive/releases/2010/06/image/e/



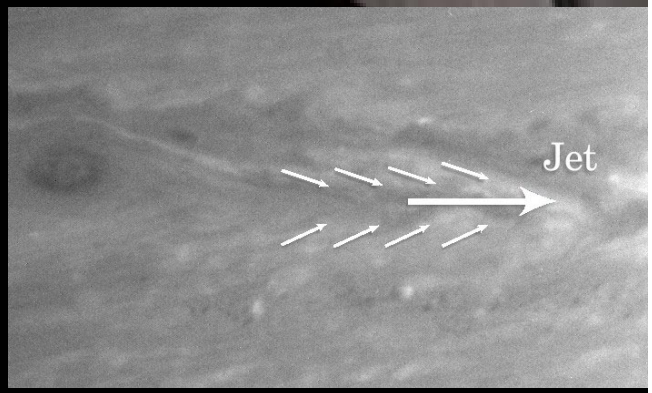
Picture credit : Pane Andov



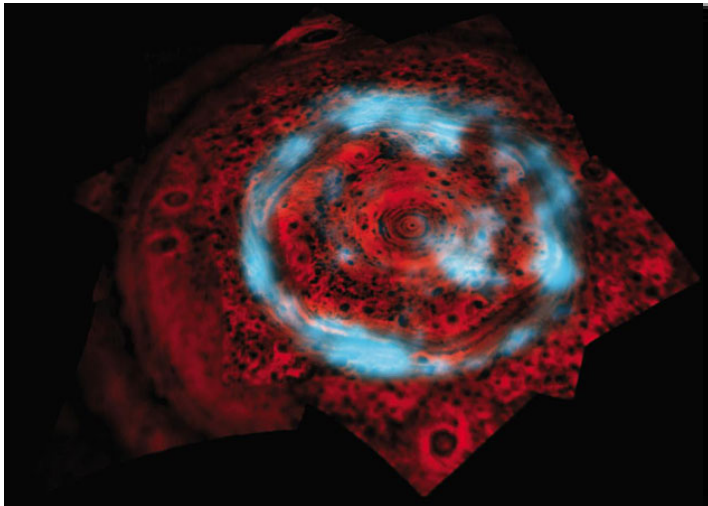
Dolginov Sh.Sh. Magnetic fields of Uranus and Neptune : a look from the Earth. // Geomagnetism and aeronomy.33, N 2, 1993. 1-22.

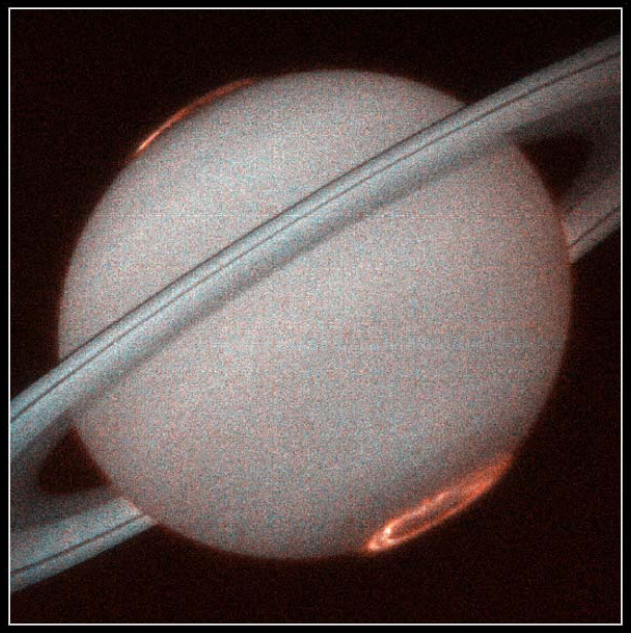
Picture credit : Pane Andov

Saturn: A major *decrease* in equatorial jet stream velocities in only 20 years, accompanied by a surprising surge of X-rays from its equator



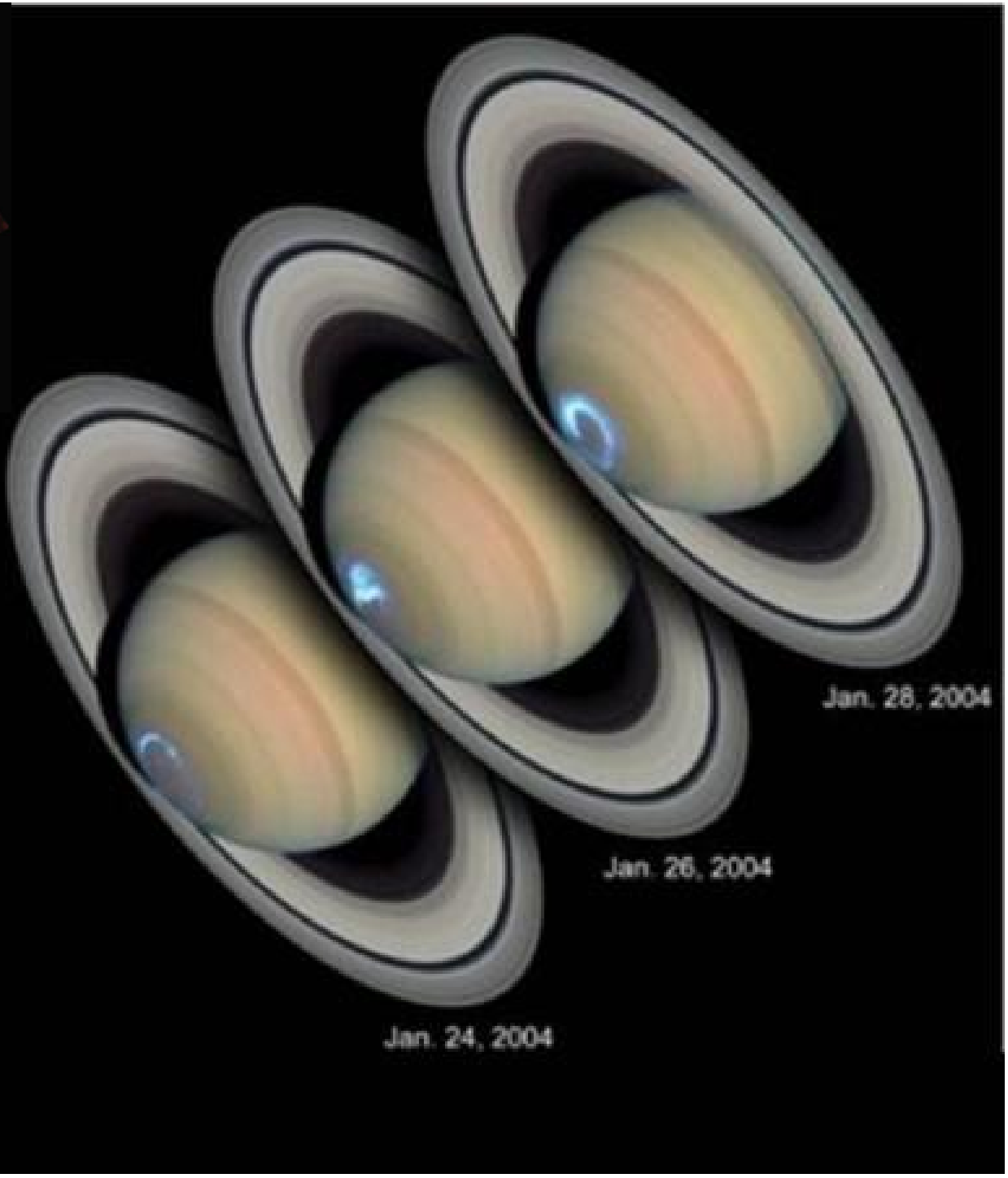
Picture credit : Pane Andov





Saturn Aurora HST • STIS

PRC98-05 • ST ScI OPO • January 7, 1998 • J. Trauger (JPL) and NASA



Jupiter: Over 200% increase in brightness of surrounding plasma clouds

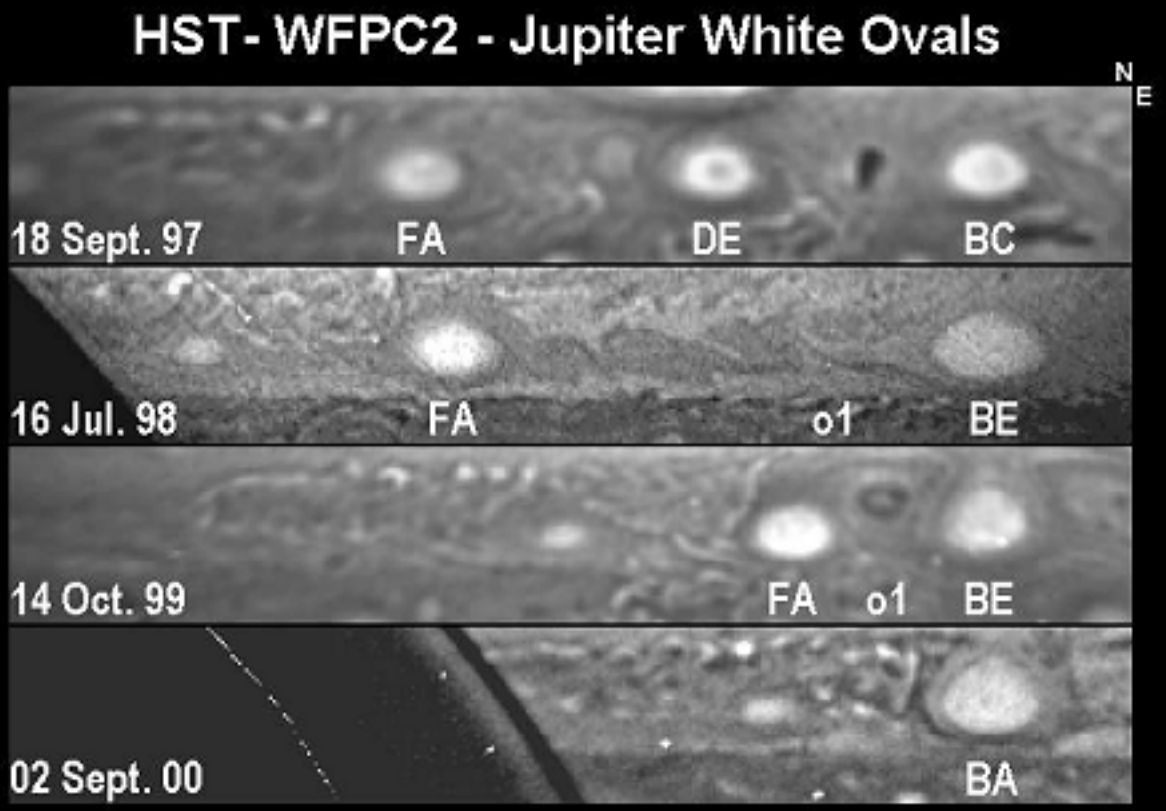
Jupiter's Red Spots

Hubble Space Telescope • Advanced Camera for Surveys

NASA, ESA, A. Simon-Miller (NASA/GSFC), I. de Pater and M. Wong (University of California, Berkeley)

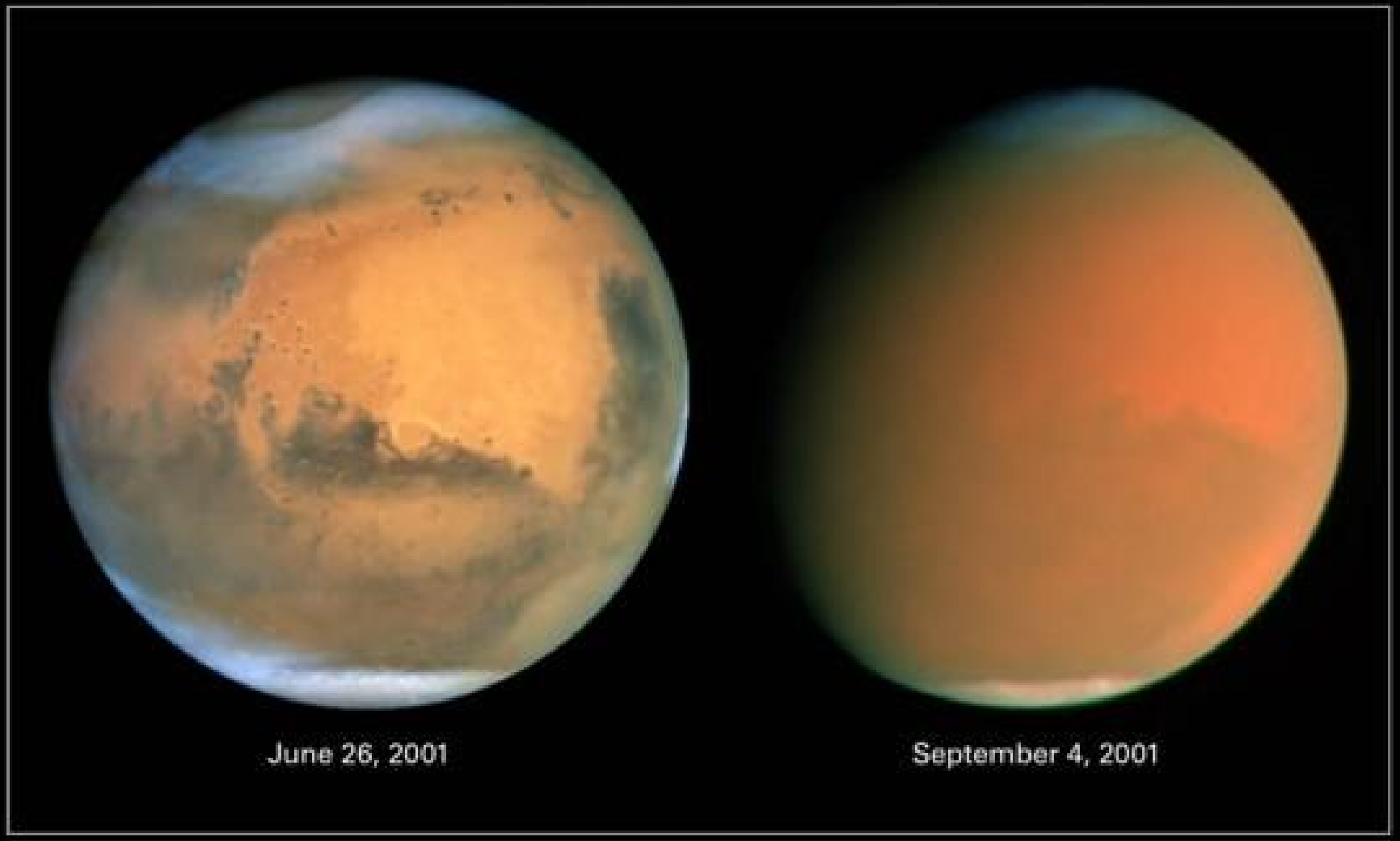
STScI-PRC06-19

Jupiter Warming



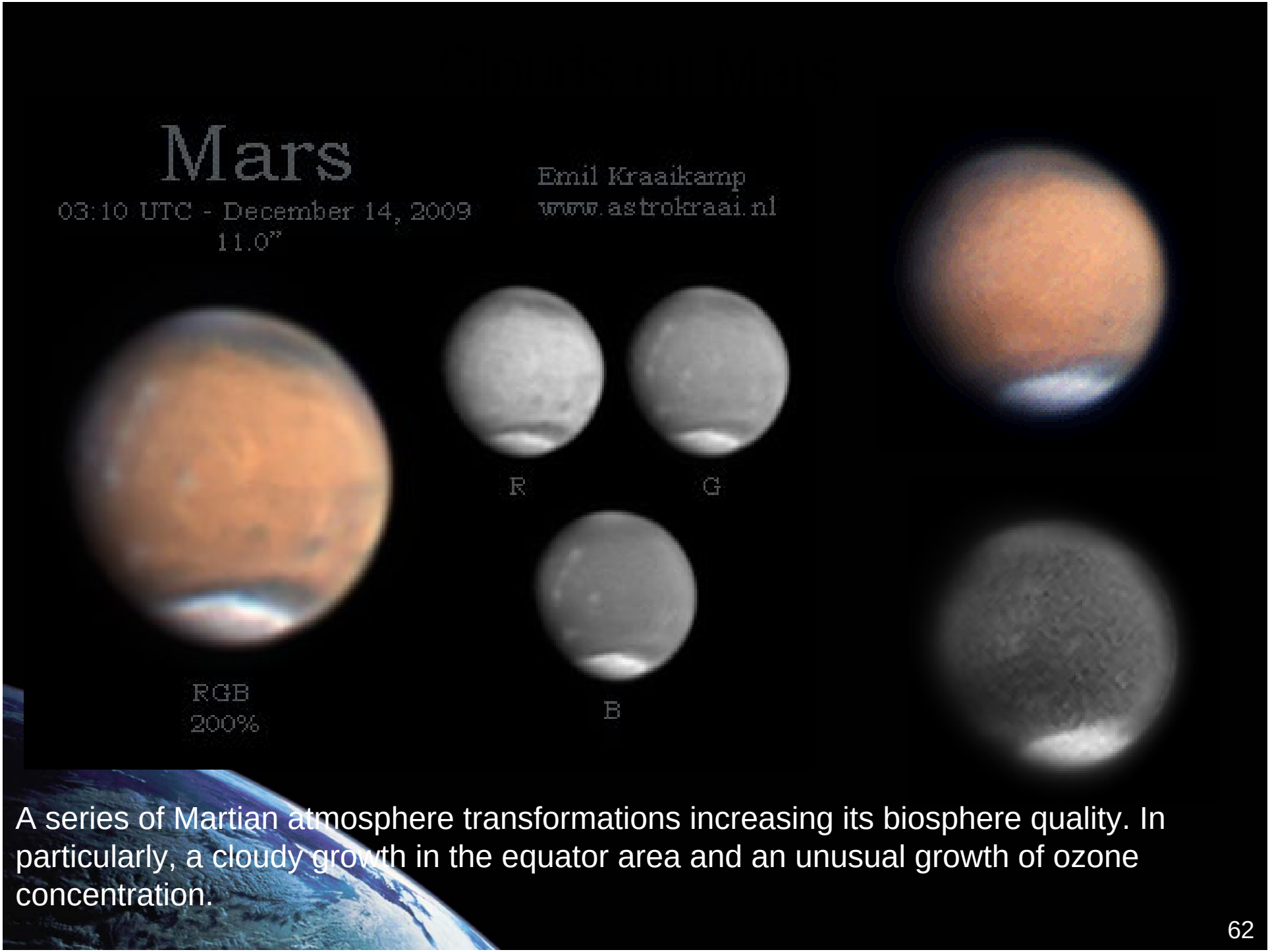
- Between 1998 and 2000, three White Ovals (giant vortices) on Jupiter merged and formed a new oval, approximately the size of Earth. Initially, it was white but it turned brown and then red in 2005. The official name of the red spot is "Oval BA" although it's more popular nickname "Red Spot Jr" has considerably more cachet.
- On Jupiter, the sun's energy is only 4% of the level we receive on earth, nowhere near enough to fuel its turbulent, planet-sized storms. Jupiter radiates into space more than twice the heat it absorbs from the sun.

Mars: "Global Warming," huge storms and the disappearance of polar ice



Mars • Global Dust Storm
Hubble Space Telescope • WFPC2

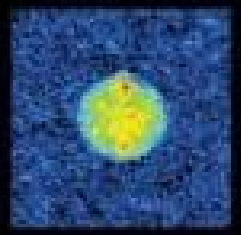
NASA, J. Bell (Cornell University), M. Wolff (SSI), and the Hubble Heritage Team (STScI/AURA) • STScI-PRC01-31

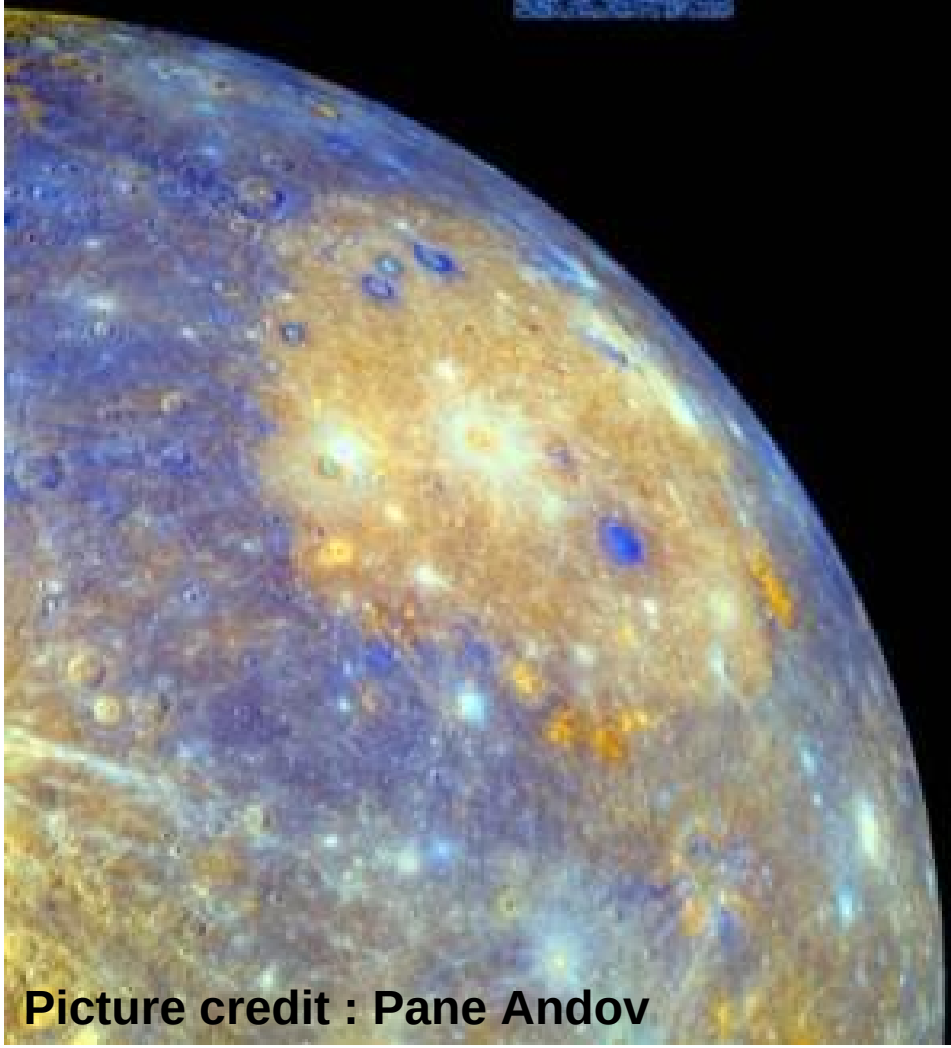


A series of Martian atmosphere transformations increasing its biosphere quality. In particularly, a cloudy growth in the equator area and an unusual growth of ozone concentration.


Venus: A 2500% increase in auroral brightness and substantial global atmospheric changes in less than 30 years.
Picture credit : Pane Andov

Mercury: Unexpected polar ice discovered, along with a surprisingly strong intrinsic magnetic field.

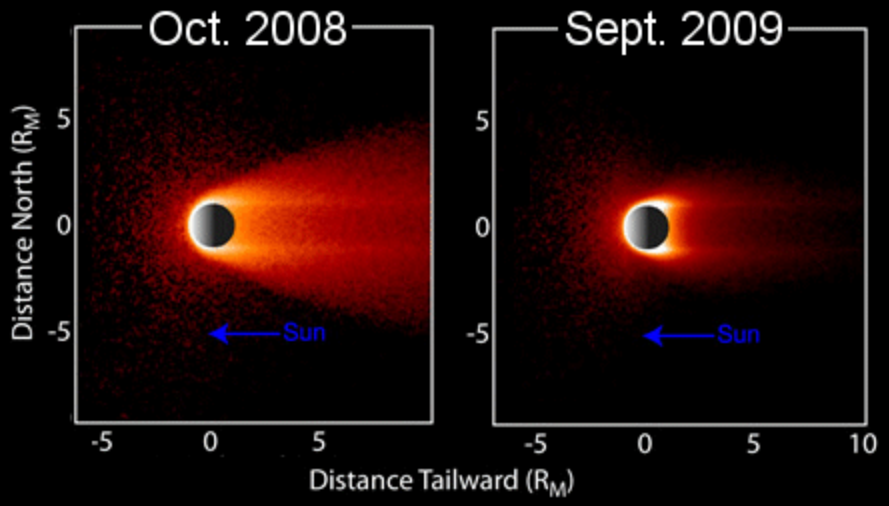




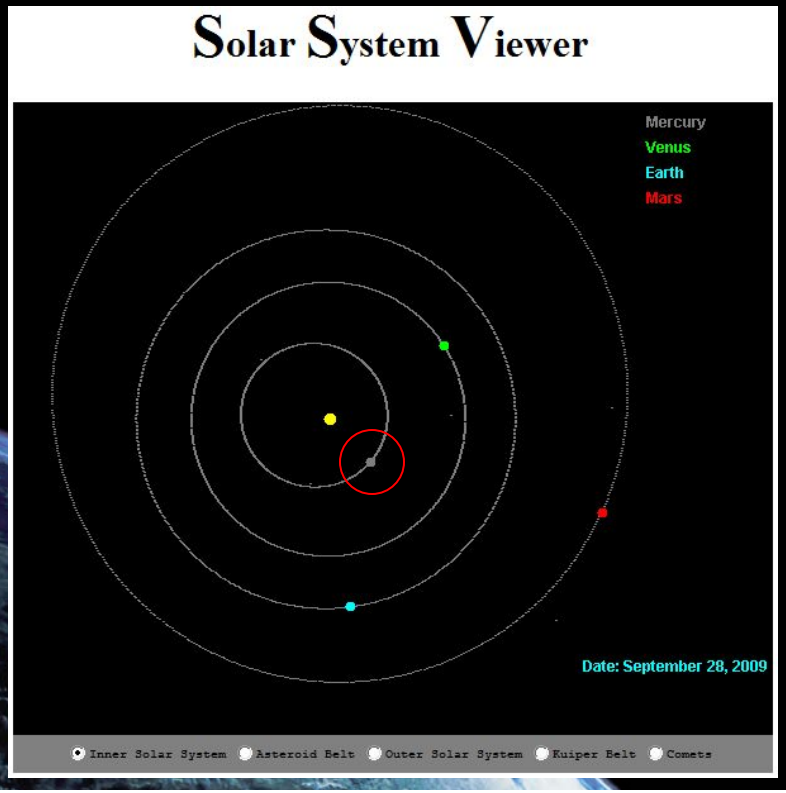
Massive Impact: MESSENGER's instruments revealed previously unseen details of Mercury's Caloris Basin impact crater.

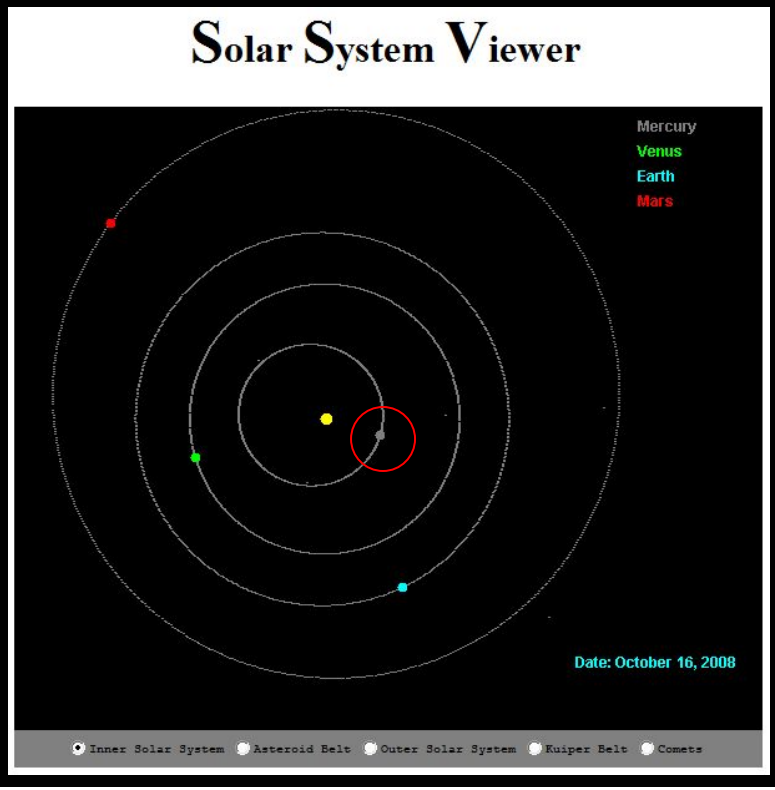
Picture credit : Pane Andov

Sodium in Mercury's Tail



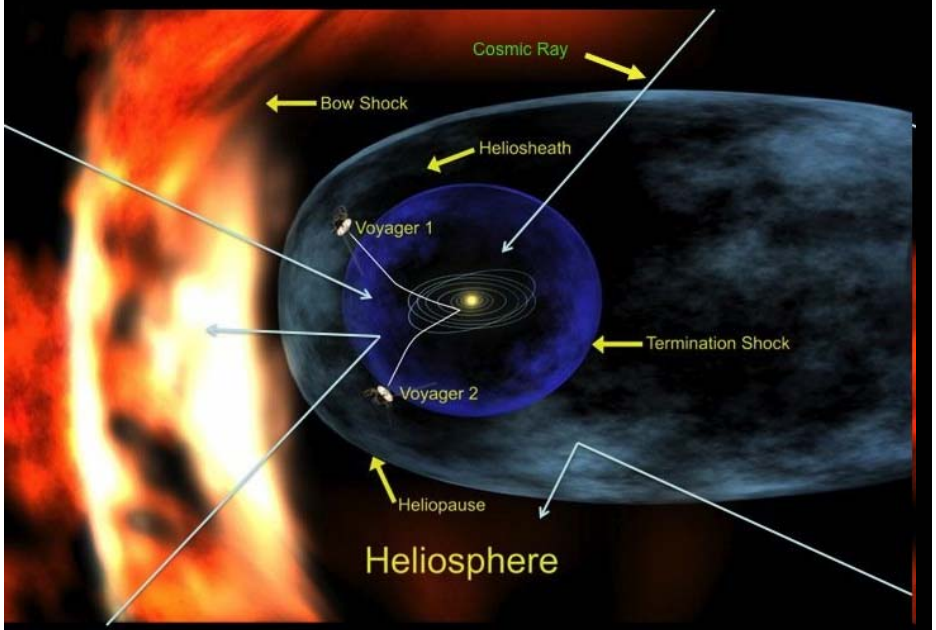
Ion sputtering occurs when ions from the solar wind or Mercury's magnetosphere impact the surface, "knocking off" atoms and molecules. Meteoroid vaporization occurs when incoming meteoroids, generally small dust particles, impact Mercury's surface at high speeds, causing the surface material to vaporize.

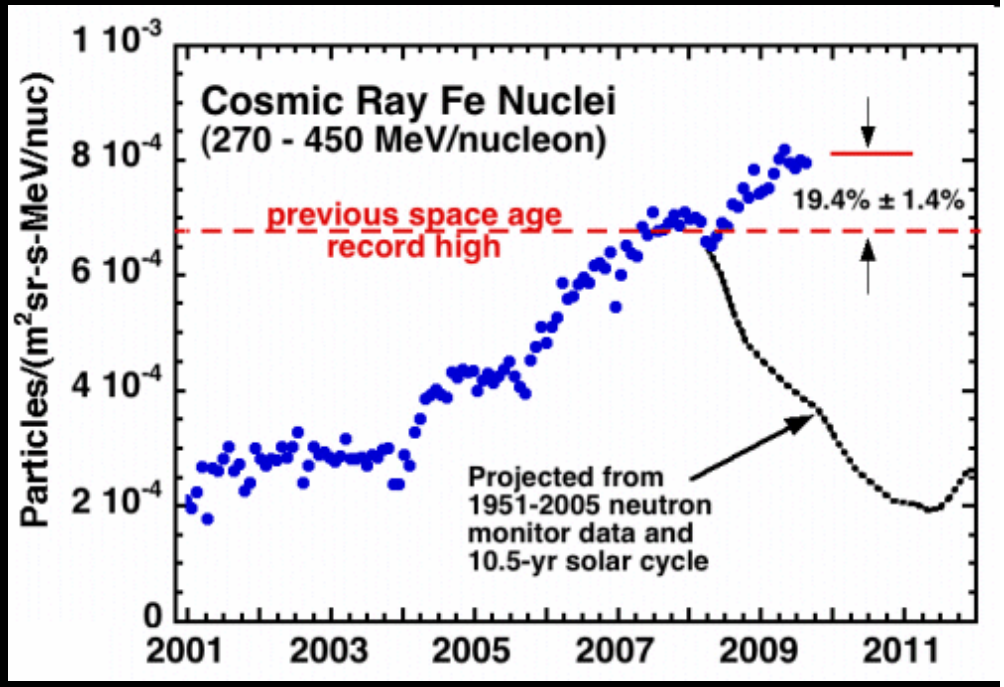




Effect on the Earth

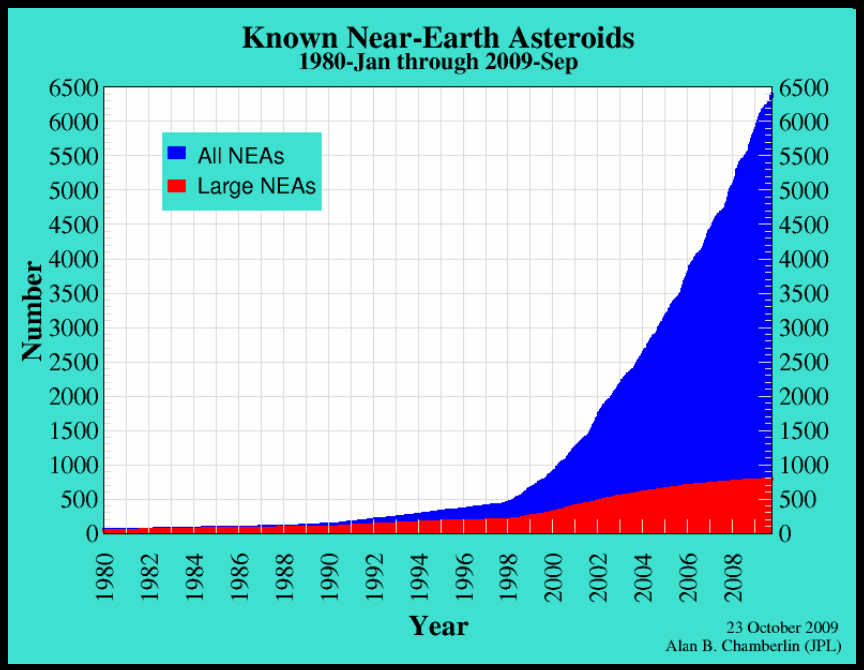
Earth sees increasing cosmic Ray and it is exceeding the space age record





Cosmic rays can seriously damage DNA. If DNA damage cannot be repaired by the cell, the cell could die. If the damage is copied into more cells, then a mutation could occur. Exposure to large amounts of cosmic rays could increase the risks for cancer, cataracts and neurological disorders. Long term exposure to cosmic rays, or short intense bursts, could affect the evolution of life on Earth.

Increase in interstellar dust grain, fireballs & meteor showers

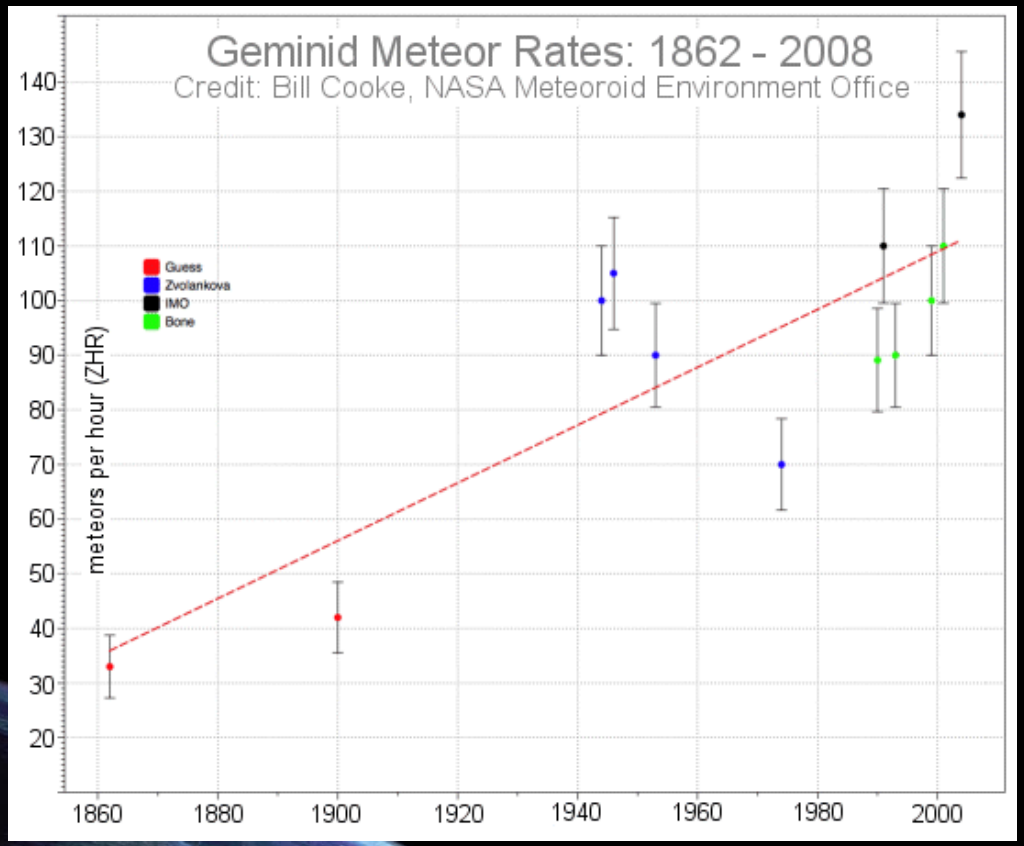


The number of interstellar dust grains increased from four per day, per meter in 1997 to 12 per day in 2000, Landgraf said. The results were announced earlier this month. He expects the rate to stay constant until 2005, and then increase by another factor of 3 prior to 2013.

More fireballs & Meteor showers

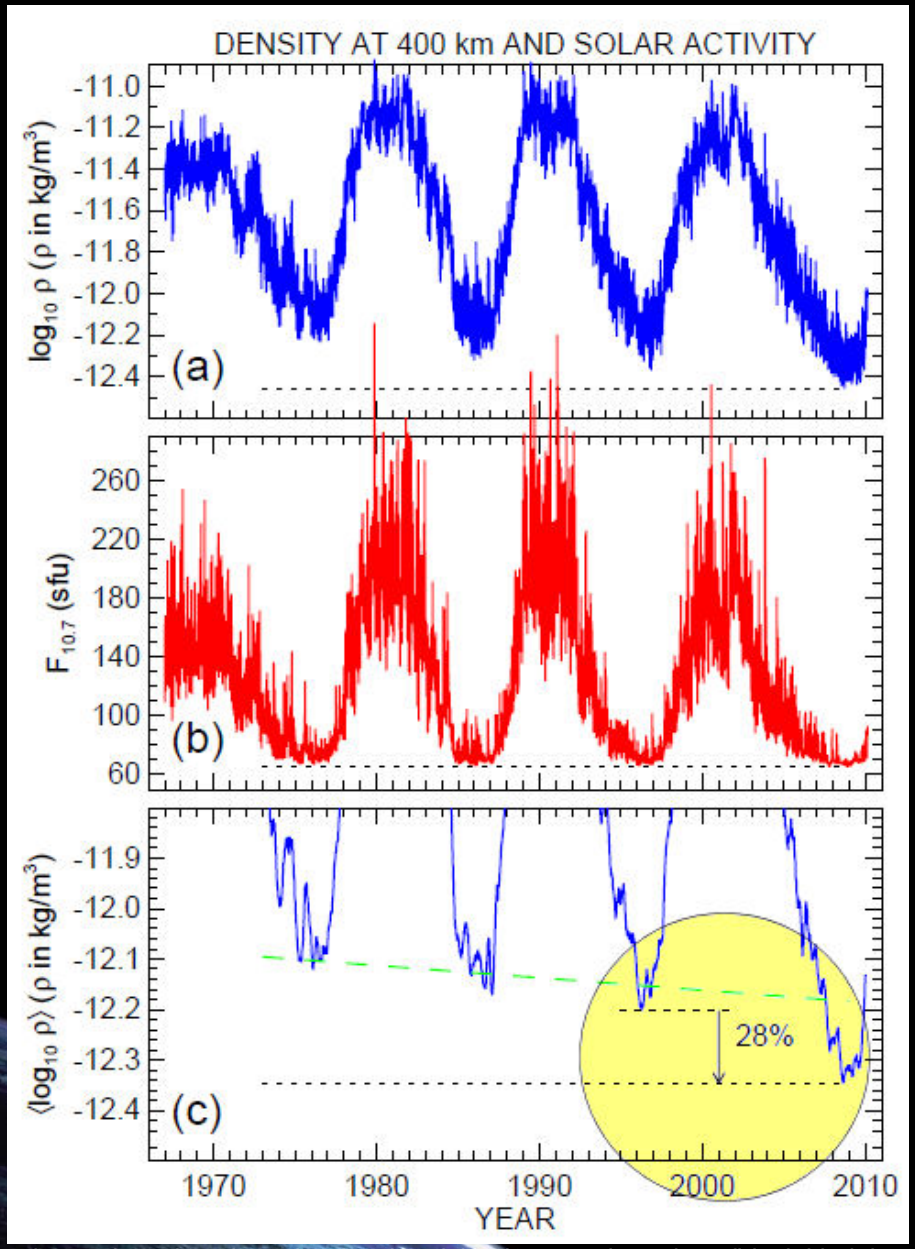
http://www.space.com/scienceastronomy/dust_storm_030814.html

Increasing Meteor Rates



This strong showing continues a recent trend of intensifying Geminids that could lead to a regular "super-shower" in the years ahead.

www.spaceweather.com



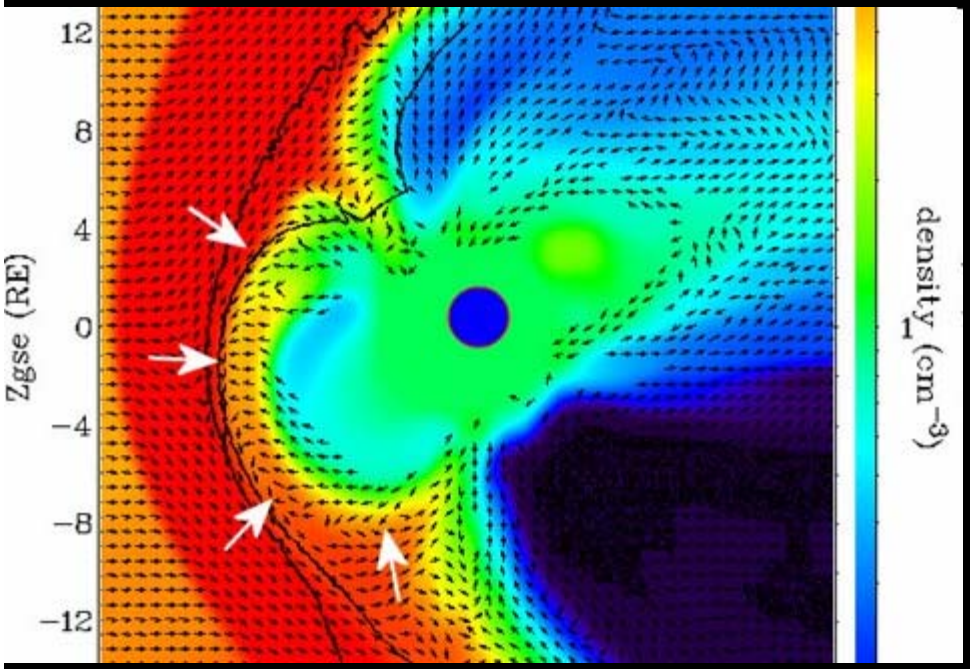
These plots show how the density of the thermosphere (at a fiducial height of 400 km) has waxed and waned during the past four solar cycles. Frames (a) and (c) are density; frame (b) is the sun's radio intensity at a wavelength of 10.7 cm, a key indicator of solar activity. Note the yellow circled region. In 2008 and 2009, the density of the thermosphere was 28% lower than expectations set by previous solar minima. Credit: Emmert et al. (2010), Geophys. Res. Lett., 37, L12102.

A Puzzling Collapse of Earth's Upper Atmosphere

July 15, 2010: High above Earth's surface where the atmosphere meets space, a rarefied layer of gas called "the thermosphere" recently collapsed and now is rebounding again.

"This is the biggest contraction of the thermosphere in at least 43 years," says John Emmert of the Naval Research Lab, lead author of a paper announcing the finding in the June 19th issue of the *Geophysical Research Letters* (GRL). "It's a Space Age record."

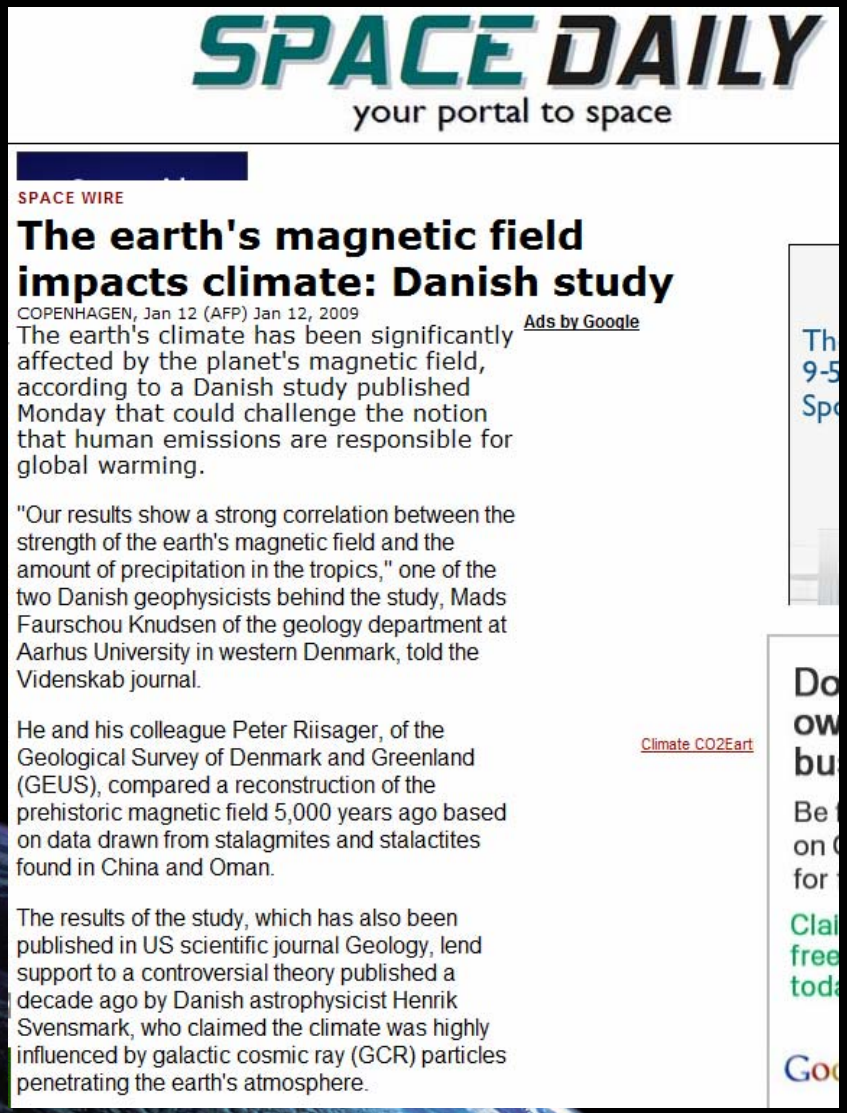
A Giant Breach in Earth's Magnetic Field



NASA's five THEMIS spacecraft have discovered a breach in Earth's magnetic field ten times larger than anything previously thought to exist. Solar wind can flow in through the opening to "load up" the magnetosphere for powerful geomagnetic storms. But the breach itself is not the biggest surprise. Researchers are even more amazed at the strange and unexpected way it forms, overturning long-held ideas of space physics.

December 16, 2008

Earth's Magnetic Field Impact Climate



SPACE DAILY
your portal to space

SPACE WIRE

The earth's magnetic field impacts climate: Danish study

COPENHAGEN, Jan 12 (AFP) Jan 12, 2009

The earth's climate has been significantly affected by the planet's magnetic field, according to a Danish study published Monday that could challenge the notion that human emissions are responsible for global warming.

"Our results show a strong correlation between the strength of the earth's magnetic field and the amount of precipitation in the tropics," one of the two Danish geophysicists behind the study, Mads Faurschou Knudsen of the geology department at Aarhus University in western Denmark, told the Videnskab journal.

He and his colleague Peter Riisager, of the Geological Survey of Denmark and Greenland (GEUS), compared a reconstruction of the prehistoric magnetic field 5,000 years ago based on data drawn from stalagmites and stalactites found in China and Oman.

The results of the study, which has also been published in US scientific journal Geology, lend support to a controversial theory published a decade ago by Danish astrophysicist Henrik Svensmark, who claimed the climate was highly influenced by galactic cosmic ray (GCR) particles penetrating the earth's atmosphere.

Ads by Google

Climate CO2Eart

- "Our results show a strong correlation between the strength of the earth's magnetic field and the amount of precipitation in the tropics," one of the two Danish geophysicists behind the study
- "If changes in the magnetic field, which occur independently of the earth's climate, can be linked to changes in precipitation, then it can only be explained through the magnetic field's blocking of the cosmetic rays," he said.

Svensmark, H. et al. 2007. Experimental evidence for the role of ions in particle nucleation under atmospheric conditions.*Proceedings of the Royal Society A*. 463 (2078): 385-396.

http://www.spacedaily.com/2006/090112183735.ojdq7esu.html

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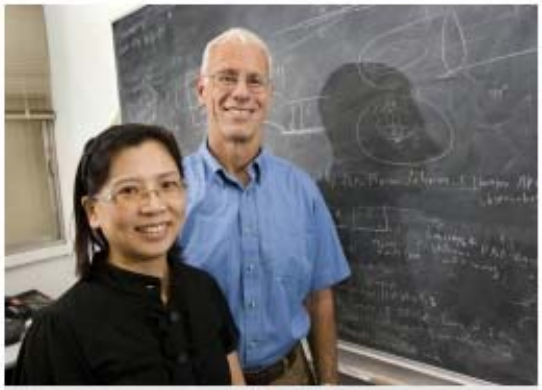
Scientists discover surprise in Earth's upper atmosphere

By Stuart Wolpert | September 09, 2009



Heejeong Kim and Larry Lyons

UCLA atmospheric scientists have discovered a previously unknown basic mode of energy transfer from the solar wind to the Earth's magnetosphere. The research, federally funded by the National Science Foundation, could improve the safety and reliability of spacecraft that operate in the upper atmosphere.

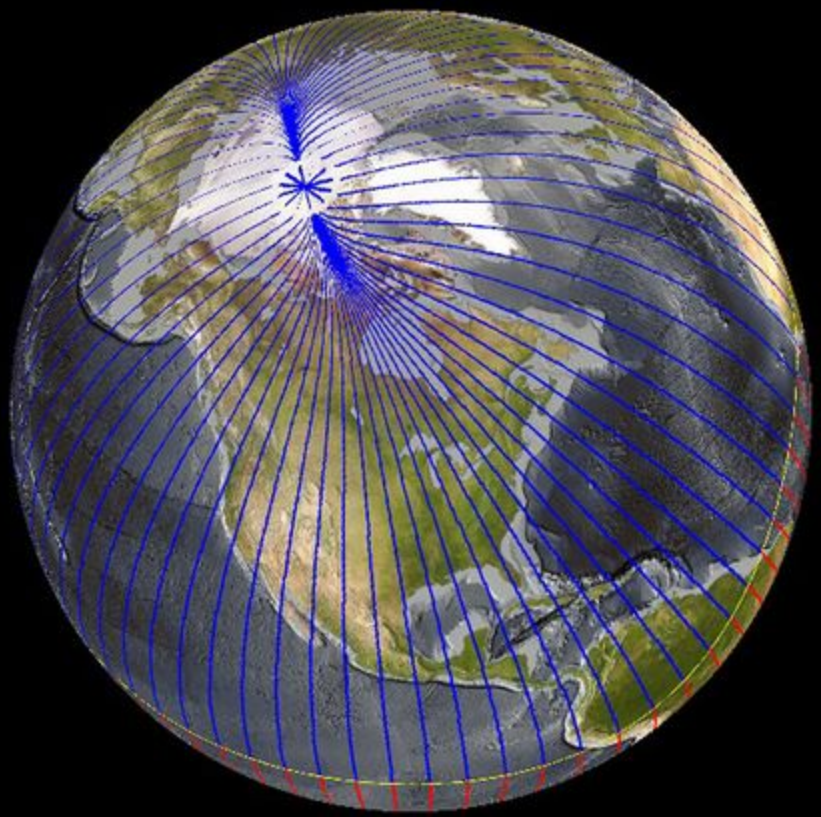
"It's like something else is heating the atmosphere besides the sun. This discovery is like finding it got hotter when the sun went down," said Larry Lyons, UCLA professor of atmospheric and oceanic sciences and a co-author of the research, which is in press in two companion papers in the Journal of Geophysical Research.

The sun, in addition to emitting radiation, emits a stream of ionized particles called the solar wind that affects the Earth and other planets in the solar system. The solar wind, which carries the particles from the sun's magnetic field, known as the interplanetary magnetic field, takes about three or four days to reach the Earth. When the charged electrical particles approach the Earth, they carve out a highly magnetized region — the magnetosphere — which surrounds and protects the Earth.

Charged particles carry currents, which cause significant modifications in the Earth's magnetosphere. This region is where communications spacecraft operate and where the energy releases in space known as substorms wreak havoc on satellites, power grids and communications systems.

http://www.newsroom.ucla.edu/portal/ucla/scientists-discover-surprise-in-101025.aspx

North Magnetic Pole Moving Due to Core Flux



Earth's north magnetic pole is racing toward Russia at **almost 40 miles (64 kilometers) a year** due to magnetic changes in the planet's core, new research says.

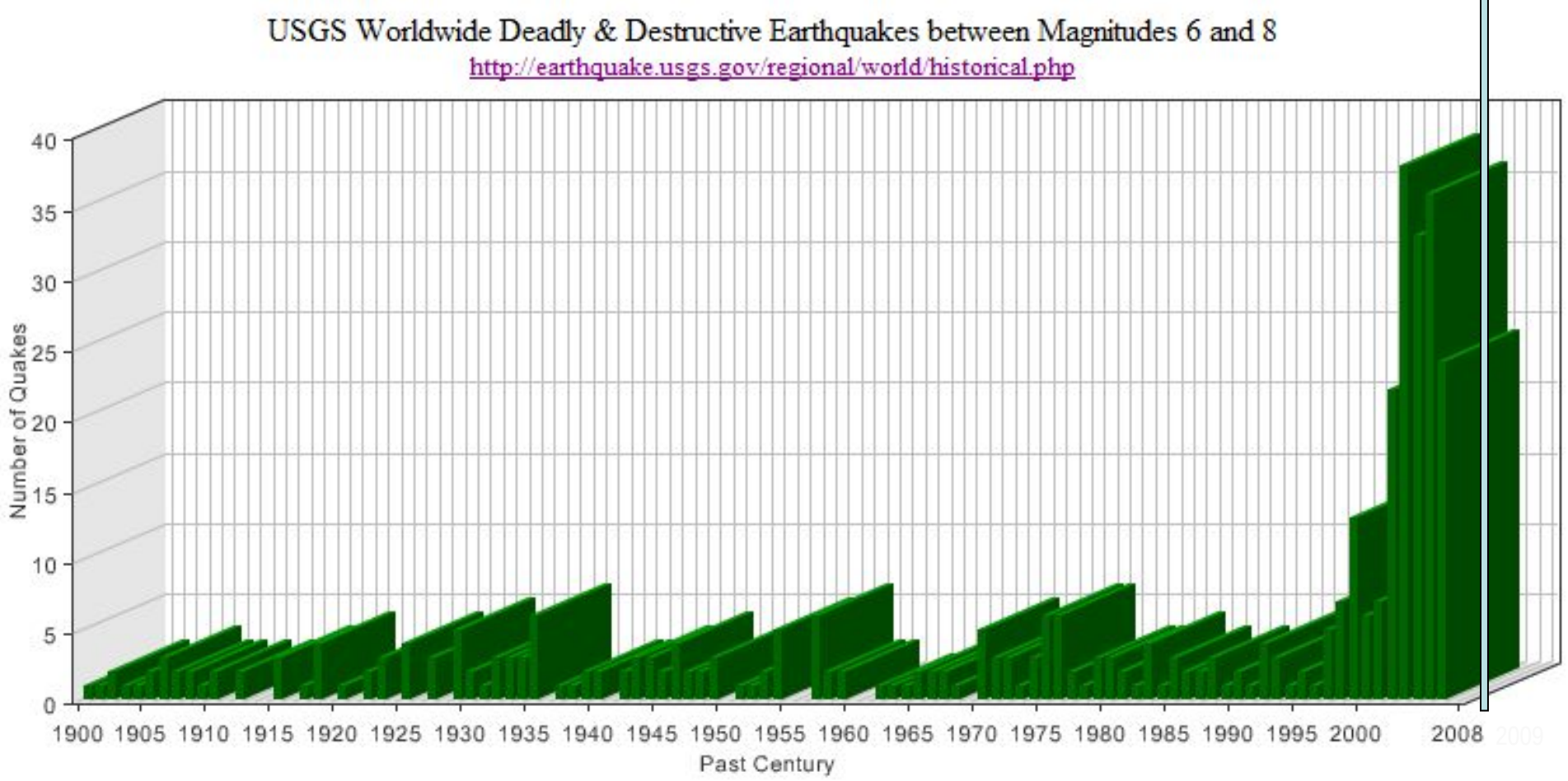
The core is too deep for scientists to directly detect its magnetic field. But researchers can infer the field's movements by tracking how Earth's magnetic field has been changing at the surface and in space.

Now, newly analyzed data suggest that there's a region of rapidly changing magnetism on the core's surface, possibly being created by a mysterious "plume" of magnetism arising from deeper in the core.

http://www.sciencedaily.com/releases/2005/12/051209113513.htm

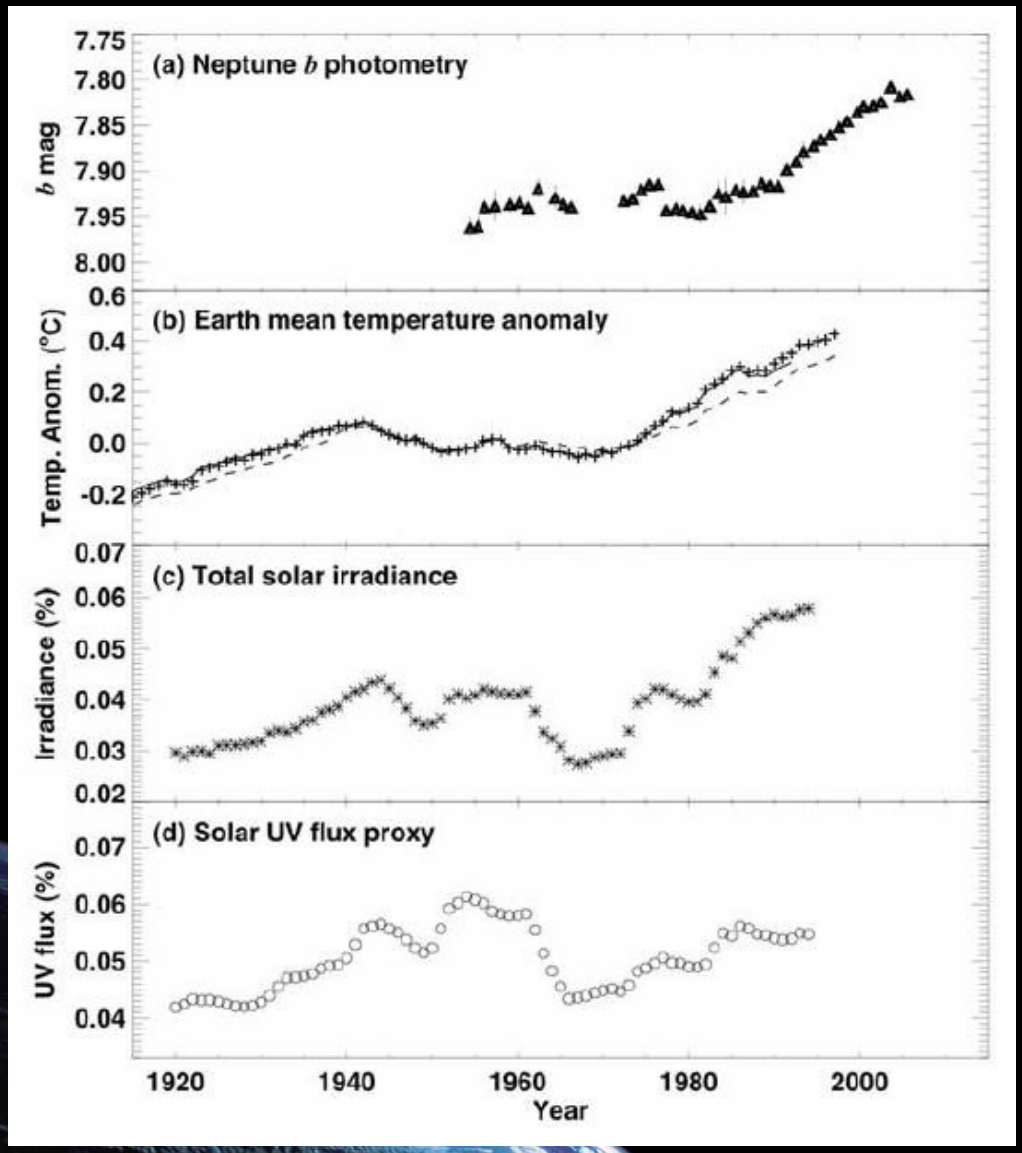
http://news.nationalgeographic.com/news/2009/12/091224-north-pole-magnetic-russia-earth-core.html

Earth sees an increase in destructive earthquake



http://www.thehorizonproject.com/earthquakes.cfm

Earth's temperature fluctuation is happening in correlation with Neptune's flux intensity



Photometry: the measurement of the flux or intensity of an astronomical object's electromagnetic radiation

Minimum Distance from Earth: 4.3 billion km (2.68 billion miles) ~ it takes 4 hours for light to travel to earth.

H. B. Hammel, G.W. Lockwood, "Suggestive correlations between the brightness of Neptune solar variability, and Earth's temperature, "
Geophys. Res. Lett., 34, L08203

http://www.worldclimatereport.com/wp-images/neptune_temps.JPG

Noctilucent clouds

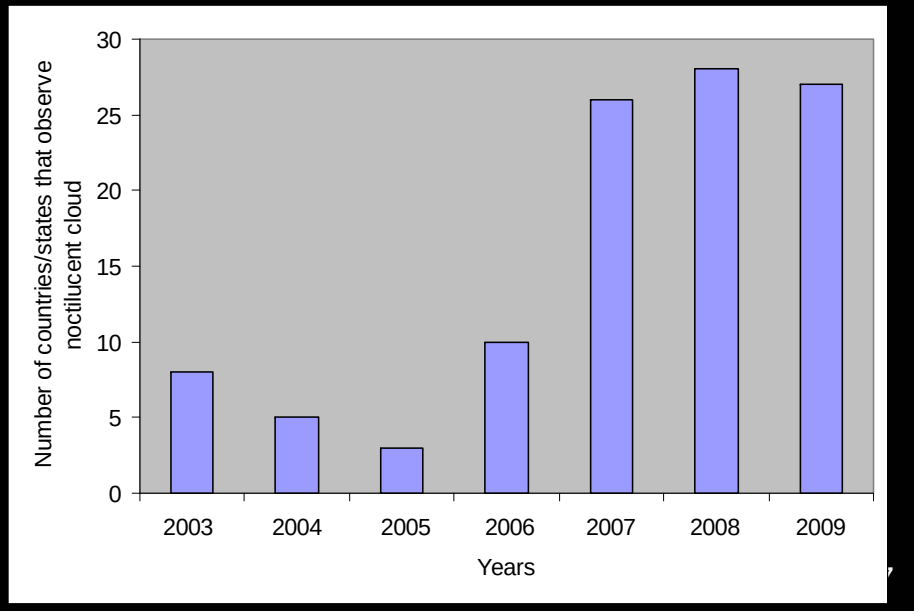
Noctilucent clouds, are tenuous cloud-like phenomena that are the "ragged-edge" of a much brighter and pervasive polar cloud layer called **polar mesospheric clouds** in the upper atmosphere, visible in a deep twilight. They are made of crystals of water ice. The name means roughly *night shining* in Latin. They are most commonly observed in the summer months at latitudes between 50° and 70° north and south of the equator.

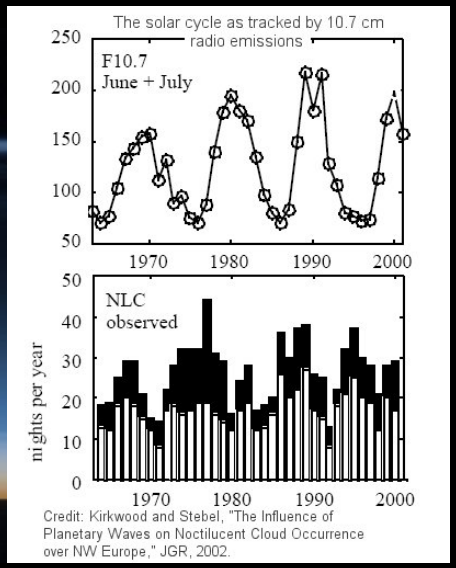
- Highly reflective (i.e. highly conductive) in the frequency ranges from 50 MHz to 1 GHz

There is evidence that the relatively recent appearance of noctilucent clouds, and their gradual increase, may be linked to climate change.

Thomas, GE; Olivero, J (2001). "Noctilucent clouds as possible indicators of global change in the mesosphere". *Advances in Space Research* **28** (7): 939–946.

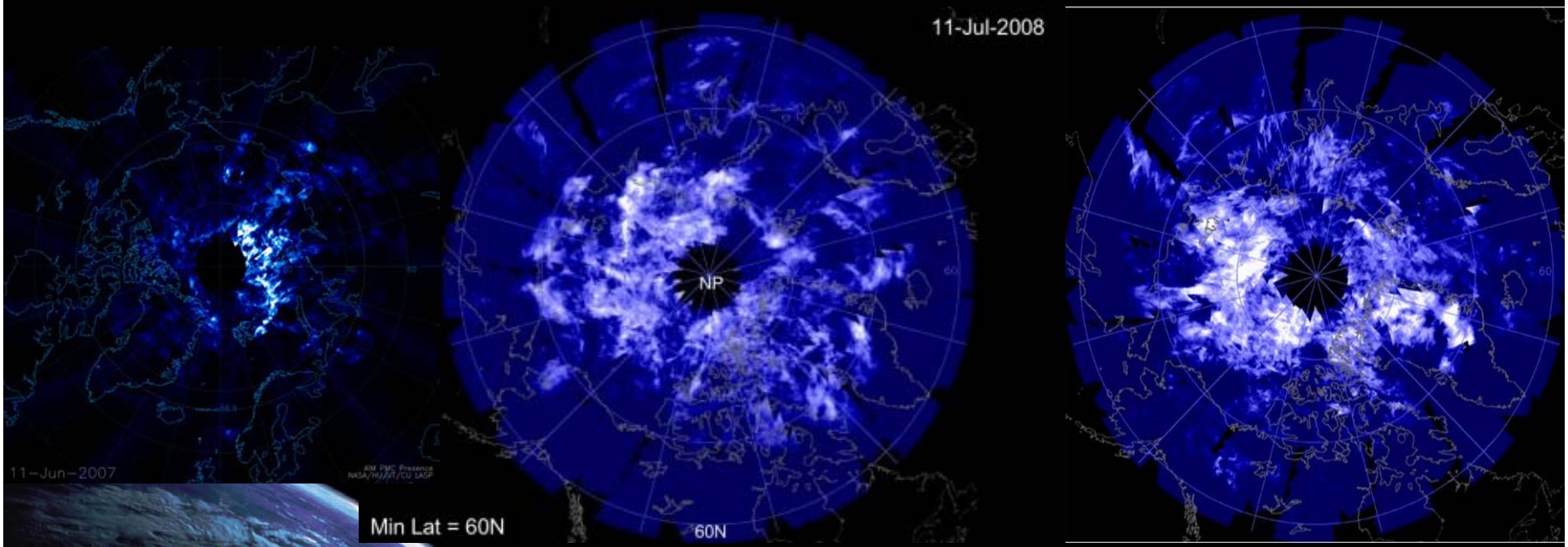
Asteroid clouds





Increasing Noctilucent cloud activity

http://www.sciencedaily.com/releases/2009/12/091215192216.htm



11-Jul-2007

11-Jul-2008

14-Jul-2009

Incoming Space Rocks Now Classified

"The fireball data from military or surveillance assets have been of critical importance for assessing the impact hazard," said David Morrison, a Near Earth Object (NEO) scientist at NASA's Ames Research Center. He noted that his views are his own, not as a NASA spokesperson.

http://www.space.com/news/090610-military-fireballs.html

Predicted GPS Outage from 2010-2014

The GAO report predicated only an 80 percent likelihood the Air Force would be able to maintain 24-satellite constellation the full over a period between 2010 and 2014. Going below 24 satellites could result in lower GPS performance, GAO said.

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Air Force Responds to GPS Outage Concerns

U.S. Air Forces Tweets That GPS Won't Go Down Despite Reports That It Is Vulnerable

By DAVID COURSEY
May 21, 2009

PCWorld

4 comments

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The sky isn't falling and neither is the Global Positioning System, the U.S. Air Force said during a Twitter news conference. "No, the GPS will not go down," tweeted Col. Dave Buckman of the Air Force's Space Command. "GAO points out, there is potential risk associated with a degradation in GPS performance."

A government watchdog group warns that the global positioning system (GPS) is vulnerable.
(ABC News Photo Illustration)

"The issue is under control. We are working hard to get out the word. The issue is not whether GPS will stop working. There's only a small risk we will not continue to exceed our performance standard," the Air Force official said.

The tweet forum marked the first time Space Command has used its Twitter page for a scheduled forum. During the session, held Wednesday afternoon, the Air Force sought to allay fears raised by a Government Accounting Office report critical of its management of the GPS program.

"Agree w/ GAO thr's a potential risk, but GPS isn't falling out of the sky--we have plans 2 mitigate risk & prevent a gap," the Air Force officials said, in the clipped 140-character cadence of Twitter conversation.

The GAO report predicated only an 80 percent likelihood the Air Force would be able to maintain the full 24-satellite constellation over a period between 2010 and 2014. Going below 24 satellites could result in lower GPS performance, GAO said.

The danger of a GPS outage, though small, exists if the Air Force is unable to improve its satellite replacement program. Currently years behind, Space Command says it has plans to launch enough satellites to keep the constellation above the 24-satellite threshold.

"We have 30+ satellites on orbit now. We'll launch another in Aug 09, and again early 10. Going below 24 won't happen," the Air Force said, counting on an improvement in its ability to get satellites into space.

"We definitely need to keep this in perspective. Since 1995, GPS has never failed to exceed performance standards."

Delays in the $5.8 billion program have occurred for a variety of reasons, the GAO report stated. Among them is consolidation among companies that supply GPS hardware to the Air Force.

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- When Lovers' Quarrels Go High-Tech
- 'Text-ual Harassment': A New Way to Stalk?

http://abcnews.go.com/Technology/AheadoftheCurve/story?id=764

guardian.co.uk

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GPS system 'close to breakdown'

Network of satellites could begin to fail as early as 2010

Comments (87)

Buzz up!

Digg it (22)

Bobbie Johnson, San Francisco
guardian.co.uk, Tuesday 19 May 2009 10.32 BST
Article history

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Technology
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It has become one of the staples of modern, hi-tech life: using satellite navigation tools built into your car or mobile phone to find your way from A to B. But experts have warned that the system may be close to breakdown.

US government officials are concerned that the quality of the Global Positioning System (GPS) could begin to deteriorate as early as next year, resulting in regular blackouts and failures – or even dishing out inaccurate directions to millions of people worldwide.

The warning centres on the network of GPS satellites that constantly orbit the planet and beam signals back to the ground that help pinpoint your position on the Earth's surface.

The satellites are overseen by the US Air Force, which has maintained the GPS network since the early 1990s. According to a study by the US government accountability office (GAO), mismanagement and a lack of investment means that some of the crucial GPS satellites could begin to fail as early as next year.

"It is uncertain whether the Air Force will be able to acquire new satellites in time to maintain current GPS service without interruption," said the report, presented to Congress. "If not, some military operations and some civilian users could be adversely affected."

The report says that Air Force officials have failed to execute the necessary steps to keep the system running smoothly.

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Stronger radiation from the Sun 'will cause sat-navs to fail', scientists warn

Britain's satellite navigation networks could soon experience problems and disruptions caused by higher levels of radiation coming from the Sun, scientists warn.

By Andrew Hough
Published: 1:00PM GMT 10 Feb 2010

« Previous 1 of 2 Images Next »

Experts say solar flares interfere with signals from satellites orbiting the earth, causing receivers to lose track of their position. Photo: BLOOMBERG

Researchers said satnav devices were facing the threat from an expected increase in solar flares from the Sun that could cause unpredictable errors in navigation.

Experts said the bursts of radiation caused by the flares interfere with signals from satellites orbiting the earth, causing receivers to fail and lose track of their position.

Now British scientists say the Sun is on its way to another "solar maximum", which will cause the stronger levels of radiation to hit the earth.

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GPS failing? Blame

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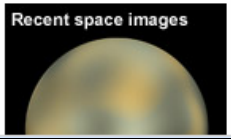

http://www.telegraph.co.uk/science/science-news/7204617/Stronger-radiation-from-the-Sun-will-cause-sat-navs-to-fail-scientists-warn.html

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Airline frequent fliers 'radiation poisoning risks' from space 'solar flare' storm activity

Airline frequent fliers are at greater risk of developing long term radiation poisoning from "solar space storms" or flare activity from the Sun, a new study warns.

By Andrew Hough
Published: 10:00PM GMT 05 Nov 2010

49 Comments

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Experts warned passengers could be subjected to increasing risk to cancer due to such radiation levels. Photo: CORBIS

Researchers found passengers faced the "hazard" of space radiation, which created unhealthy levels of exposure while flying at "typical cruise altitudes" of 40,000 feet.

Experts warned passengers could be subjected to increasing risk to cancer due to such radiation levels.

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Astronomy photography

- Researchers found passengers faced the "hazard" of space radiation, which created unhealthy levels of exposure while flying at 'typical cruise altitudes' of 40,000 feet.
- Nasa scientists believe the earth is facing danger from a **once-in-a-century** "solar flare", a disturbance on the Sun's surface that could cause geomagnetic storms on this planet.

http://www.telegraph.co.uk/science/space/8102629/Airline-frequent-fliers-radiation-poisoning-risks-from-space-solar-flare-storm-activity.html

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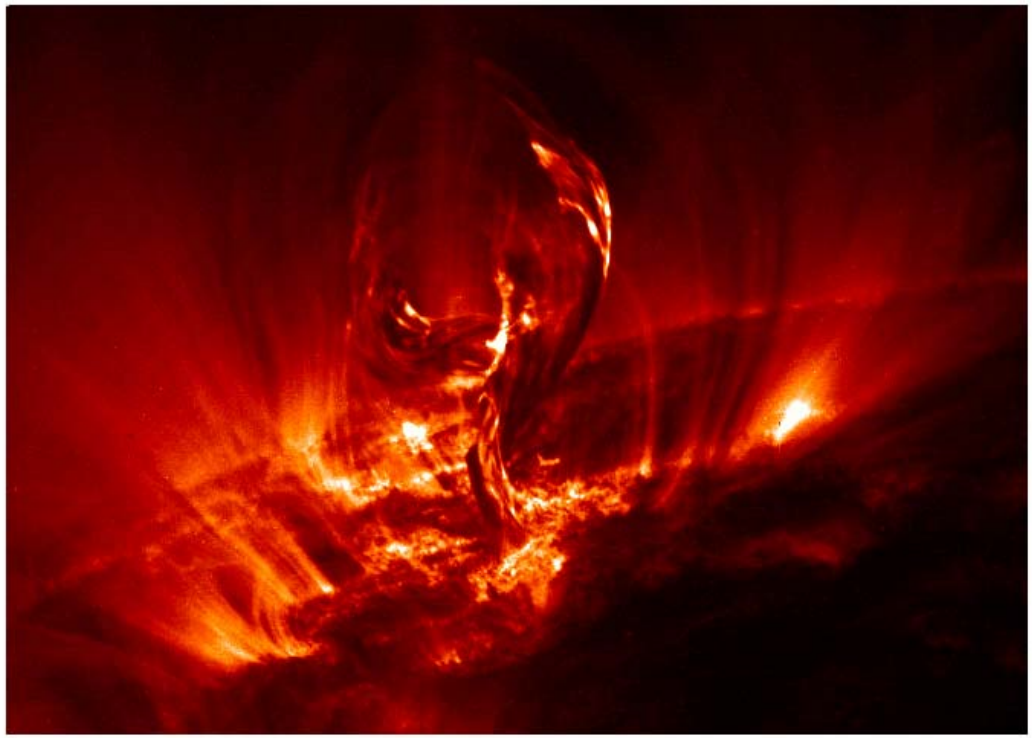
Telegraphs Ran on Electric Air in Crazy 1859 Magnetic Storm

By Alexis Madrigal September 2, 2009 | 6:44 pm | Categories: Space, Tech



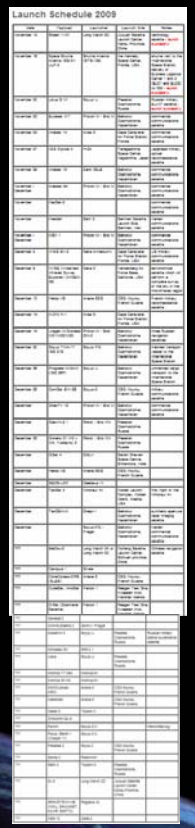
On Sept. 2, 1859, at the telegraph office at No. 31 State Street in Boston at 9:30 a.m., the operators' lines were overflowing with current, so they unplugged the batteries connected to their machines, and kept working using just the electricity coursing through the air.

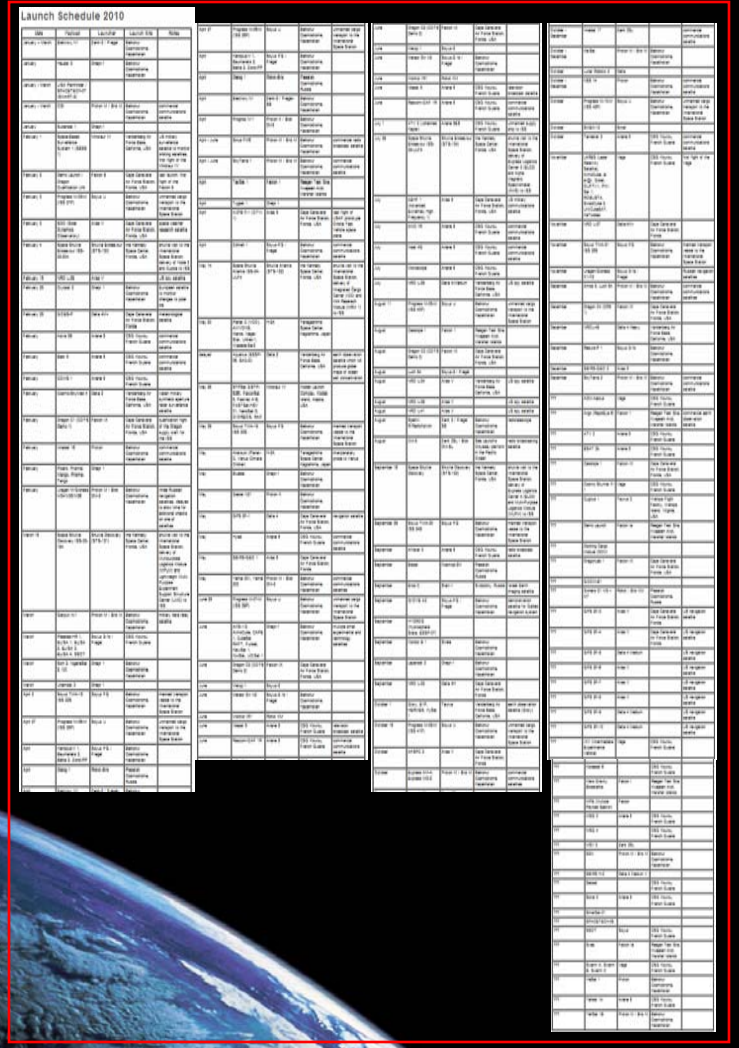
- On Sept. 2, 1859, at the telegraph office at No. 31 State Street in Boston at 9:30 a.m., the operators' lines were overflowing with current, so they unplugged the batteries connected to their machines, and kept working using just the electricity coursing through the air

http://www.wired.com/wiredscience/2009/09/telegraphs-ran-on-electric-air-in-crazy-magnetic-storm-150-years-ago/

Public Domain Information on Number of Satellites Launched Between 2009 - 2014

2009 **2010** **2011** **2012** **2013** **2014**





http://www.satelliteonthenet.co.uk/index.php/2013

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Burma's new capital city unveiled

By Jonathan Head
BBC News, Naypyidaw

Burma's military rulers have been showing off their new capital for the first time to the outside world.

Journalists caught a rare glimpse of Burma's military leader Than Shwe

The new city, called Naypyidaw, or Abode of Kings, is being built about 460km (300 miles) north of the old capital, Rangoon.

Until now few outsiders were allowed to go there, but the foreign media has been invited to the capital to watch the huge Armed Forces Day parade.

However, it is still not clear why the generals have moved here.

The rutted and overcrowded roads of Burma suddenly give way to smooth eight-lane motorways as you approach the new capital.

Naypyidaw is being built on a vast and extravagant scale in hundreds of square kilometres of tropical scrubland.

In pictures: Capital on parade

Shining new buildings rise out of tropical scrub like a mirage, separated by miles of broad highways and boulevards.

Hardline message

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Last Updated: Thursday, 1 March 2007, 18:05 GMT

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Dutch pioneer floating eco-homes

By Alix Kroeger
BBC News, Maasbommel, the Netherlands

Small and densely populated, the Netherlands is one of the countries most at risk from climate change and rising sea levels.

The Dutch have found a new way to cope with excess water

But in one village in the south of the country, they are trying out a new way of living with an increased risk of floods.

A small ferry shuttles back and forth from one bank of the River Maas to the other. This is the only way of reaching Maasbommel, in Gelderland province, from the south.

The landscape is saturated with water, criss-crossed by rivers and the network of dykes which are supposed to protect the area from flooding.

But the dykes are not always enough. In 1993 and again in 1995, floods forced tens of thousands of people to leave their homes.

> **"Sustainable buildings which have no adverse impact on the environment"**
>
> Chris Zevenbergen of Dura Vermeer

Rising sea levels

Now, with climate change, floods are likely to be more frequent and more severe

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updated 1:42 p.m. EDT, Tue March 10, 2009

City floating on the sea could be just 3 years away

STORY HIGHLIGHTS

- Prototype floating city, called a seastead, may be ready in 3 years, engineer says
- Not clear if construction is possible or what it would cost, he admits
- The cities would look a bit like oil platforms but wouldn't be fixed in place
- Floating cities could experiment with new forms of government, planners say

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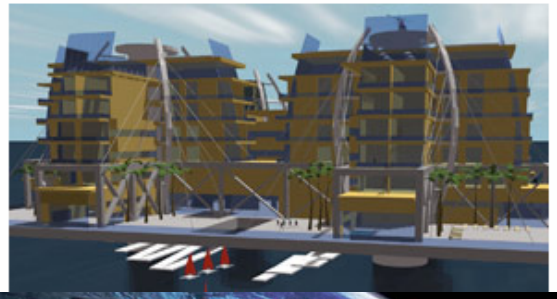
By Shelby Erdman
CNN

TEXT SIZE

(CNN) -- A floating city off the coast of San Francisco may sound like science fiction, but it could be reality in the not-too-distant future.



The Seasteading Institute already has drawn up plans for the construction of a homestead on the Pacific Ocean.

One project engineer described the prototype as similar to a cruise ship, but from a distance the cities might look like oil-drilling platforms.

According to the plans, the floating cities would not only look different from their land-based counterparts, but they might operate differently,

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Inside Norway's underground military HQ

22 September 2010 Last updated at 01:55 ET

In November, Norway will officially move its military command base to its former Cold War complex in Bodo inside the Arctic Circle.

As Russia is strengthening its armed presence on the other side of their shared border, there is no better illustration of the militarisation of the Arctic, and of its serious strategic value for Norway.

The BBC's Paul Henley has been given exclusive access to the underground Norwegian headquarters.

- In November, Norway will officially move its military command base to its former Cold War complex in Bodo inside the Arctic Circle.

http://www.bbc.co.uk/news/world-europe-11386699

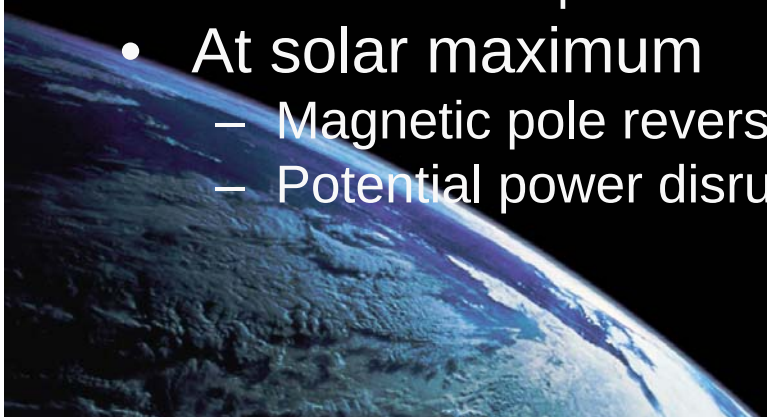
Russia is building 5,000 underground bunkers to be completed in 2012

- Nearly 5,000 new emergency bomb shelters will be built in Moscow by 2012 to save people in case of potential attacks.
- Moscow authorities say the measure is urgent as the shelters currently available in the city can house no more that half of its population.

http://windowstorussia.com/moscow-building-5000-bomb-shelters-by-2012.html

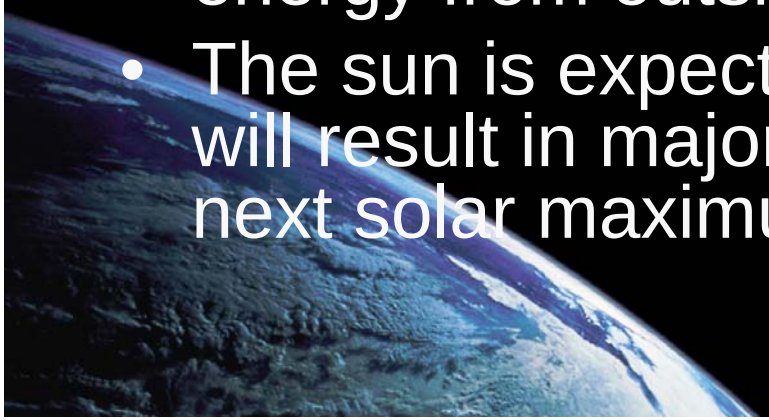
Future Earth Changes Summary

- Decreasing solar wind pressure
- Increasing interstellar dust
- Increasing cosmic ray – link to cloud formation
- More active Sun
- Leak in Earth's Magnetosphere
- Major solar eruption ~ 2010 - 2017
  - Earthquake
  - Severe weather
  - More comets & asteroid
  - More dust entering our solar system
  - Power disruption
- At solar maximum
  - Magnetic pole reversal ~ 2013
  - Potential power disruption



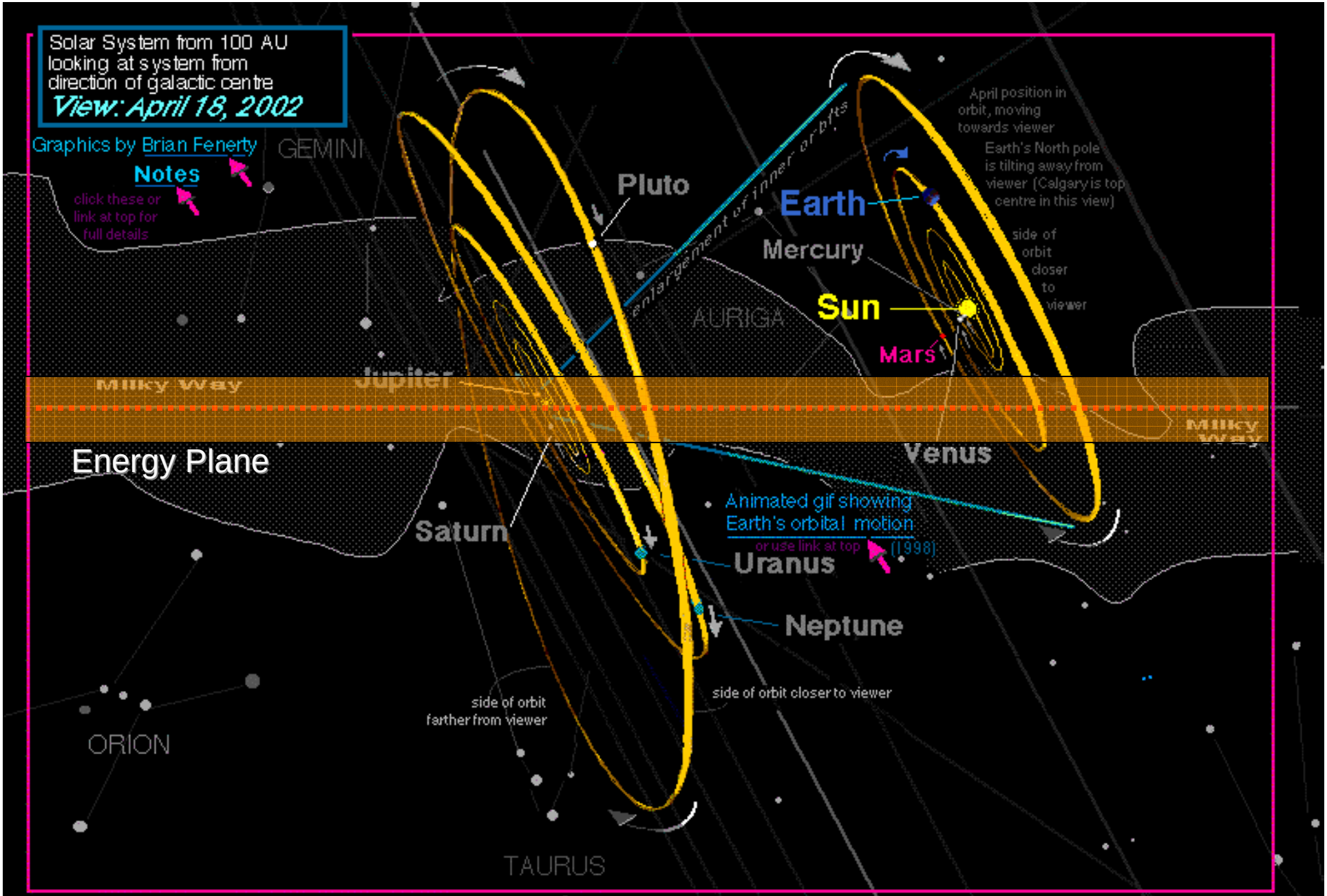
Conclusions

- All of information IS in the public domain
- The solar system is traveling into the plane of milky way containing large amount of energy.
- The Sun's heliosphere is strongly interacting with the galactic plane.
- Climate change is happening to all planets in our solar system.
- The solar activity interacts with the planets and energy from outside the solar system.
- The sun is expected to have strong activity and will result in major events on earth during the next solar maximum.



Connections among Planets & the Sun

- Summary of the current space weather situation
- Solar Dynamic – interaction between the Sun and earth
- Planetary alignment



Solar system position relative to the galactic plane

Summary for Earth changes

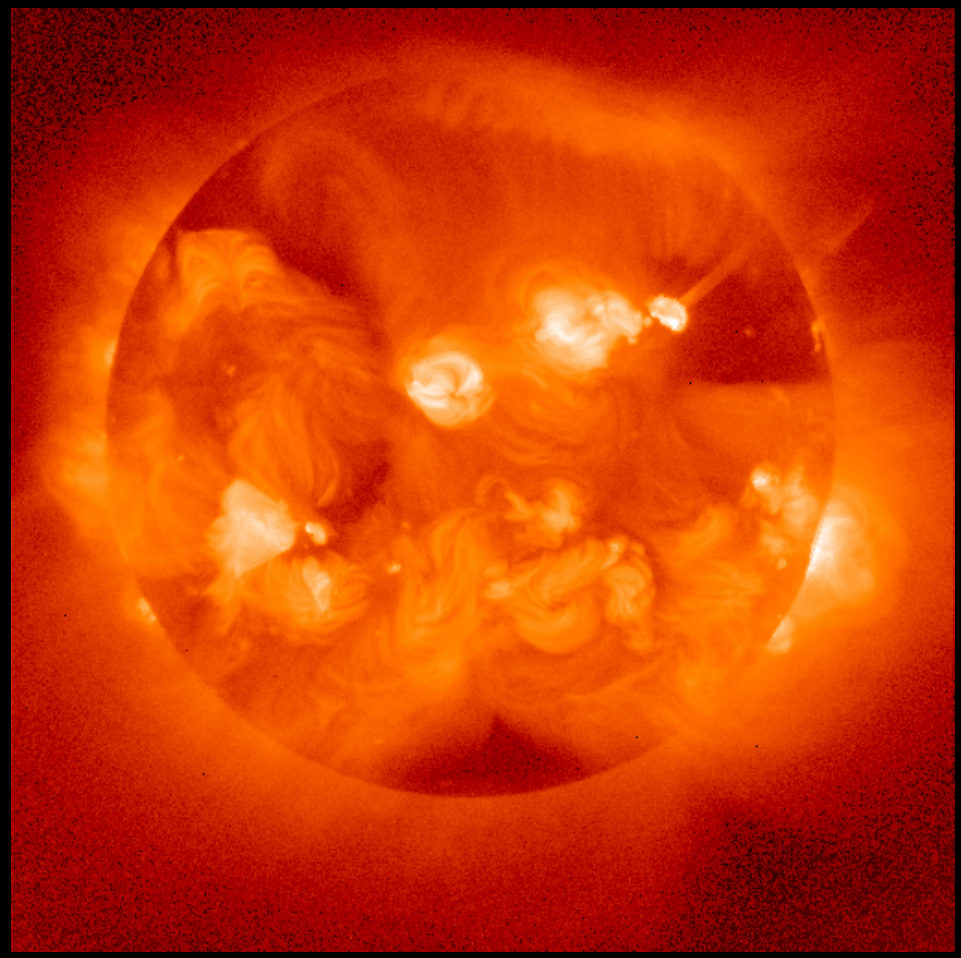
- Increase in Cosmic ray
- Increase in Cosmic dust
- Increase in meteor shower rate and space rocks
- Rapid shift in Earth magnetic field
- Giant breach in Earth’s magnetic field
- Collapse in Earth upper atmosphere
- More rain & floods
- More earthquake occurred on new fault zone

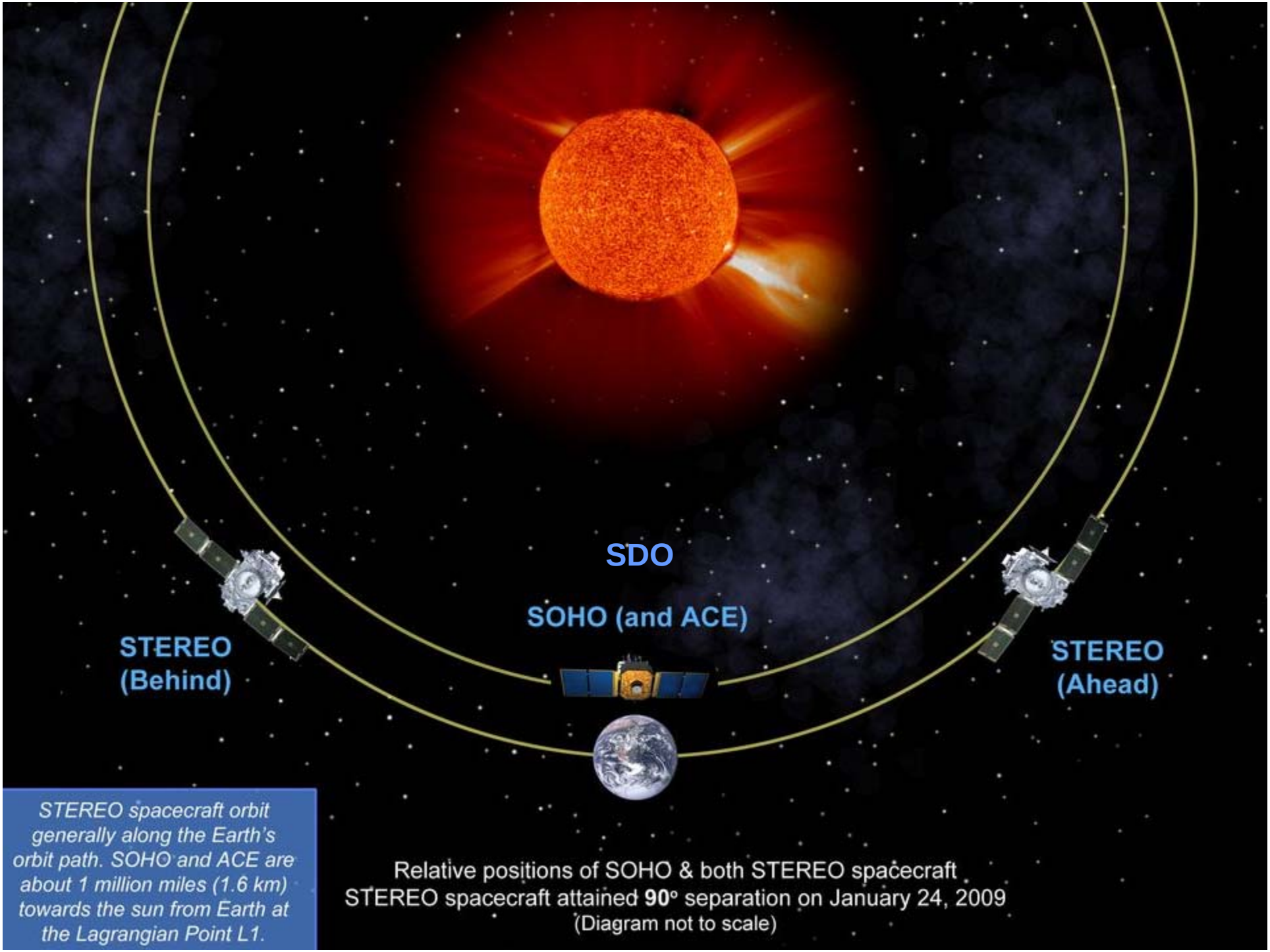
Solar Dynamic – interaction between the Sun and earth

- Solar Cycle
- Connections with Earthquake and climate disruptions
- Solar activities & climate change predictions

The Sun

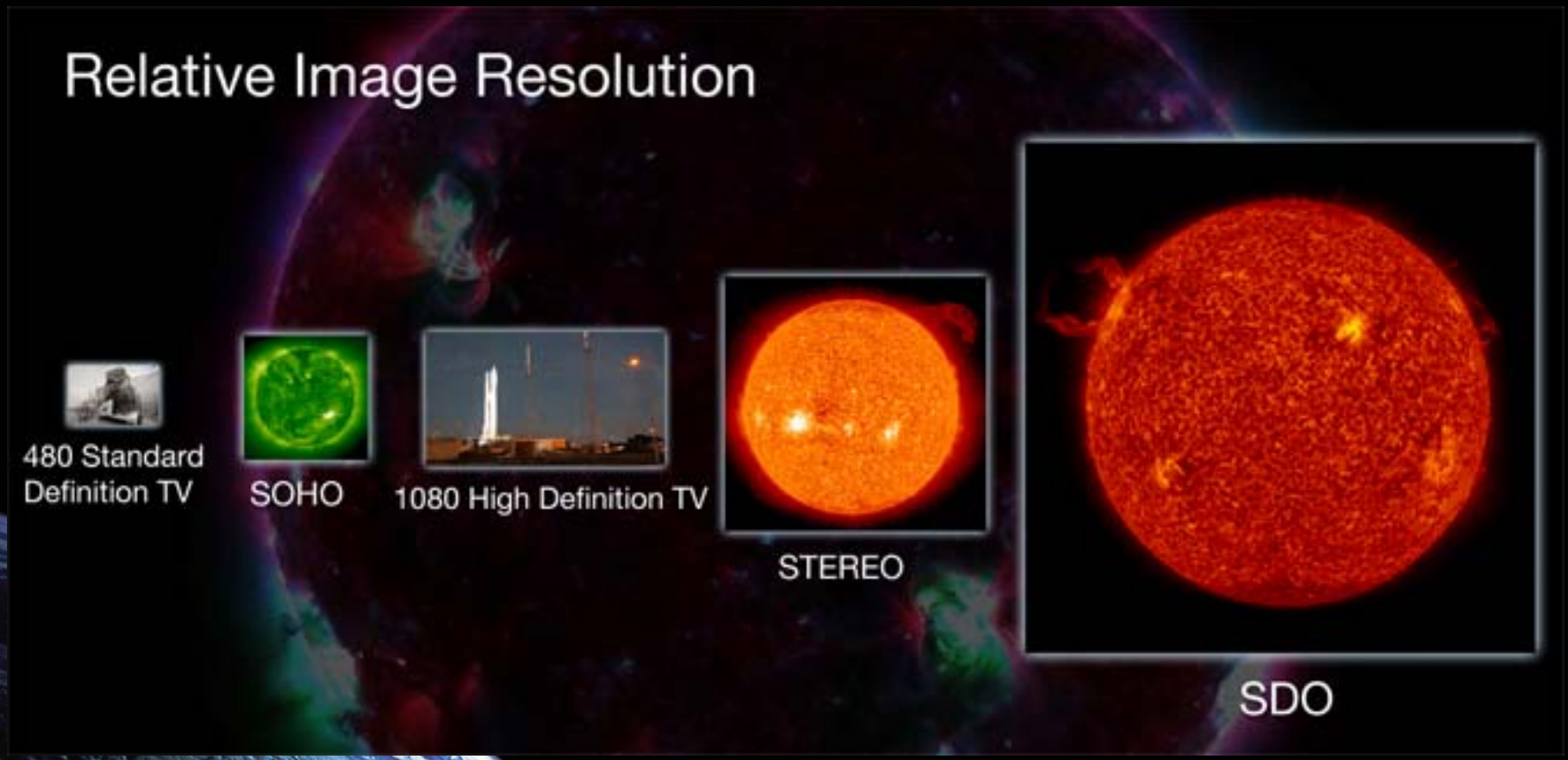
- Account for 99.86% of the Solar system's mass.
- Diameter : 109 x Earth
- Mass: 332,900 x Earth
- Surface temperature ~ 5,778 K
- Composition by mass
  - Hydrogen : 73.46%
  - Helium : 24.85%
  - Oxygen : 0.77%
- Solar Magnetic Activity Cycle



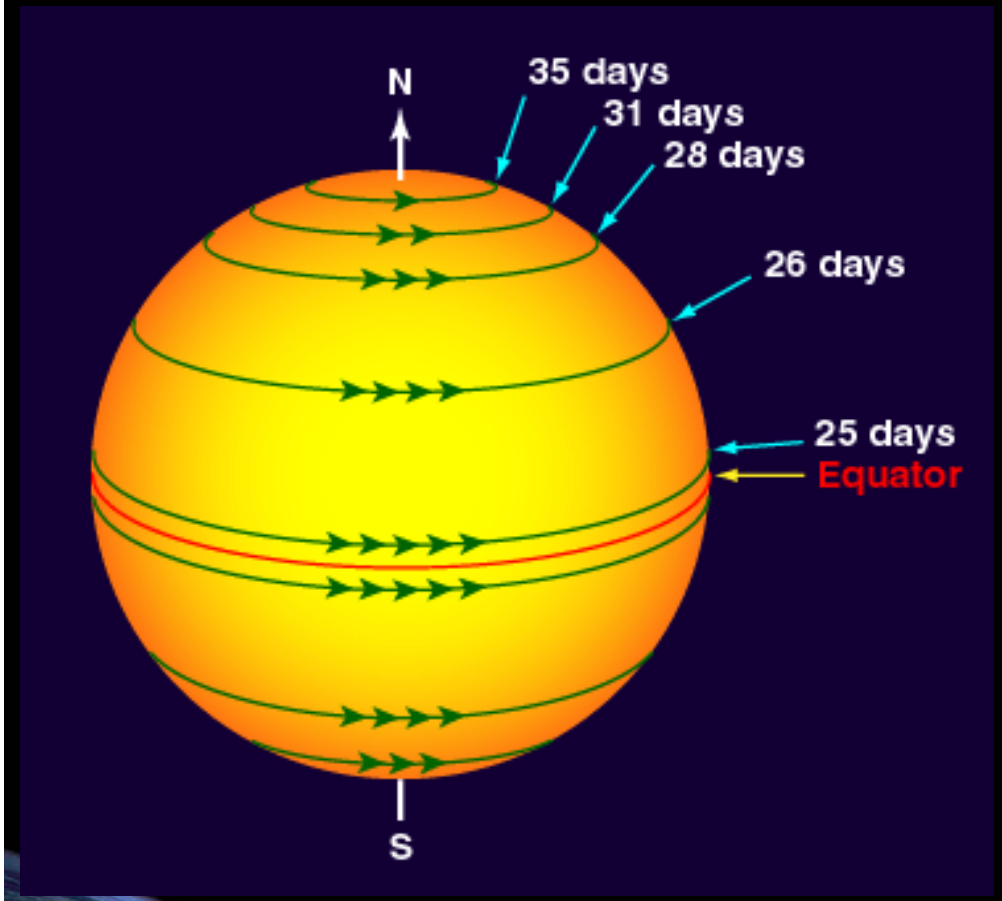

SDO
SOHO (and ACE)
STEREO
(Behind)
STEREO
(Ahead)
STEREO spacecraft orbit generally along the Earth's orbit path. SOHO and ACE are about 1 million miles (1.6 km) towards the sun from Earth at the Lagrangian Point L1.
Relative positions of SOHO & both STEREO spacecraft
STEREO spacecraft attained 90° separation on January 24, 2009
(Diagram not to scale)

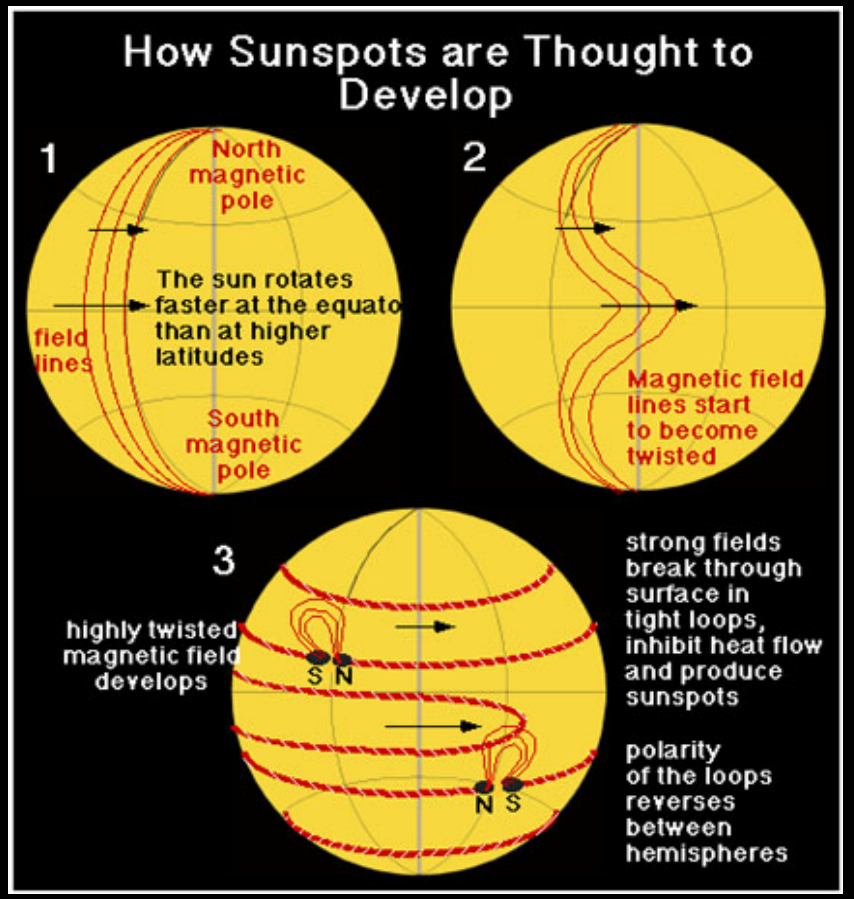
Main Satellite that are used to observe the Sun

SOHO, STEREO, SDO, ACE



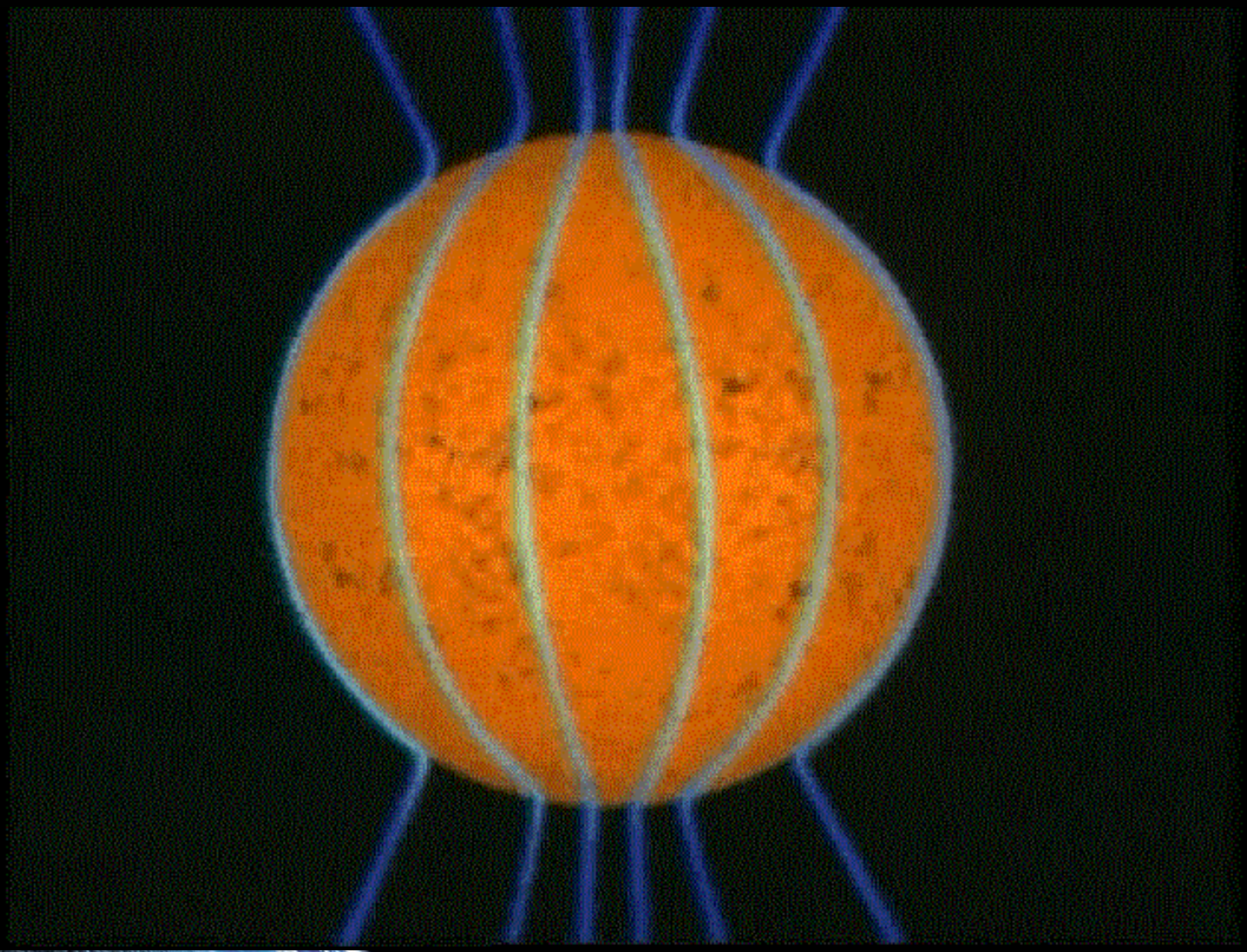
Solar Rotation





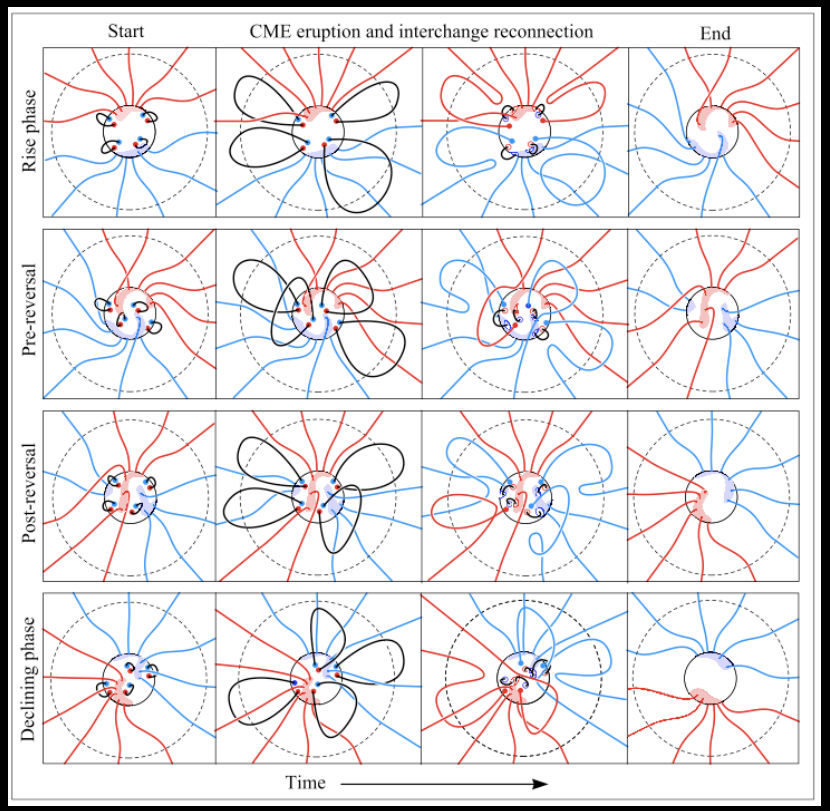
Sun is made of a gaseous plasma and is not a solid body, it does not rotate at the same speed at all places. Specifically, near the poles the surface rotates in around 35 days, but near its equator the Sun rotates about every 25 days. This is called differential rotation. This process leads to stretching and stressing of the Sun's magnetic field, creating heat, intense active regions, and solar blasts of charged particles.

Sun’s Magnetic Field Cycle

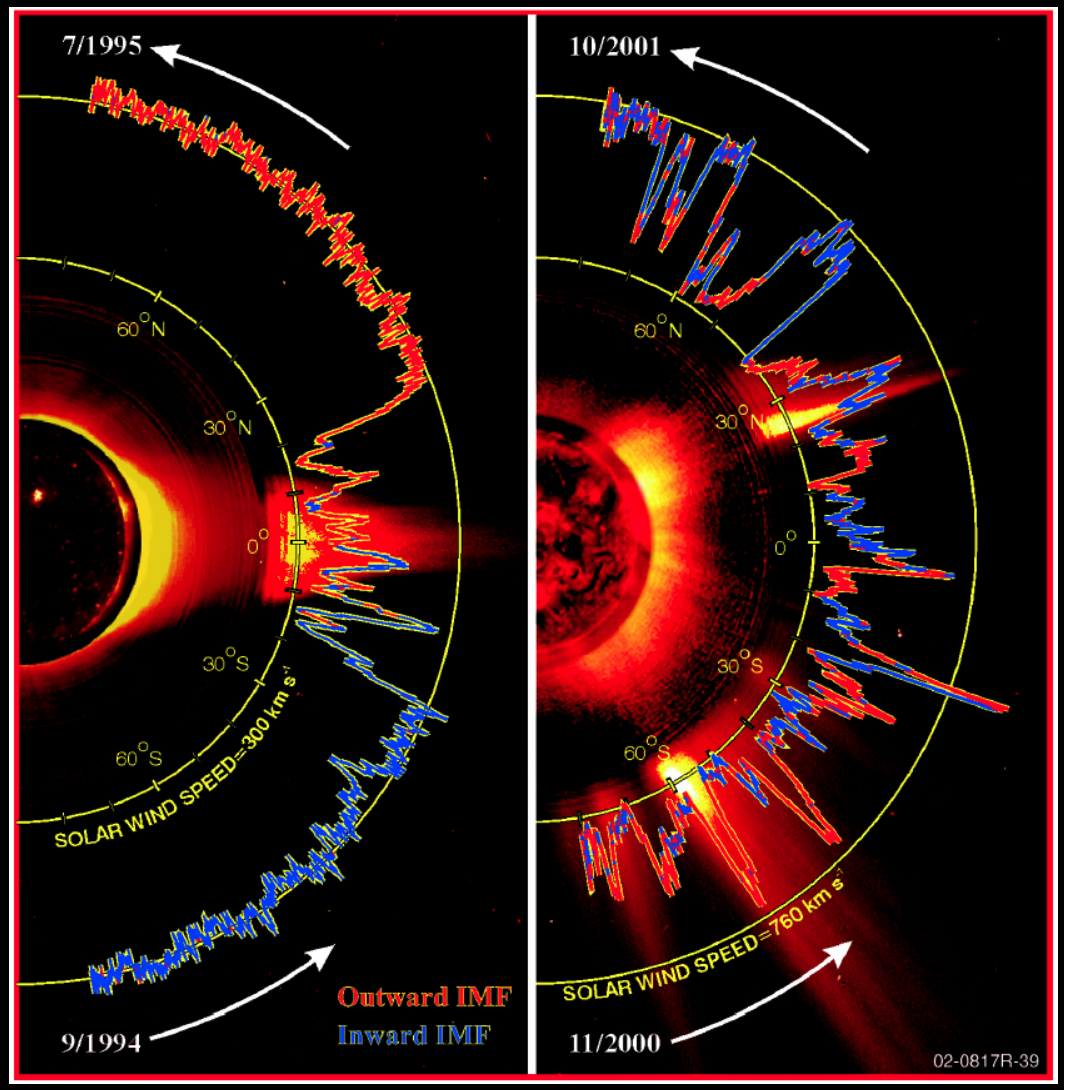


Sun magnetic pole reverse every 11 years

Solar Wind Speed During Magnetic Pole Reversal



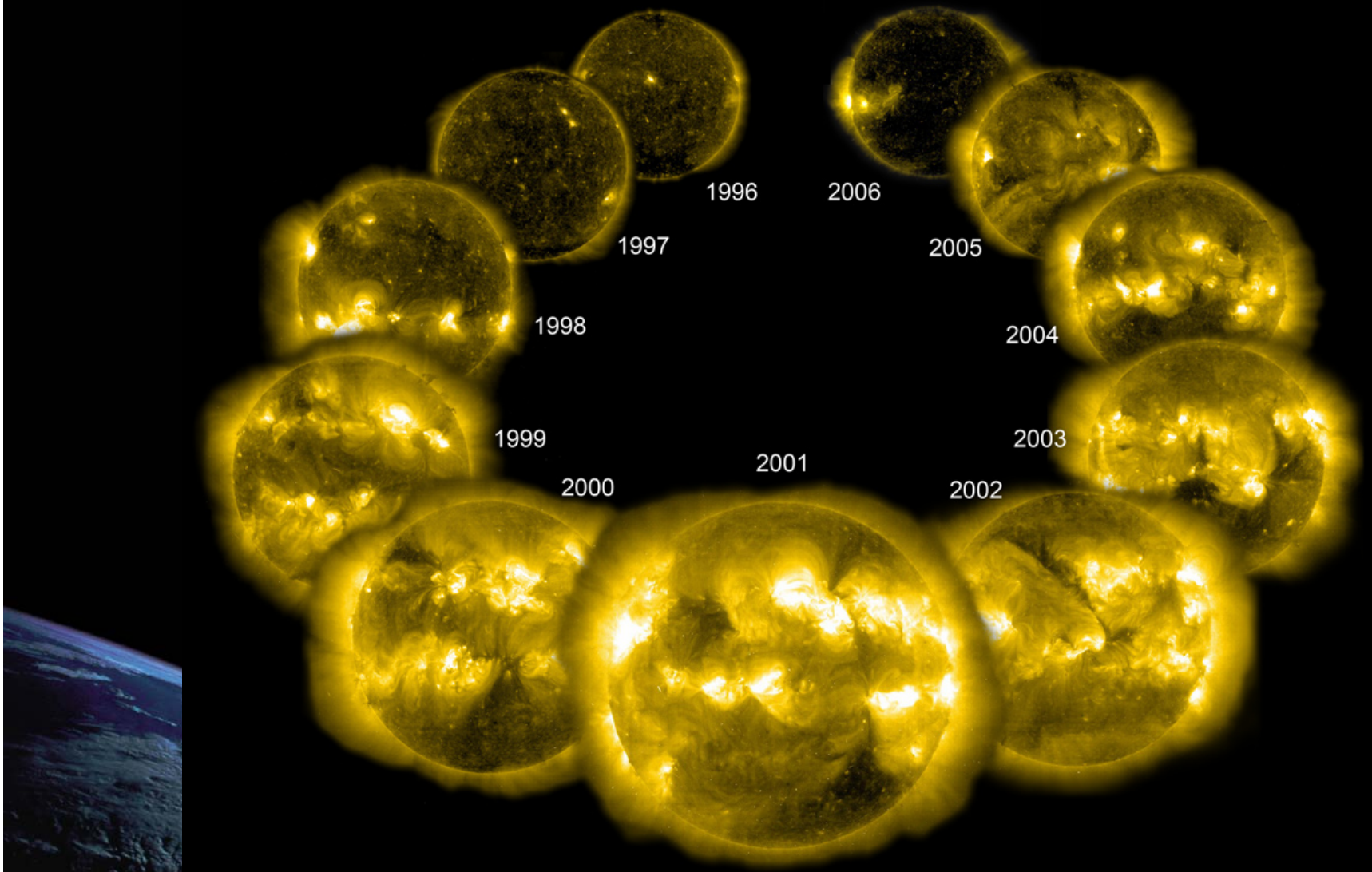
Sun magnetic pole reversal process



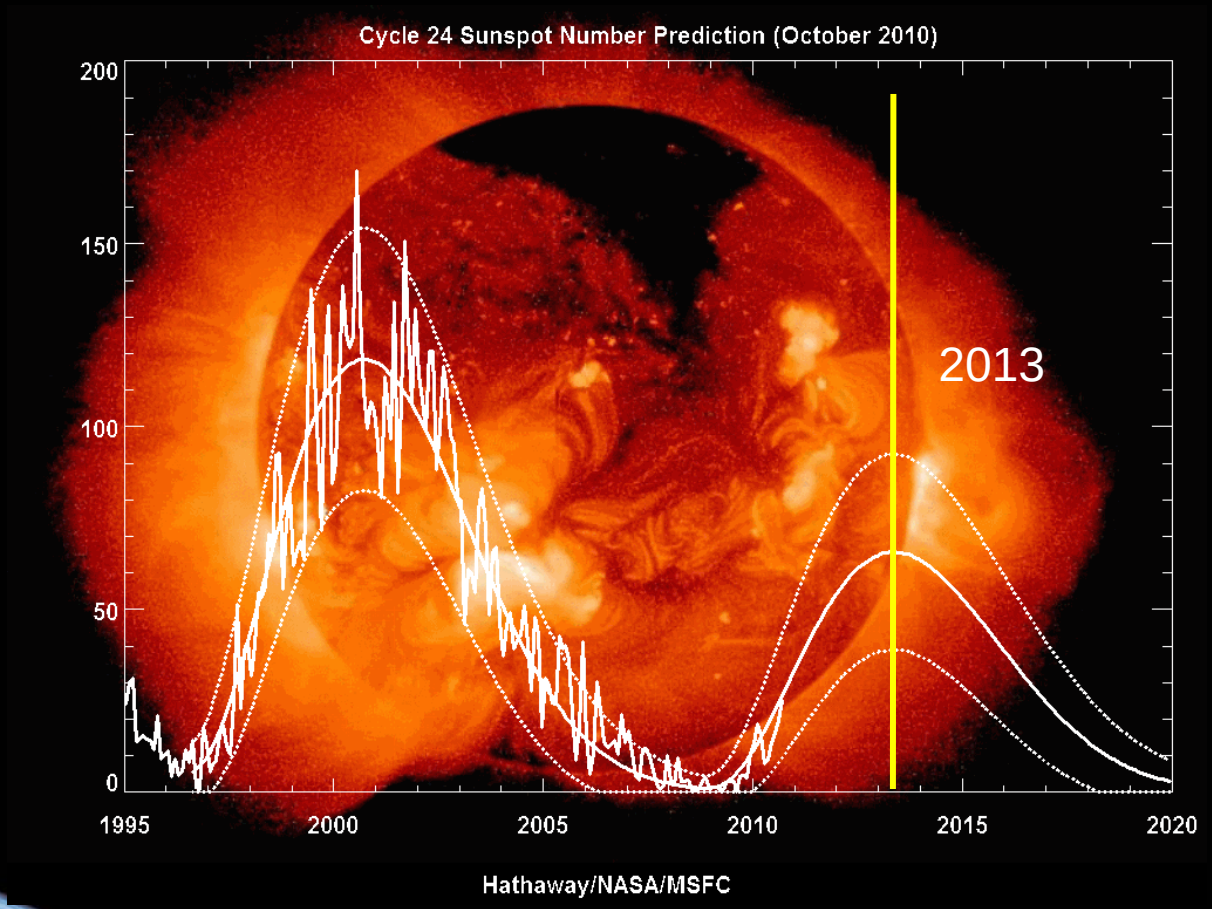
During the solar pole reversal, the heliosphere will be altered for a short period of time.

Owens et al., 2006

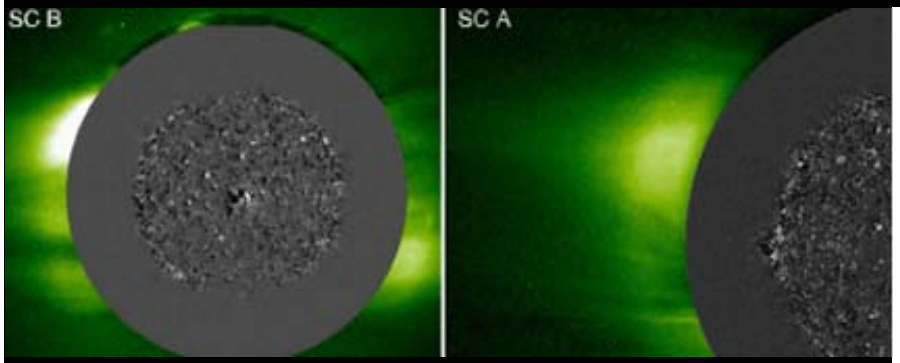
Solar Activity Cycle

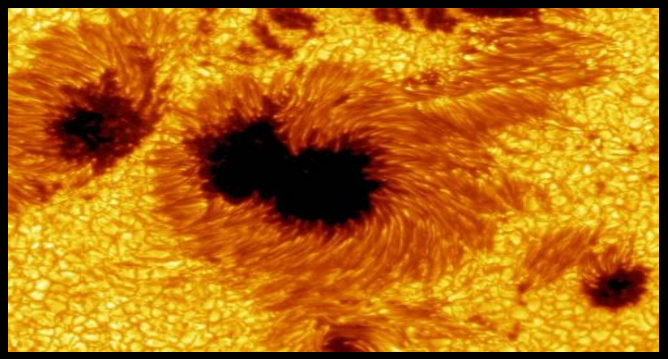


Solar Cycle 24

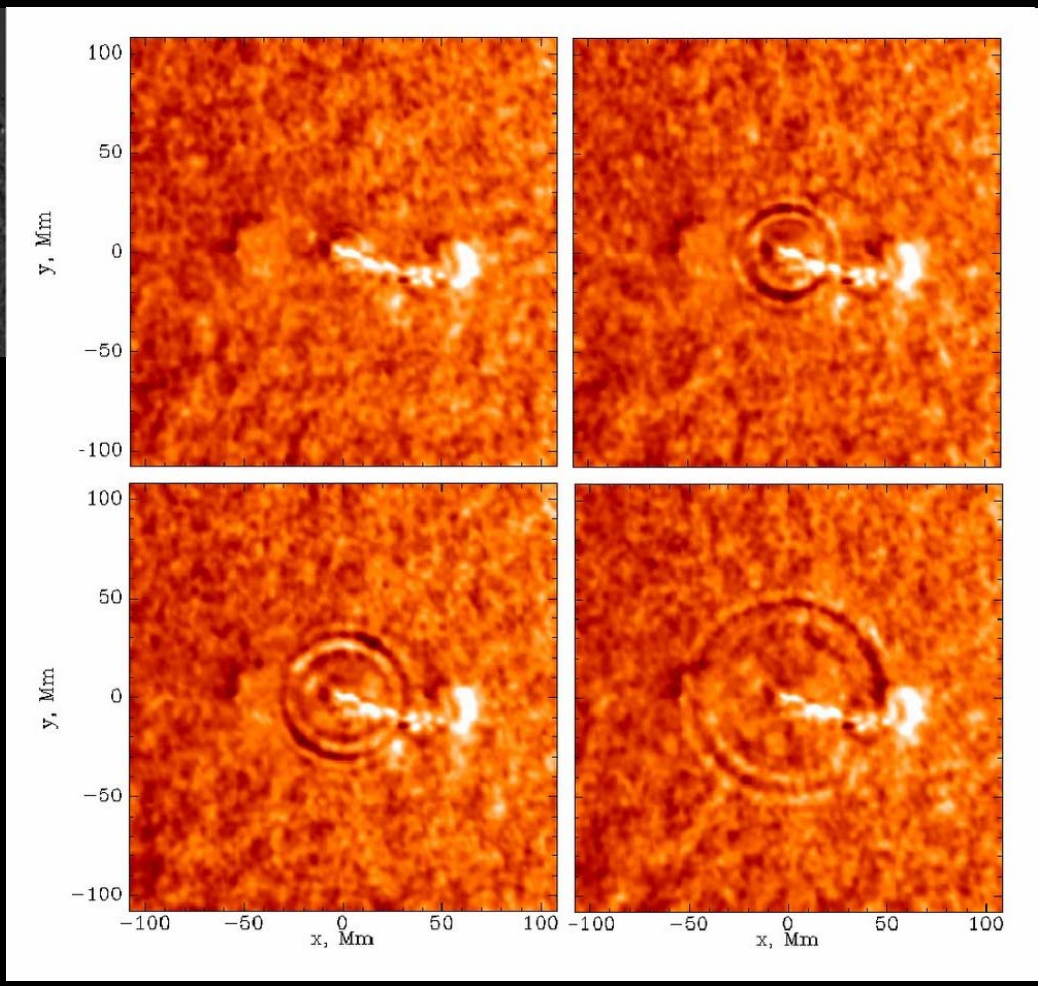


the solar cycle vary greatly in magnitude and duration from cycle to cycle as they depend on the position and tilt of each planet and its conductance presented for this electron flow





The average sunspot is about the size of Earth, though the largest can be 20 times the size of Earth.



The technical name is "fast-mode magnetohydrodynamical wave," or "MHD wave" for short.

Corona Mass Ejections (CMEs)

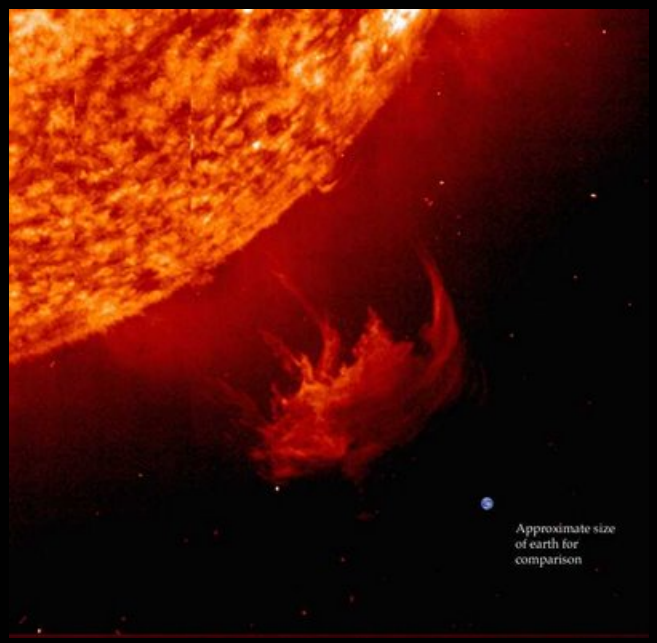
CMEs are large Scale magneto-plasma structures (storms) that erupt from the Sun and propagate through the interplanetary medium with speeds ranging from few Km S-1 to more than 3000 Km S-1.

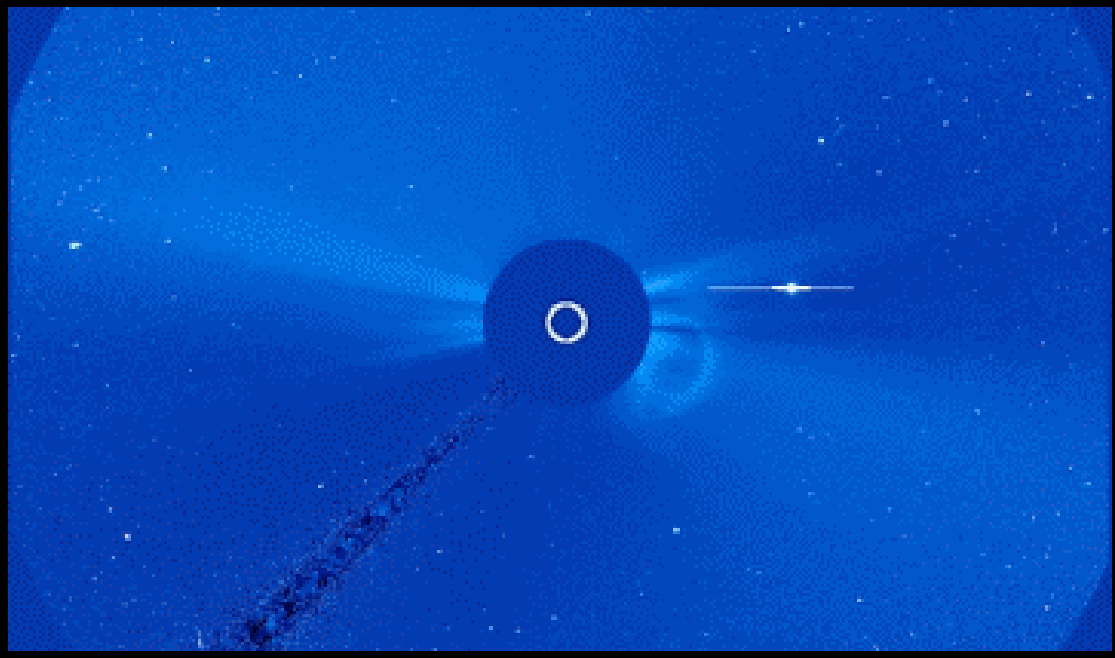
CMEs are large solar storms that can blast out a cloud of billions of tons of particles at over two million Km per hour. Smaller one s can occur almost any day.

CMEs originate from active regions, filament regions or from complex e.g. containing filaments and active regions.
When CMEs occurs the closed magnetic structures are flown off, which expand into the inner heliosphere following a CME, the coronal near the sun restructures itself, producing post eruption arcades or flare loops.

CMEs originating on the visible solar disk are known as Earth directed CMEs and reaches to Earth within 1 to 3 days .

CME Video

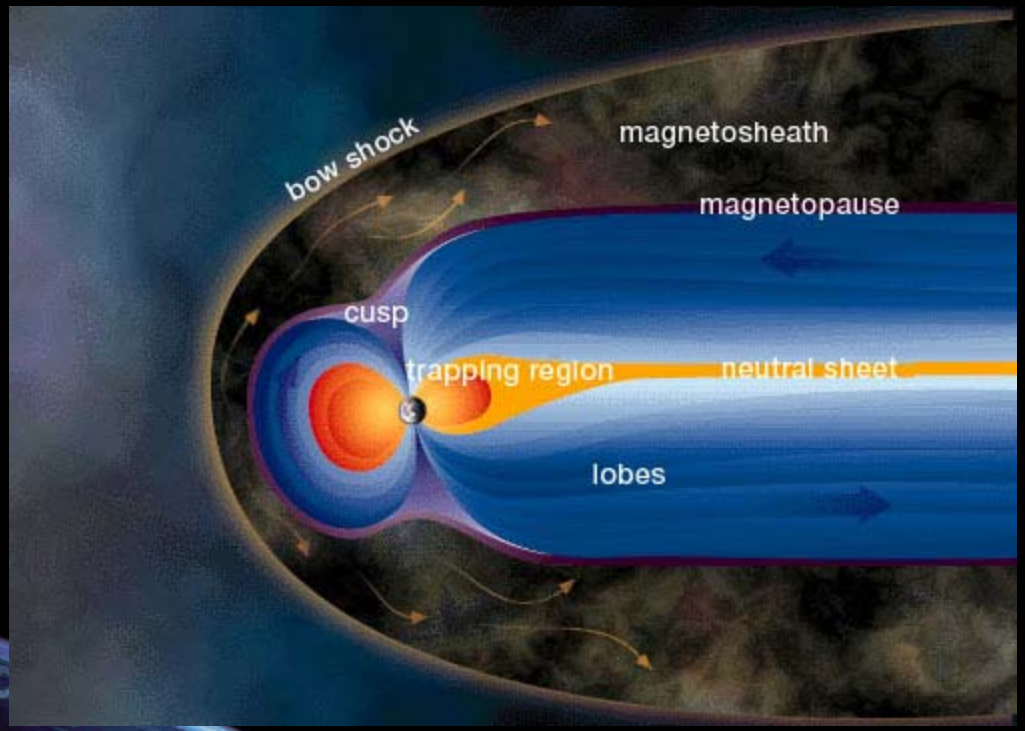




LASCO (Large Angle Spectrometric Coronagraph)

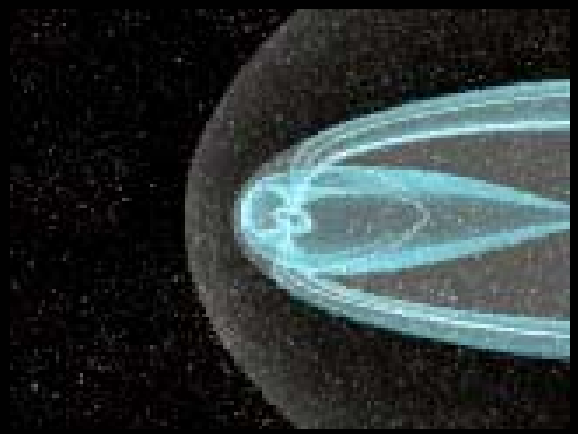
C3 images have a larger field of view: They encompass 32 diameters of the Sun. To put this in perspective, the diameter of the images is 45 million kilometers at the distance of the Sun, or half of the diameter of the orbit of Mercury.

Earth Magnetosphere



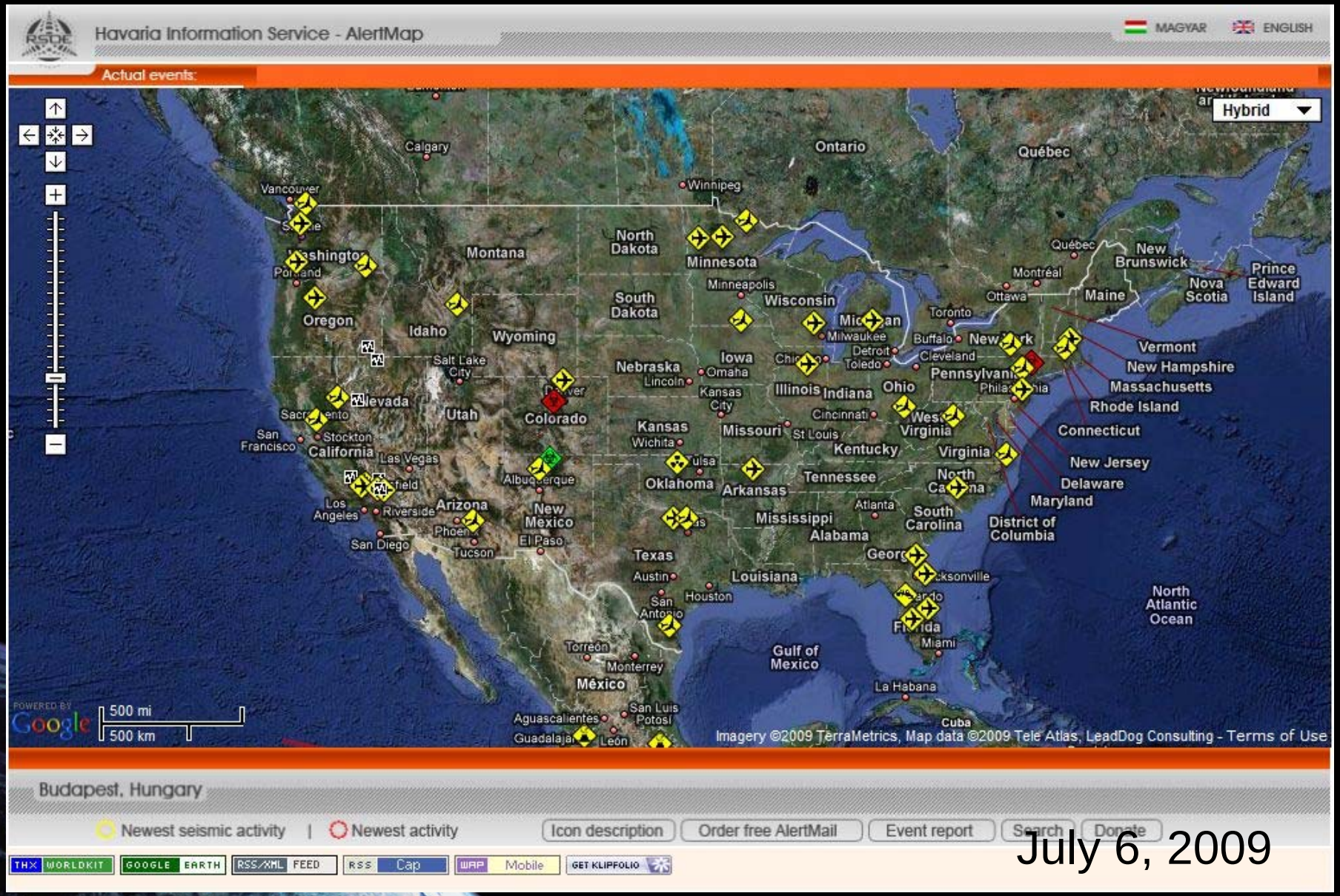
Similar to the sun, earth also has magnetosphere that protect the planet from harmful radiation, cosmic dust, meteorite and etc.

CME In action



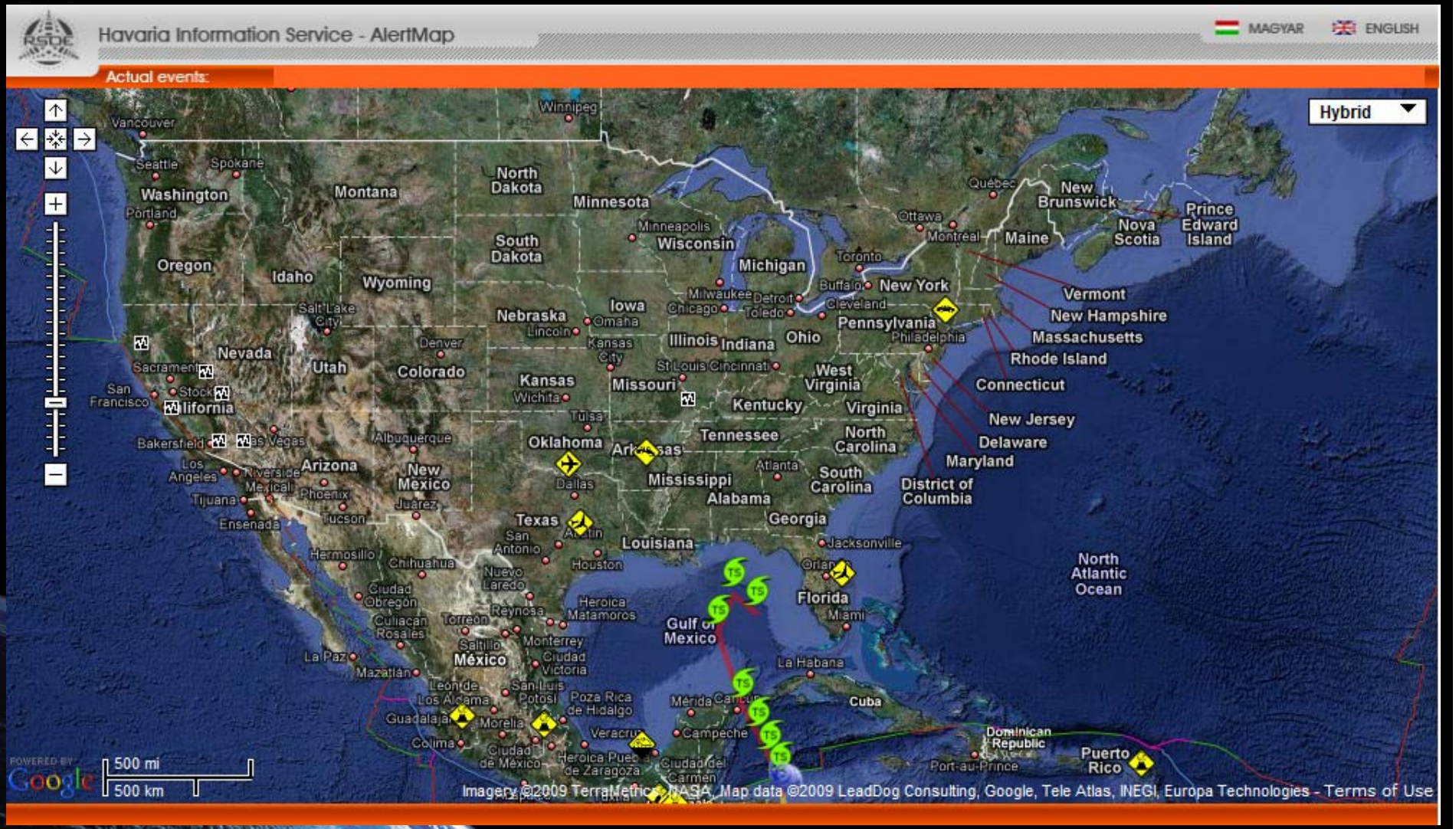
Speed of fast wind at Earth: ~800 km/s
Speed of slow wind at Earth: ~300 km/s
Activity minimum:
Fast wind source: polar coronal holes.
Slow wind source: equatorial streamer belt.

Airplane incident during the time when the sun has high activity



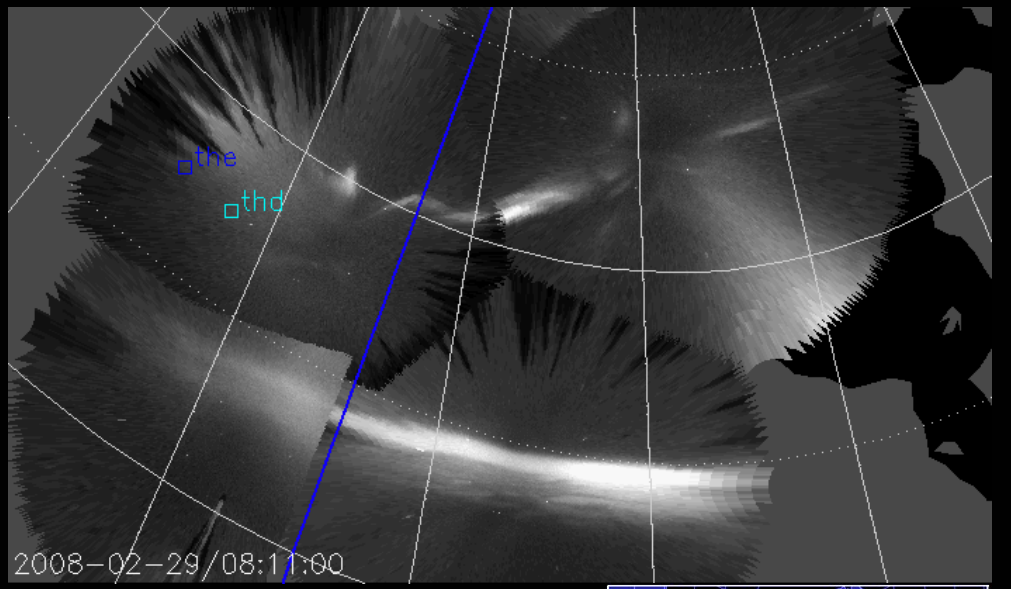
July 6, 2009

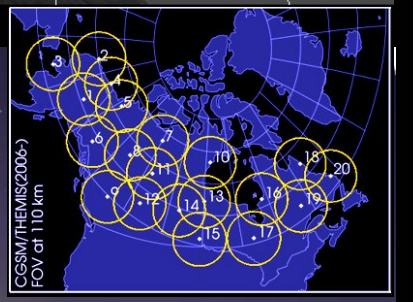
Airplane incident during the time when the sun has low activity



November 6, 2009

Aurora

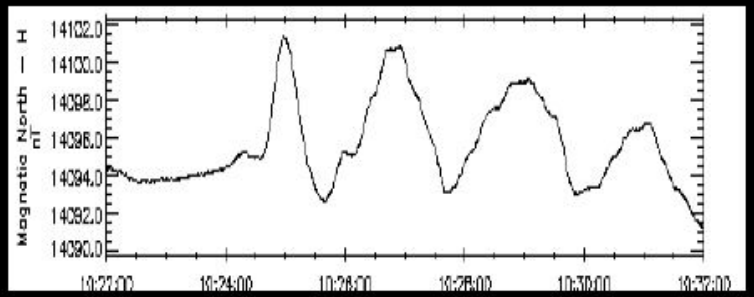




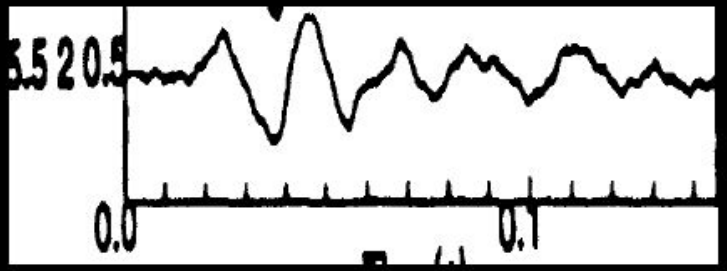
Spacequake

Earthquake

Magnetogram

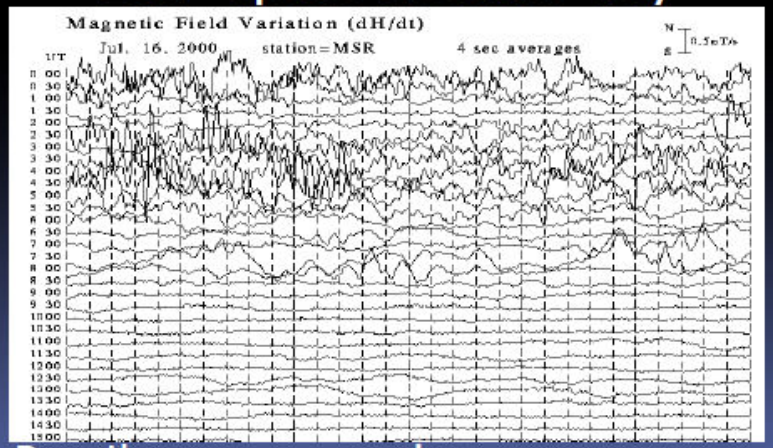


Seismogram



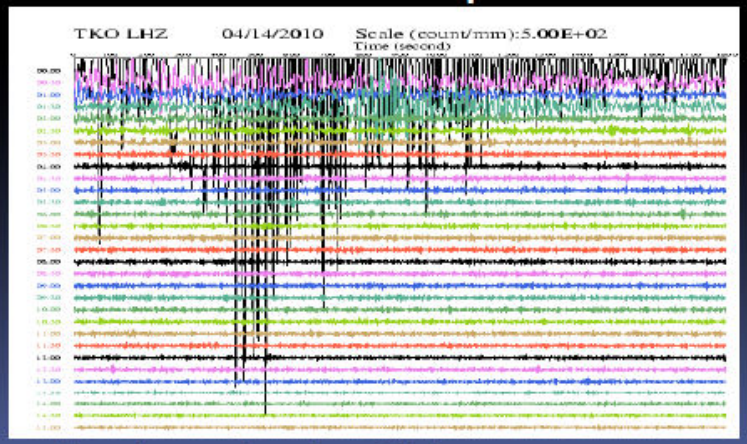
Big Events

"Bad" space weather day



Bastile space weather event,
July 14-16, 2000, Kp 9

M 6.9 earthquake



Earthquake in China,
April 14, 2010, M 6.9

http://science.nasa.gov/science-news/science-at-nasa/2010/27jul_spacequakes/

Moving to the rhythm of the Sun

esa space science

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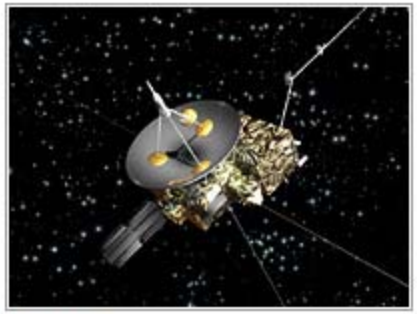


Ulysses

Moving to the rhythm of the Sun

17 August 2007

Scientists from the Ulysses mission have proven that sounds generated deep inside the Sun cause the Earth to shake and vibrate in sympathy. They have found that Earth's magnetic field, atmosphere and terrestrial systems, all take part in this cosmic sing-along.

David Thomson and Louis Lanzerotti, team members of the HISCALE experiment, on board Ulysses, together with colleagues Frank Vernon, Marc Lessard and Lindsay Smith, present evidence that proves that Earth moves to the rhythm of the Sun. They show that distinct, isolated tones, predicted to be generated by pressure and gravity waves in the Sun, are present in a wide variety of terrestrial systems.

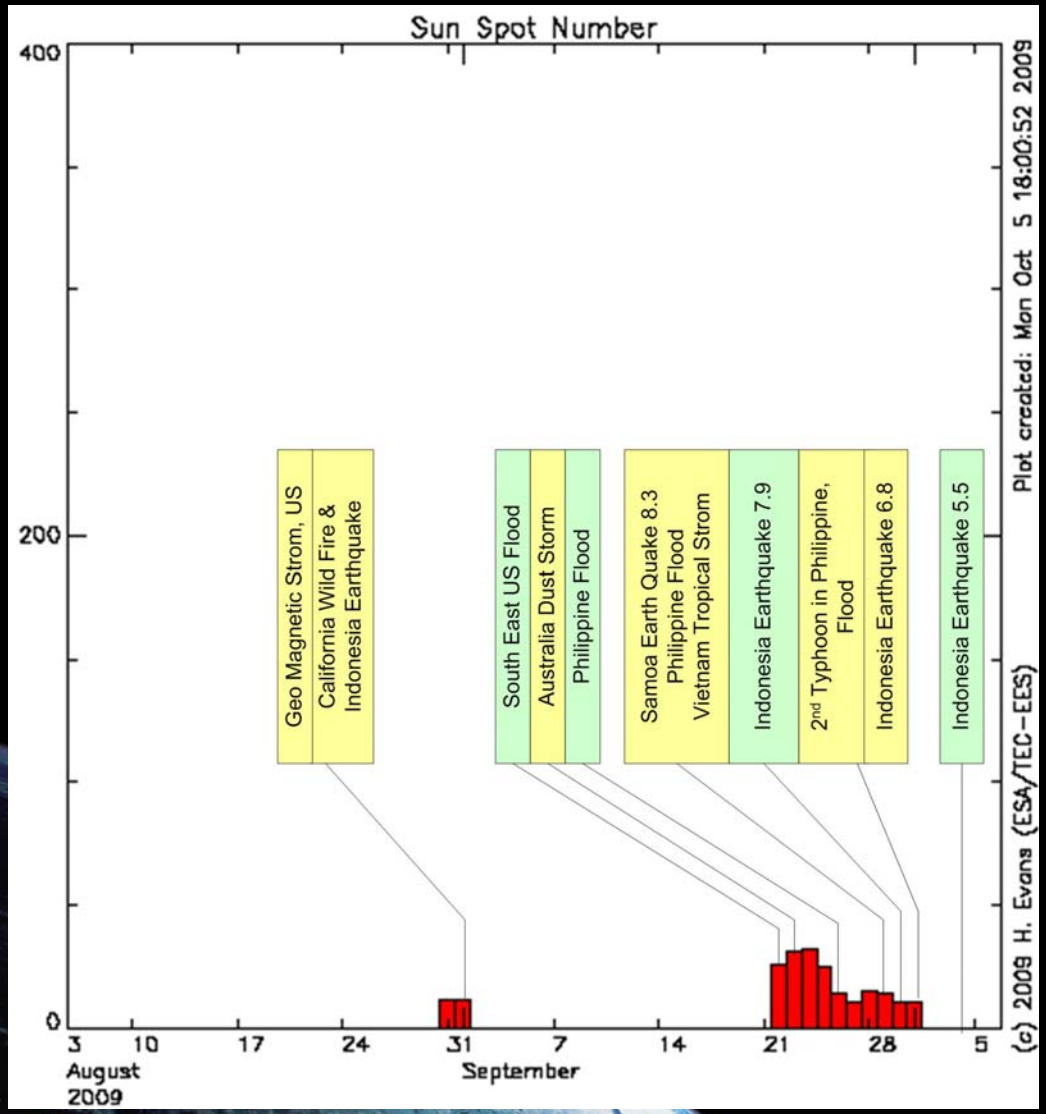
Using highly sophisticated statistical techniques, Thomson and colleagues have discovered these same, distinct tones emitted by the Sun, in seismic data here on Earth. They have also found that Earth's magnetic field and atmosphere, and even voltages induced on ocean cables, are all taking part in this cosmic sing-along.

Although these tones are all around us, it would not be possible for us to hear them, even if we listened very closely. Their pitch is too low for the human ear, typically 100-5000 microHertz (1 microHertz corresponds to 1 vibration every 278 hours). This is more than 12 octaves below the lowest note audible to humans. For comparison, the note to which orchestras tune their instruments (A above Middle C on a piano) corresponds to 440 Hertz.

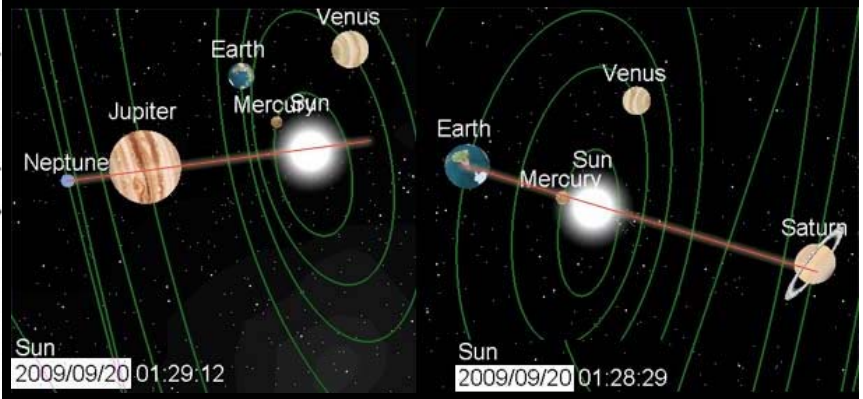
Scientists from the Ulysses mission have proven that **sounds generated deep inside the Sun cause the Earth to shake and vibrate in sympathy.** They have found that Earth's magnetic field, atmosphere and terrestrial systems, all take part in this cosmic sing-along.

http://www.esa.int/esaSC/SEMJJYUL05F_index_0.html

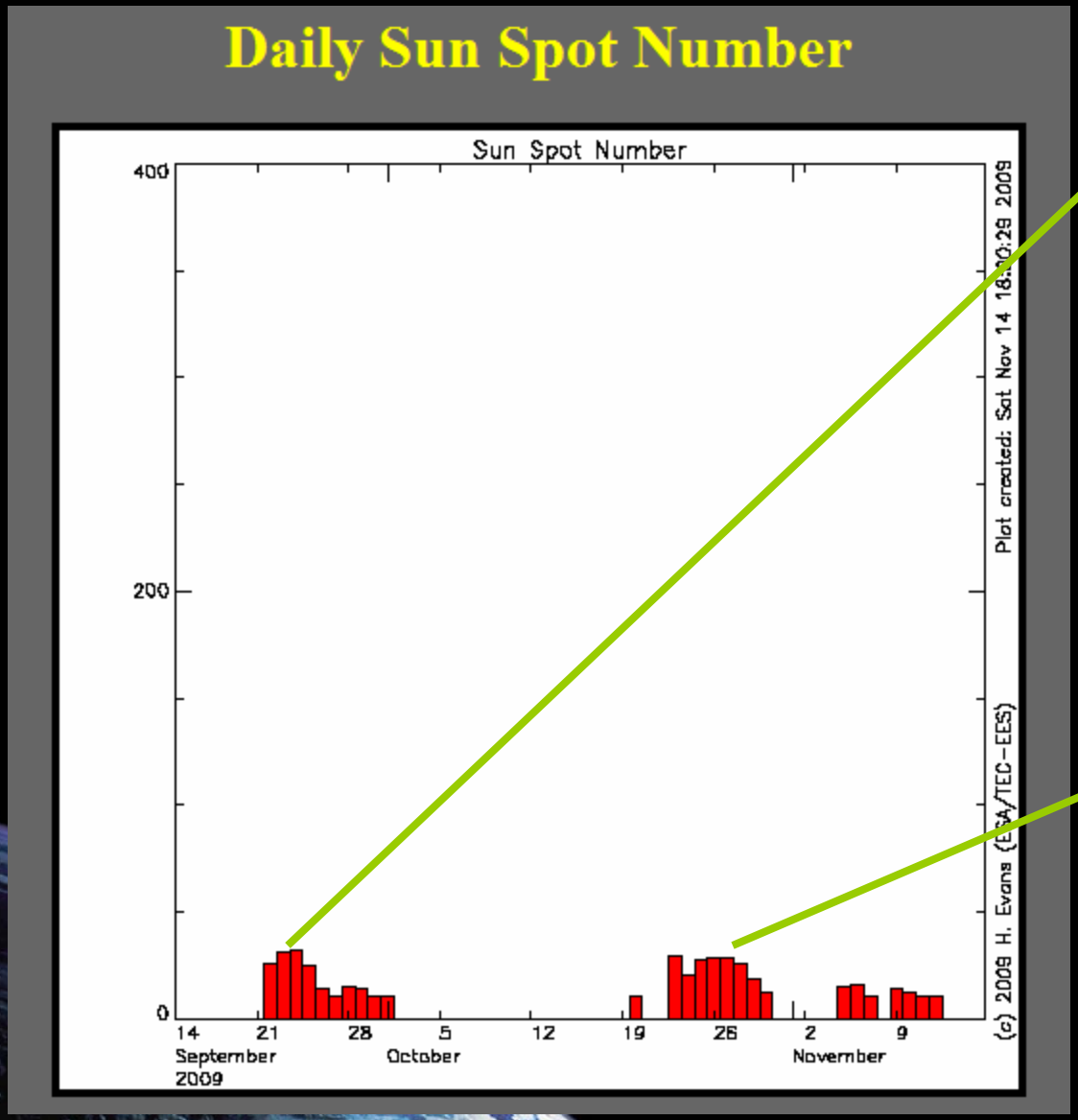
The Connection Between Planetary Alignment & Earth's Natural Disaster

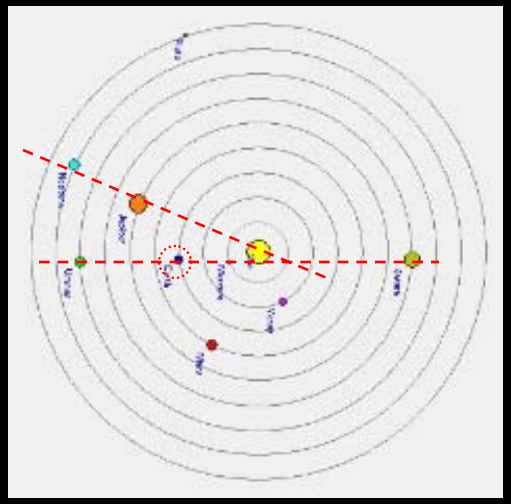


The solar activity around October 26, 2009 did not effect the earth as much as in September since the earth is not in alignment with the sun

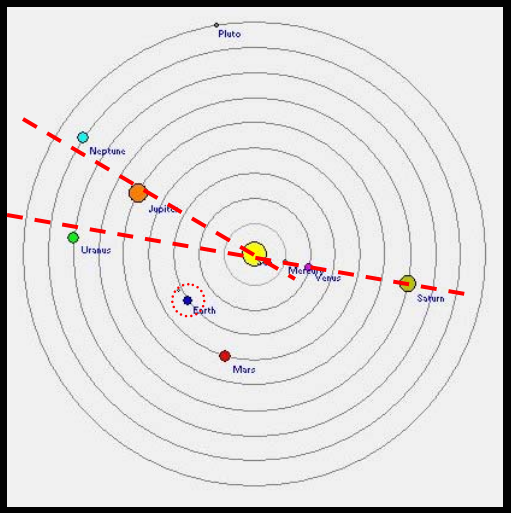


Sun Spot and Planetary Alignment





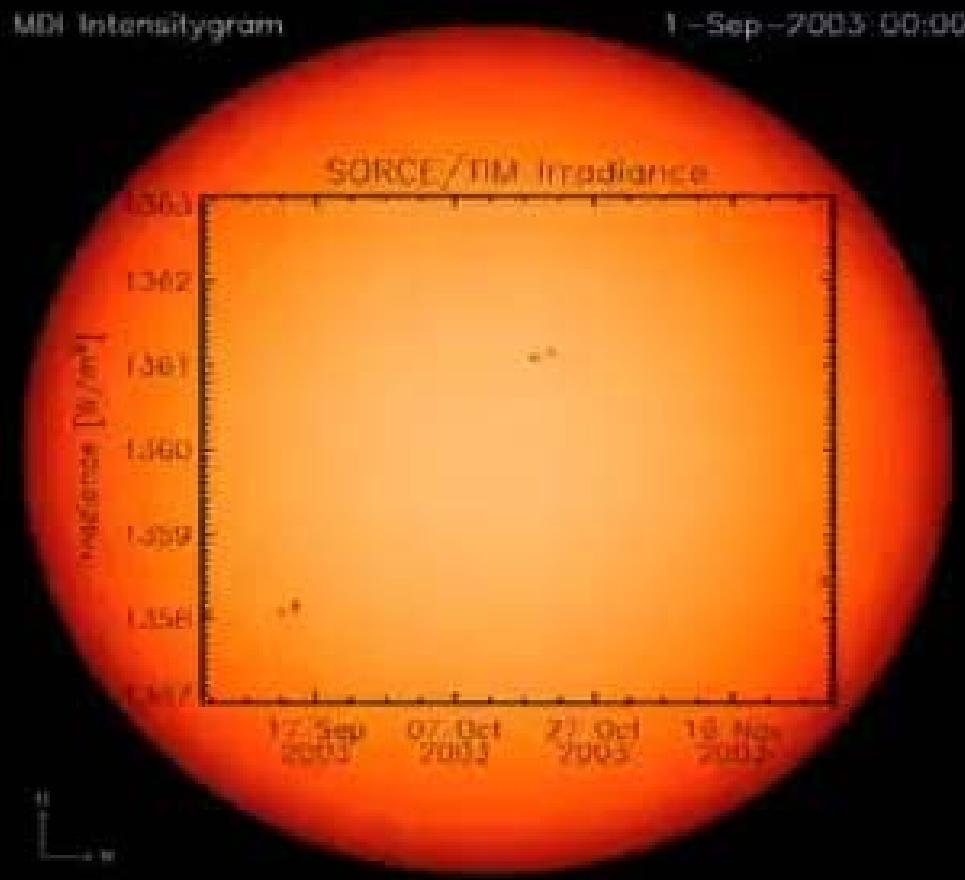
September 21, 2009



October 26, 2009

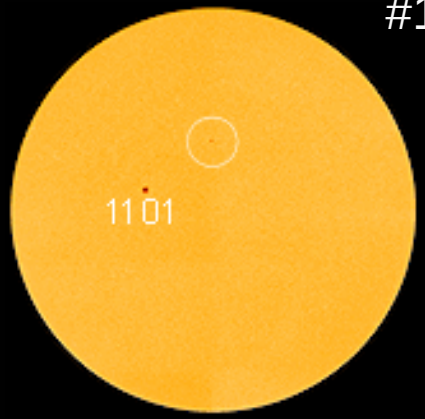
Mercury, Jupiter, Saturn, Uranus, and Neptune. Jupiter's moon Ganymede has a small magnetosphere

Sunspot and Correlation with Earthquake

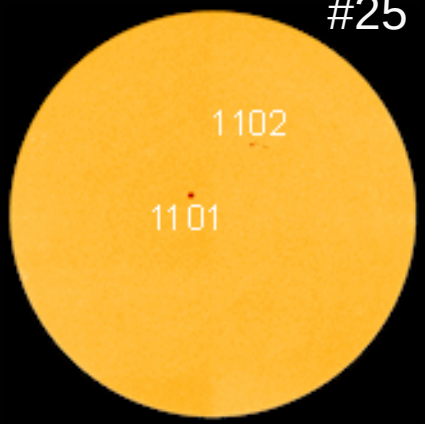


October 10, 2003 31 01:06.28 Lat 37.81 Long 142.62 Depth 10 Magnitude 7.0 Mw

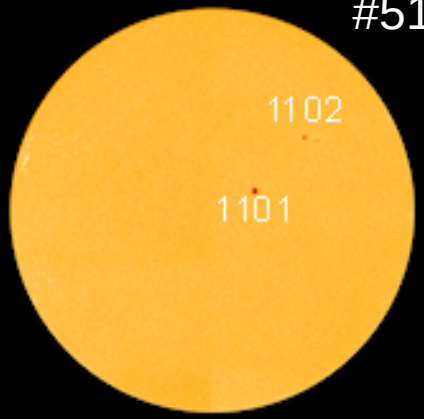
Case Study : August 31st 2010



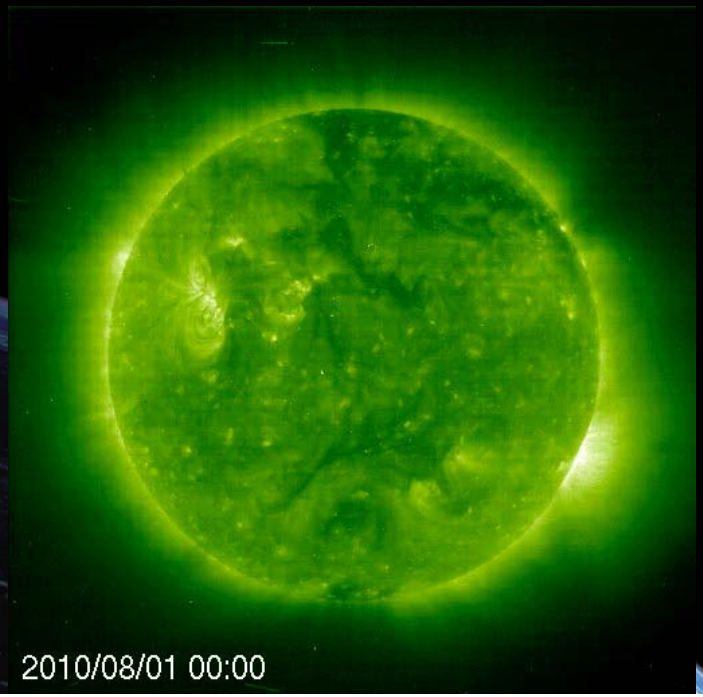
August 29



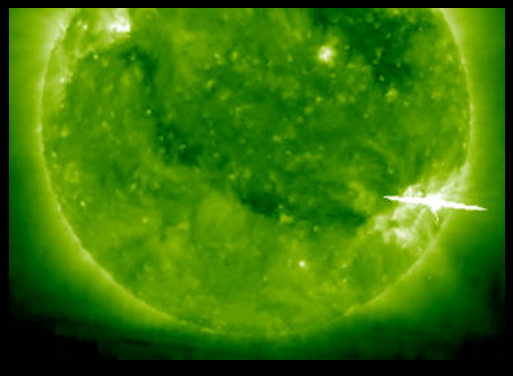
August 30



August 31

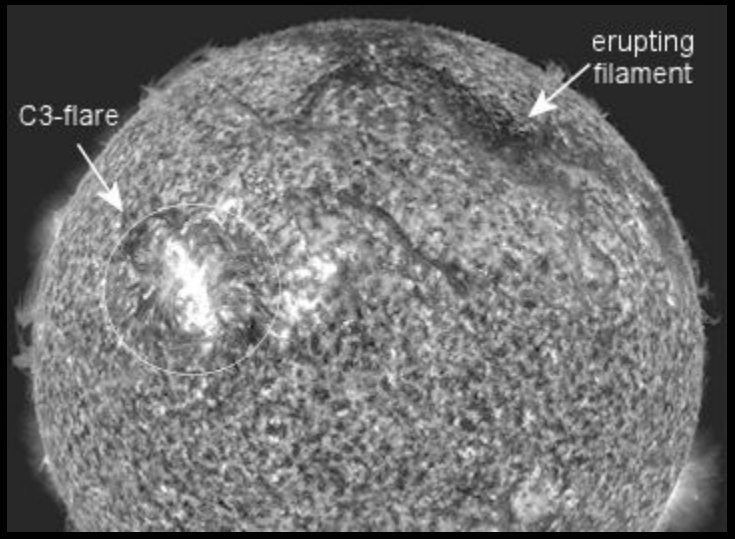


- Rapid increase in Sunspot
- C-class flare at 7:24 UTC August 1st, 2010
- CME 0:12 UTC August 2nd, 2010
- New Zealand Earthquake 7 MW, August 3rd , 2010 16:35 UTC

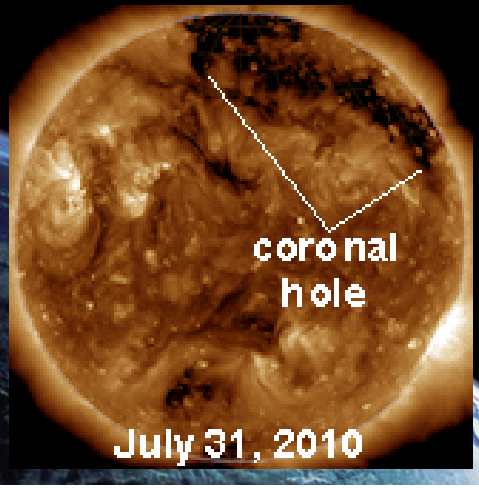


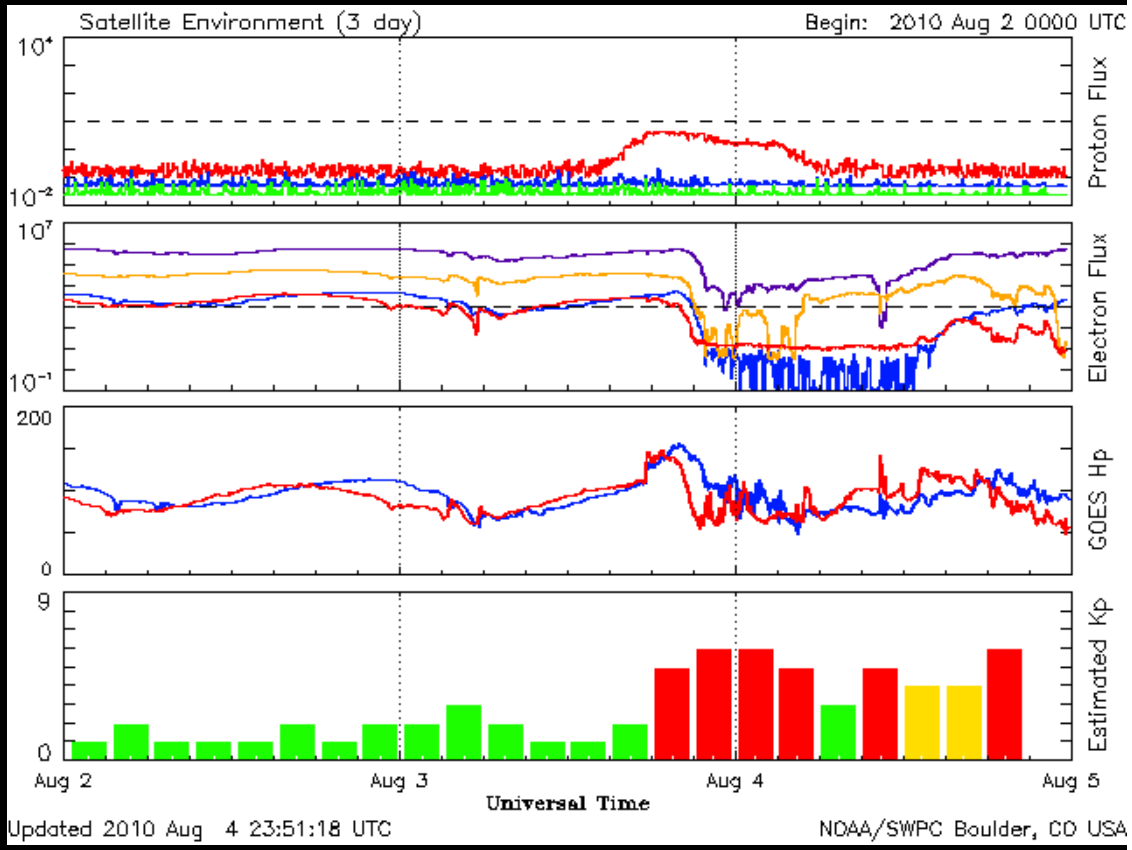
STEREO A
M-Class flare on the back side of the Sun
August 31 20:55 UTC

Solar Events



C3-Flare & filament eruption
at 8:55 UTC, August 1st, 2010





Geomagnetic Strom, August 3rd, 2010

Disaster on Earth during the active Sun

Mount Sinabung Eruption, Indonesia,
August 29-30, 2010
September 3rd, 2010

http://www.csmonitor.com/World/Asia-Pacific/2010/0903/Indonesia-volcano-eruption-sends-villagers-fleeing-for-the-second-time-this-week

http://www.alertnet.org/thenews/pictures/CD10.htm

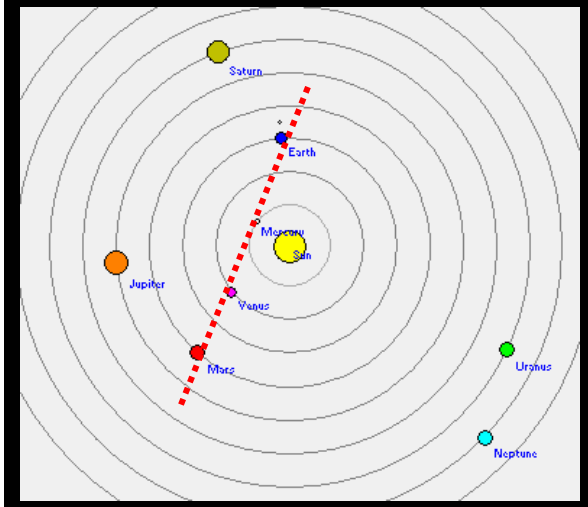
New Zealand Earthquake 7.0 Mw

Landslide in Guatemala

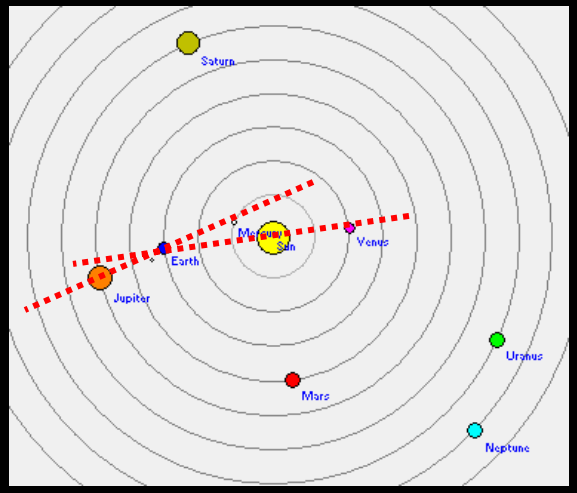
September 5, 2010

Planetary and Galactic Alignment Past, Present and Future

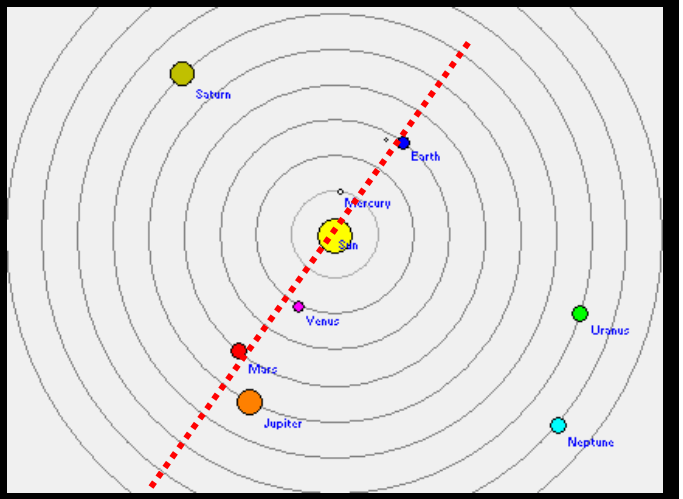
Planetary Alignment & Earthquake



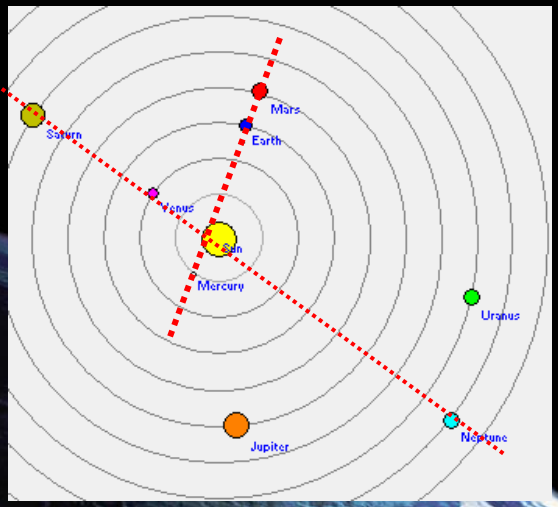
12/26/2004
9.1 MW Indonesia



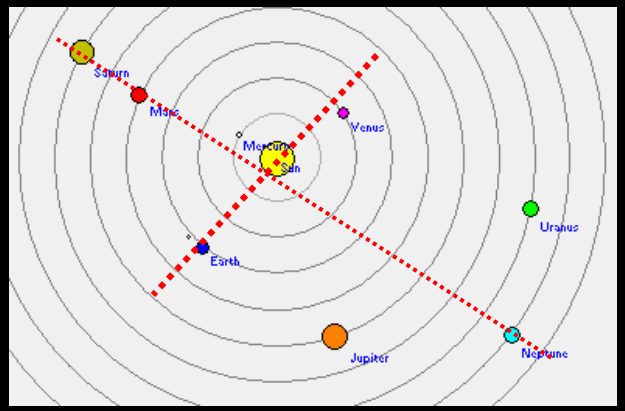
3/28/2005
8.6 MW Indonesia



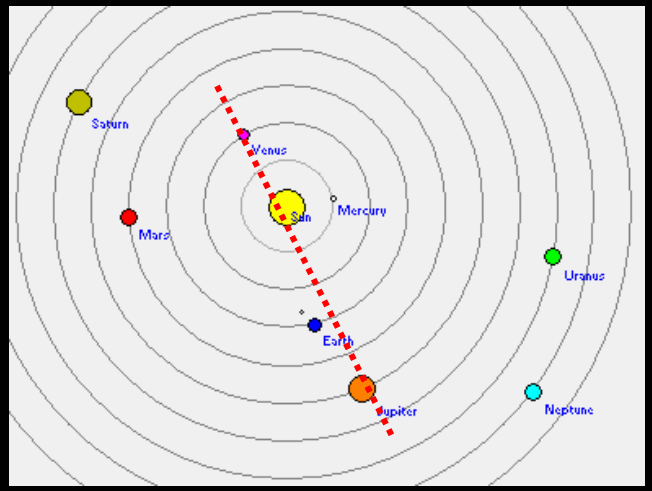
11/15/2006
8.3 MW Kuril Island



12/9/2007
7.8 MW Fiji Island

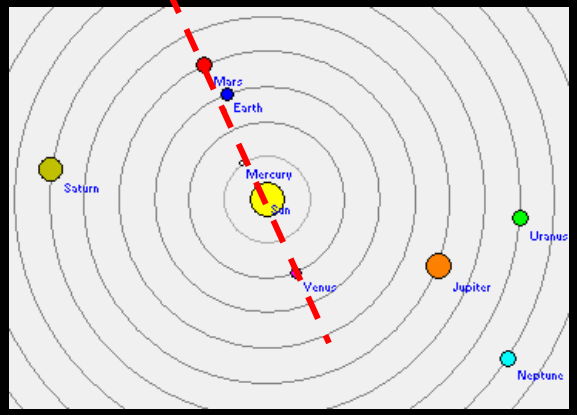


5/12/2008
7.8 MW Sichuan, China

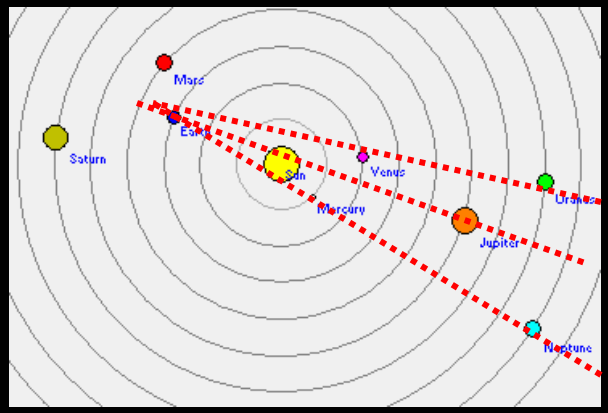


7/8/2008
7.7 MW Sea of Okhotsk

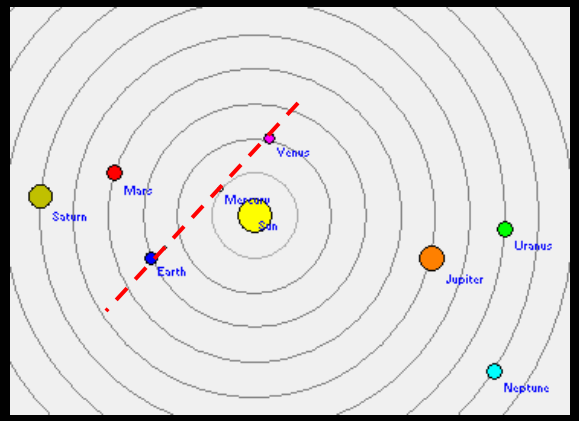
Planetary Alignment & Earthquake



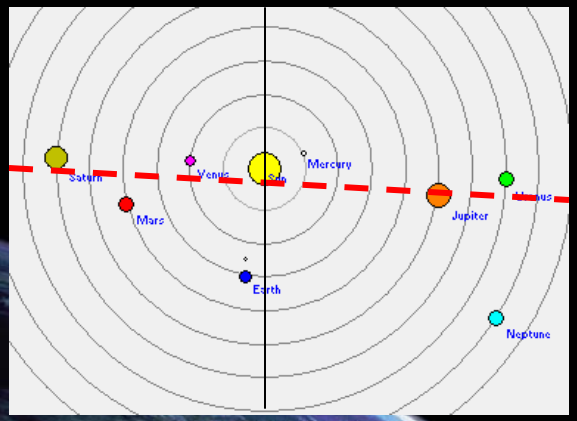
1/12/2010
7.1 MW Indonesia



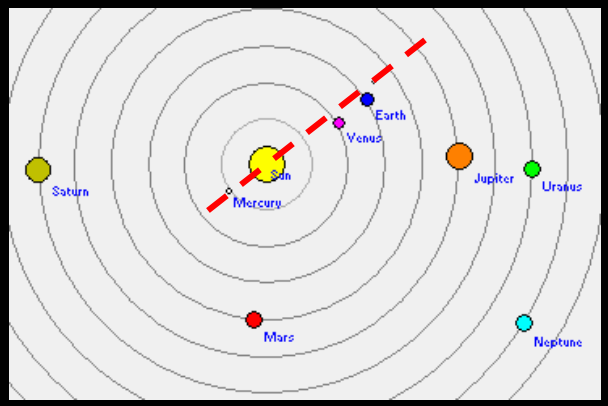
2/27/2010
8.8 MW Indonesia



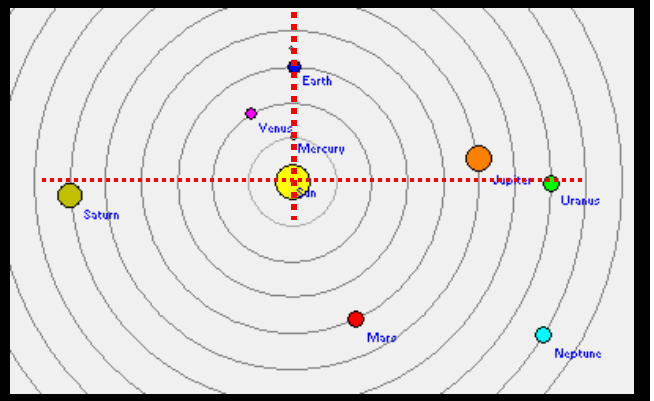
4/13/2010
6.9 MW China



6/12/2010
7.5 MW Indian Ocean

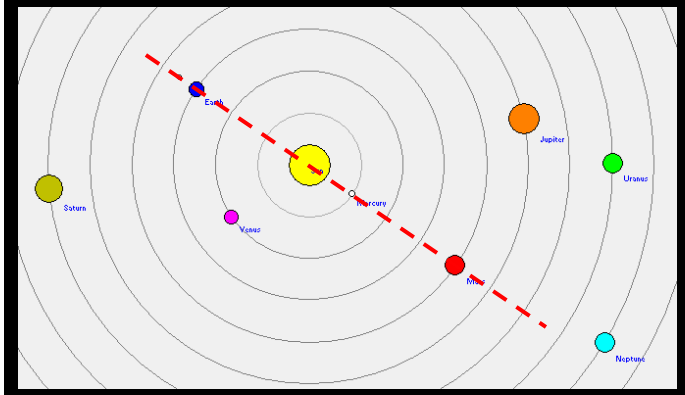


10/25/2010
7.7 MW Indonesia

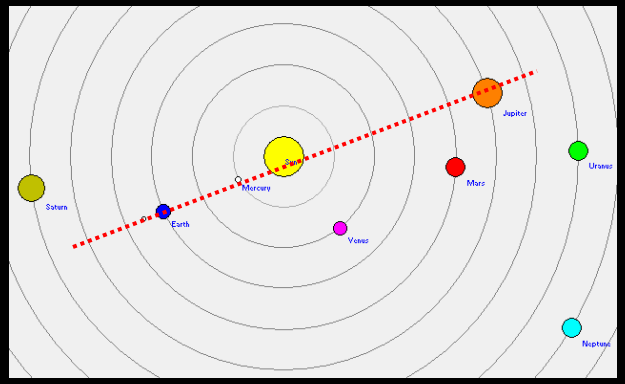


12/20/2010
?

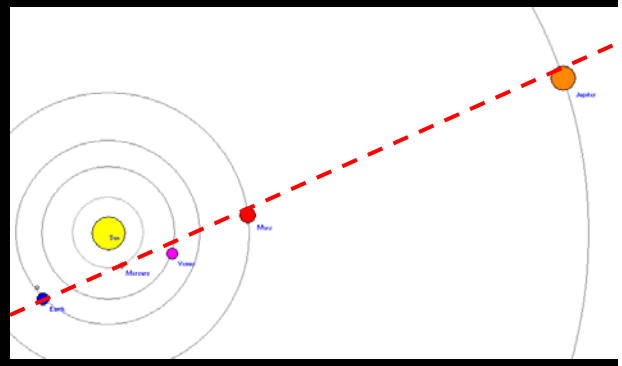
Major Planetary Alignments in 2011



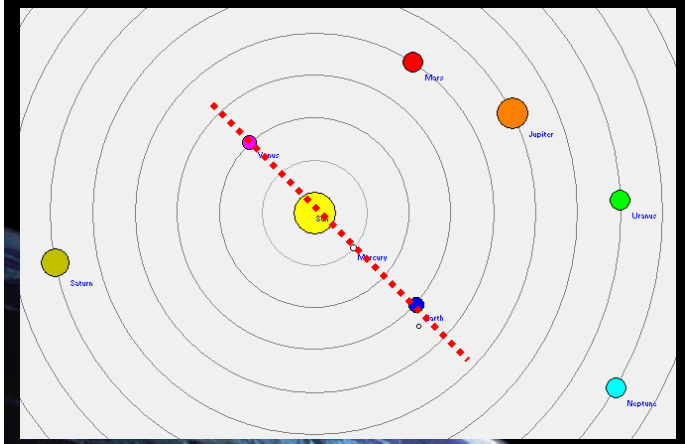
Feb 17



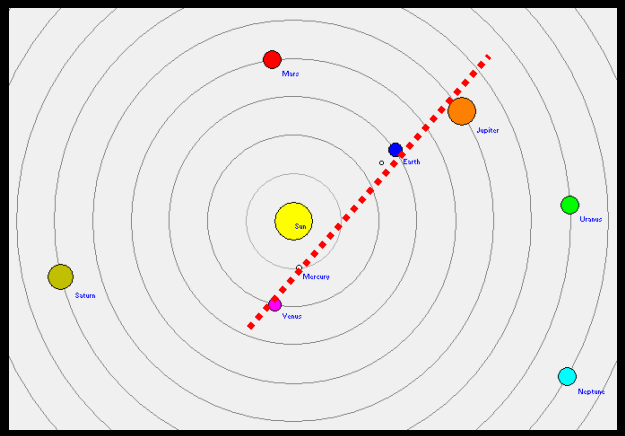
April 17



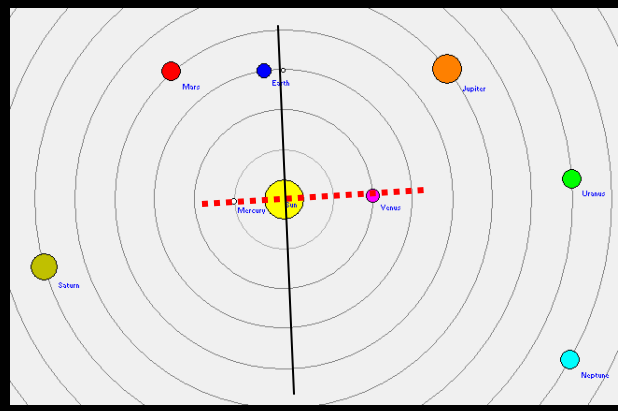
May 8 - 16



August 10

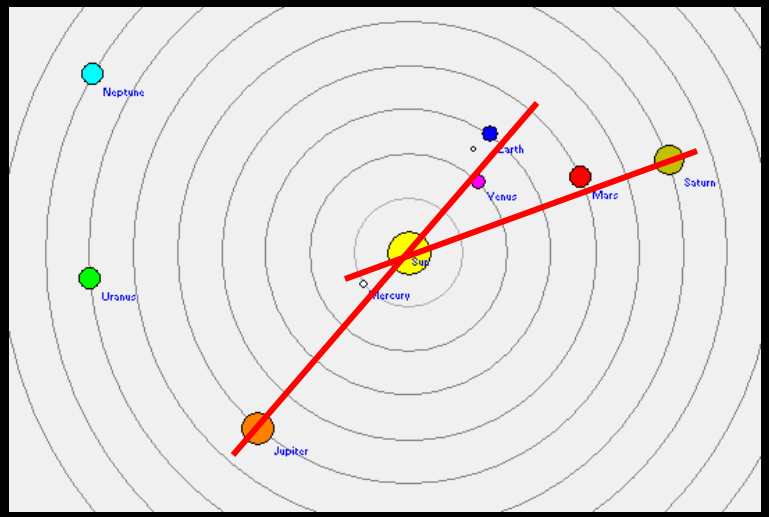


October 20-27

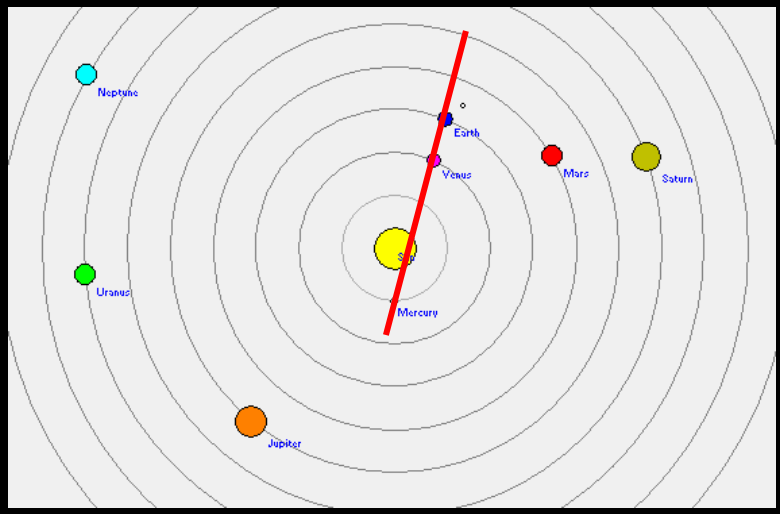


December 31

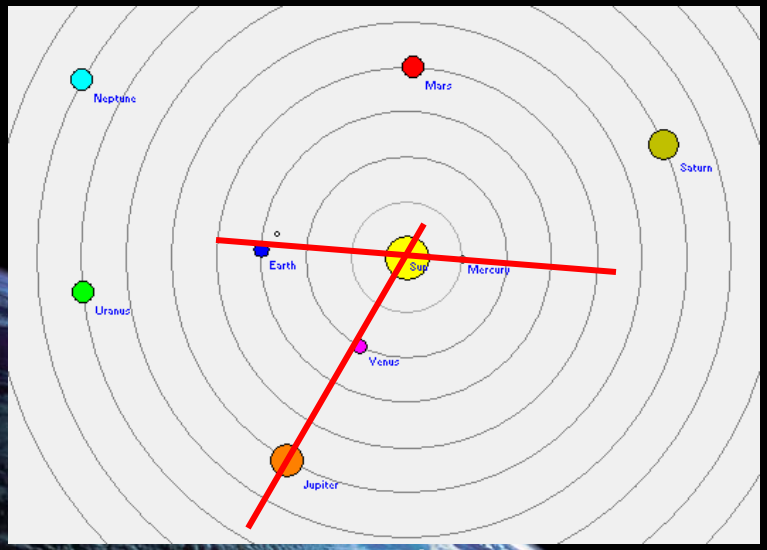
Major Planetary Alignments in 2012



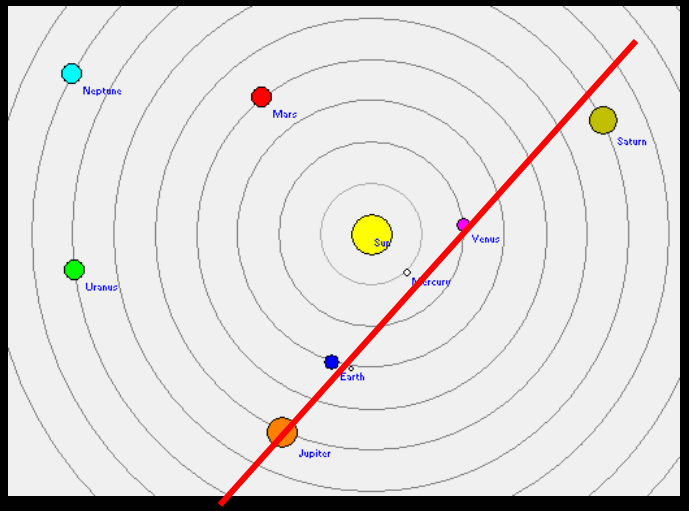
May 5-17



June 1-2

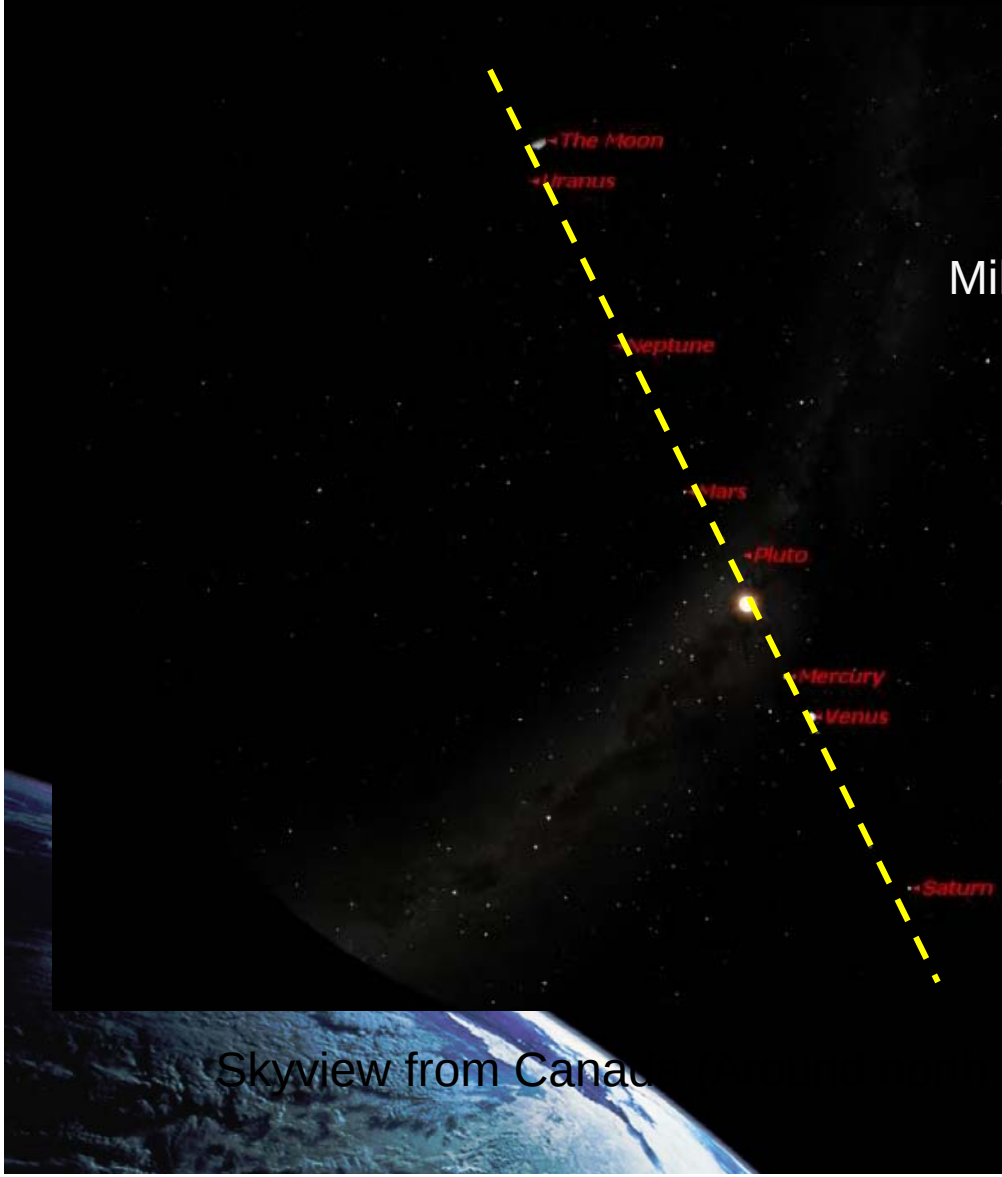


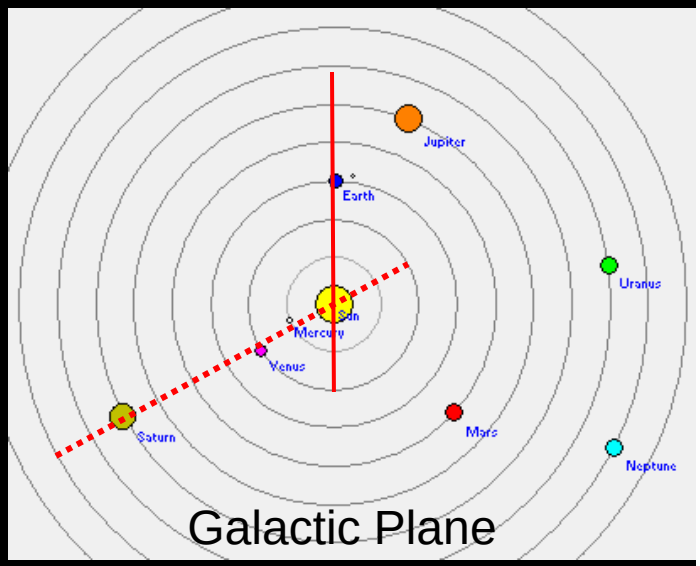
September 19



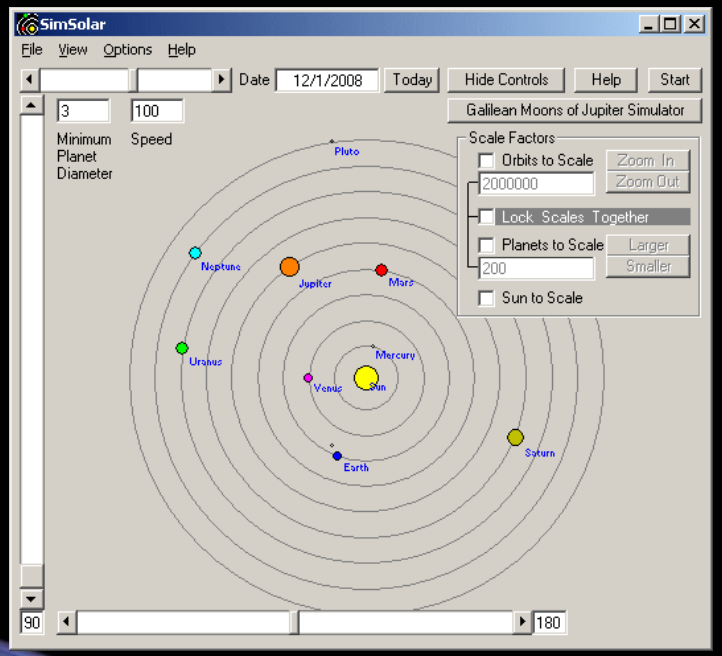
December 5-7

December 21, 2012 Alignment

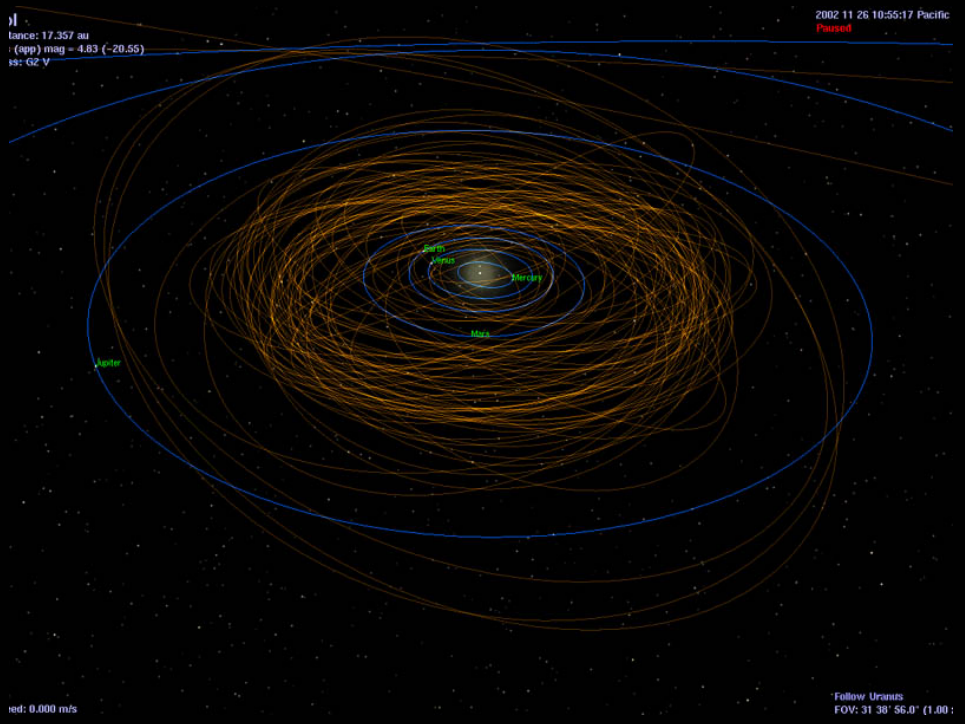




Astronomy Software to Determine Planetary Alignments

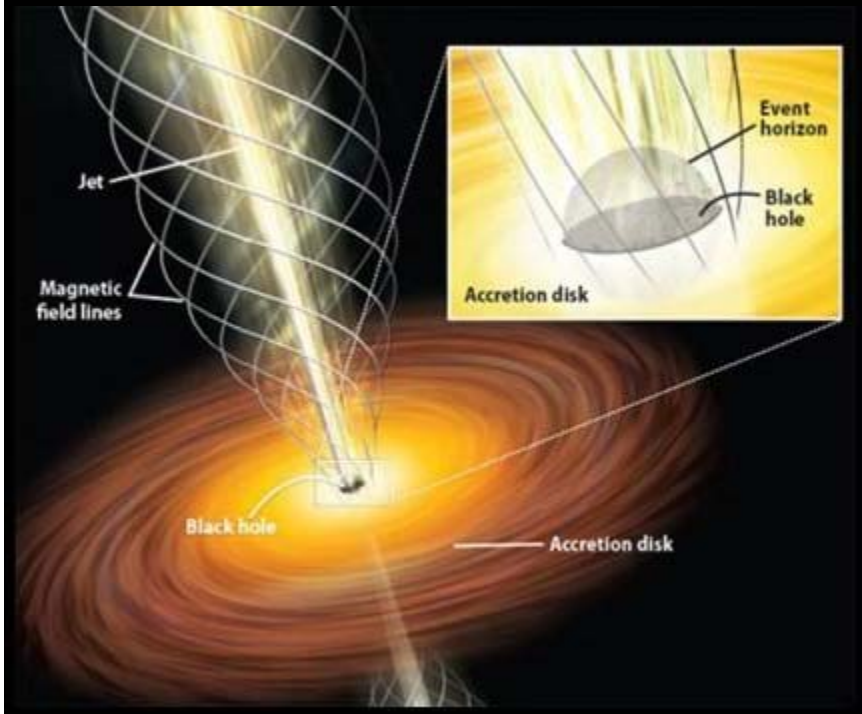


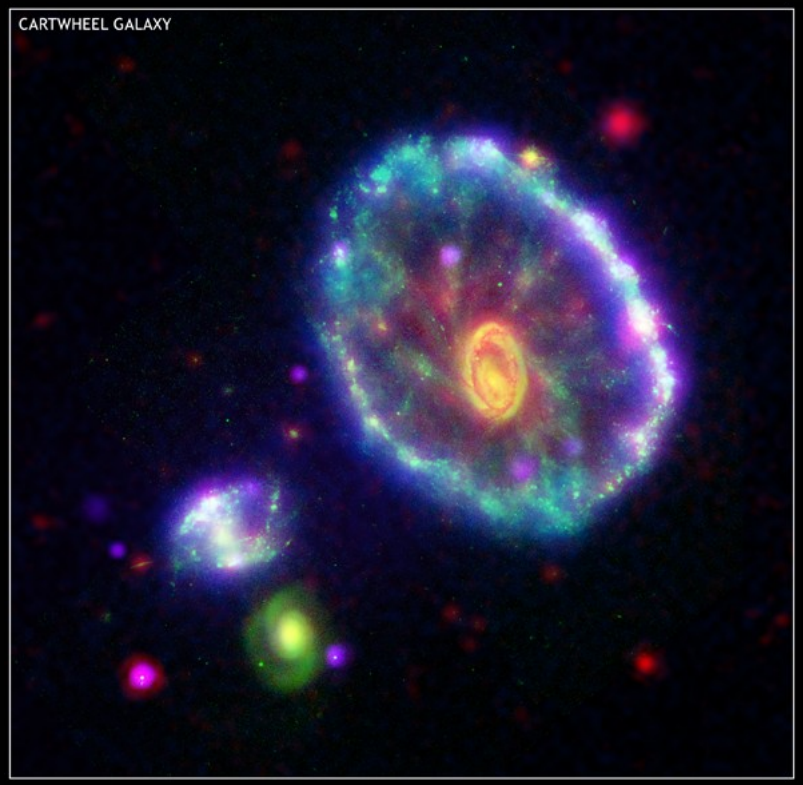
Simsolar : http://www.pwr-tools.com/simsolar/

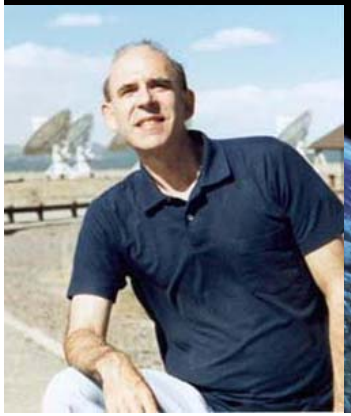


Celestia : http://www.shatters.net/celestia/

Galactic Super Wave

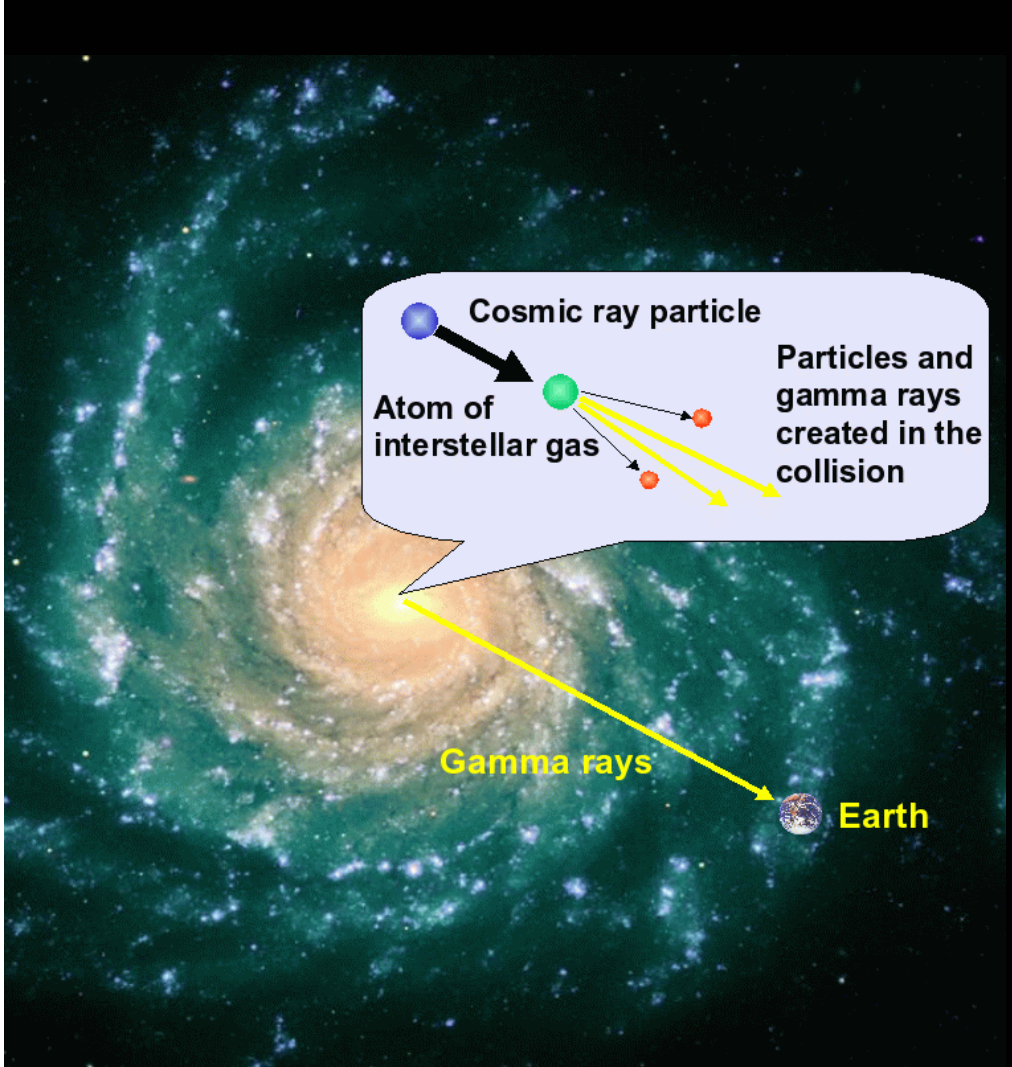


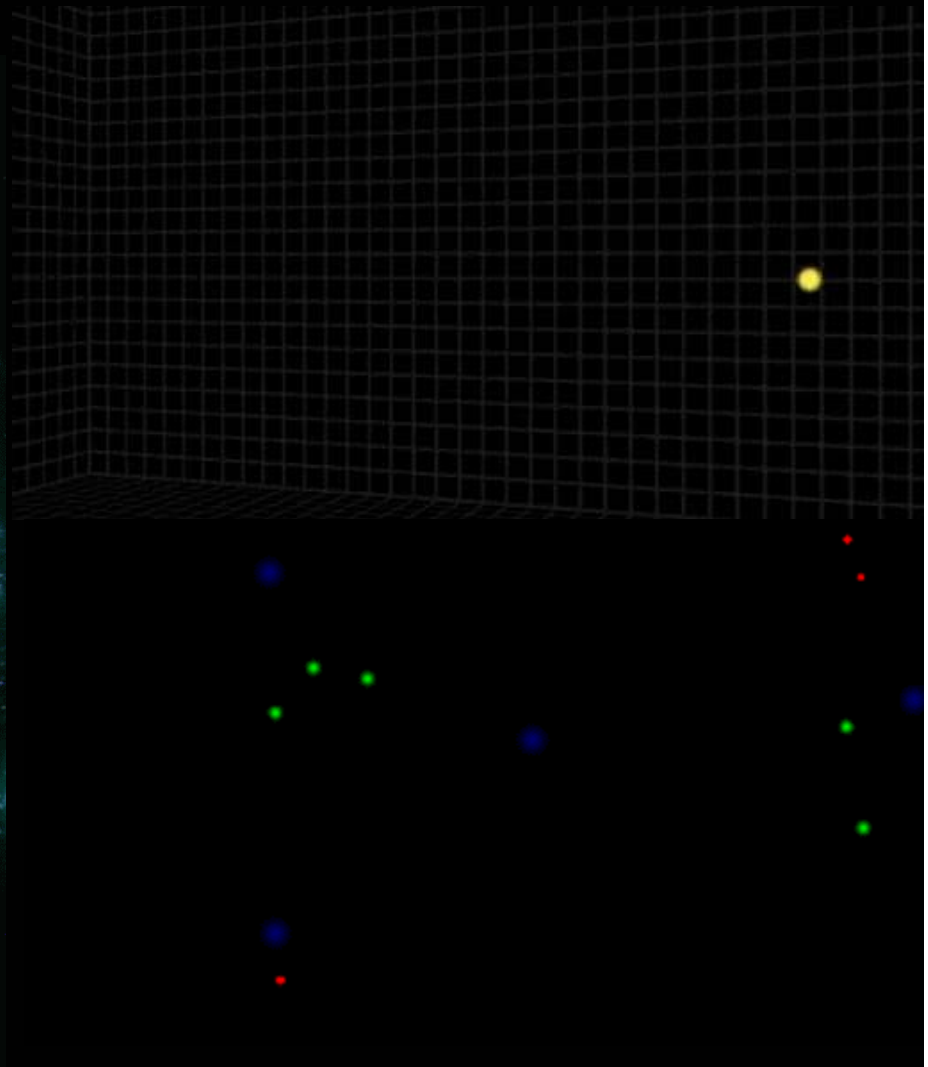




Paul LaViolette called attention to terrestrial dangers of Galactic core explosions, pointing out that the arrival of the cosmic ray superwave they produced would be signaled by a high intensity gamma ray burst which would also generate EMP effects.

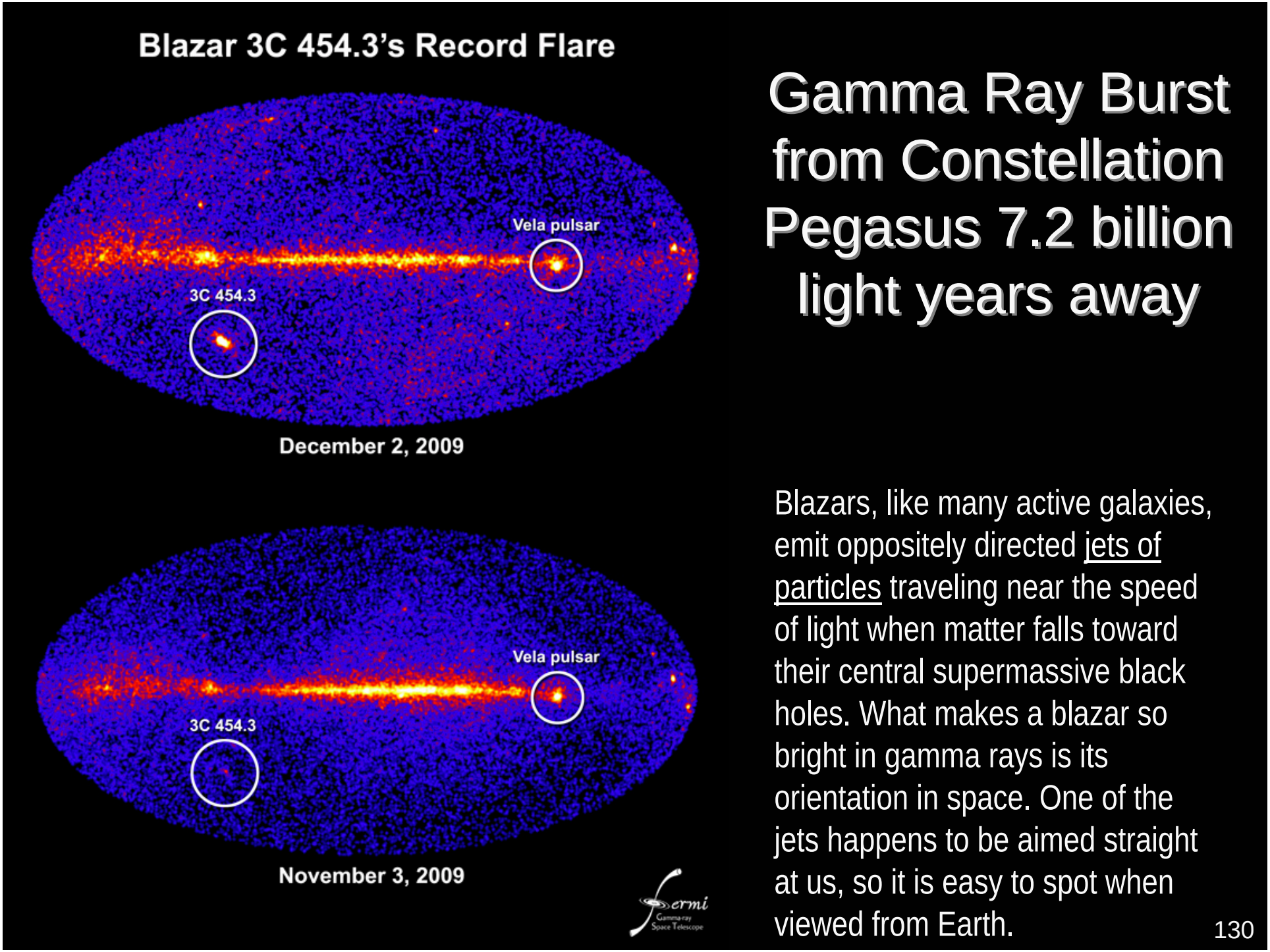
Gamma Ray Generation





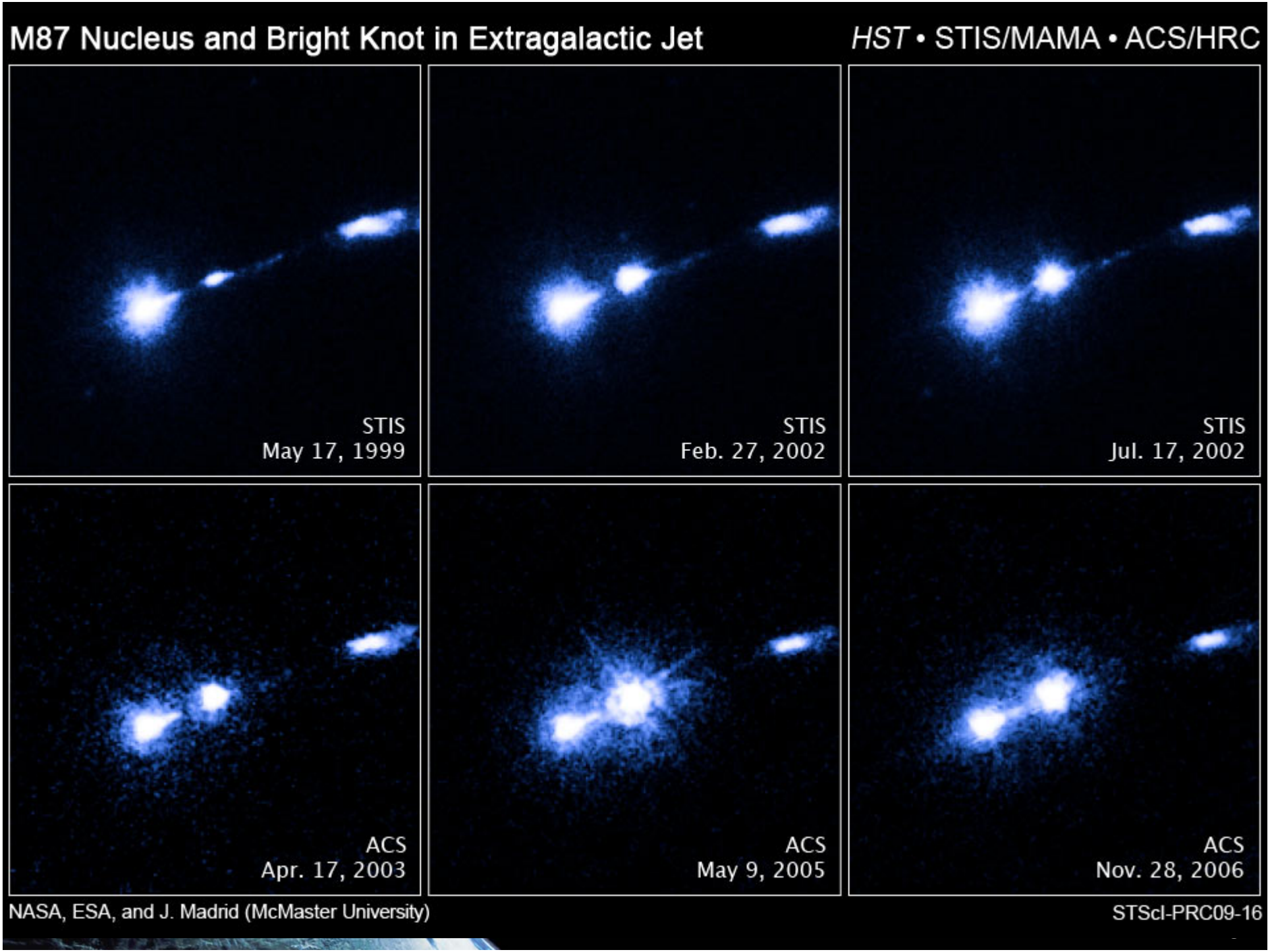
Background image credit: GSFC

Colored dots represent gamma rays of different energies. Visible light has energy between about 2 and 3 electron volts (eV). The blue dots represent lower-energy gamma rays (less than 100 million eV); green, moderate energies (100 million to 1 billion eV); and red, the highest energies (more than 1 billion eV).

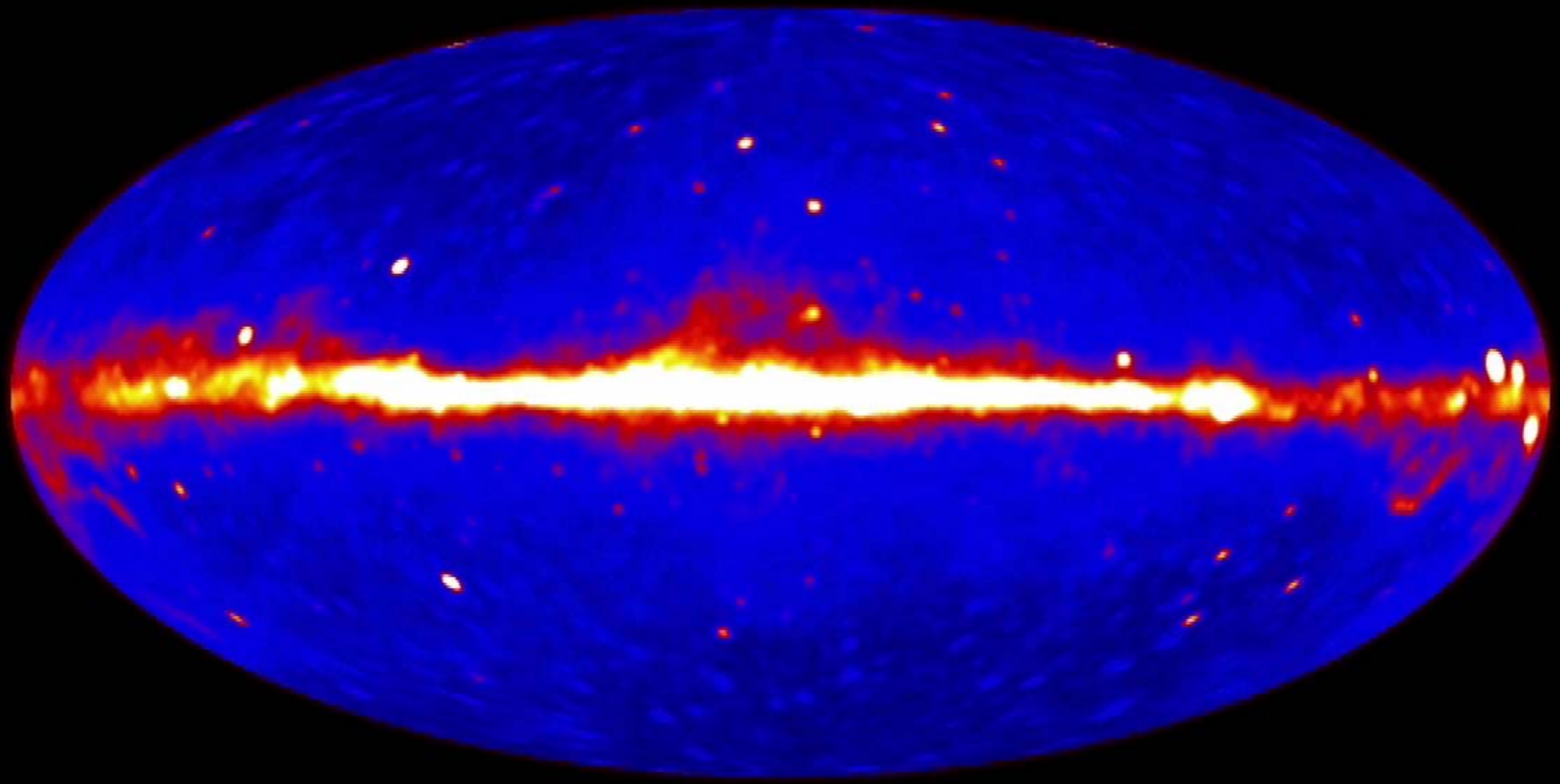


Gamma Ray Burst from Constellation Pegasus 7.2 billion light years away

Blazars, like many active galaxies, emit oppositely directed jets of particles traveling near the speed of light when matter falls toward their central supermassive black holes. What makes a blazar so bright in gamma rays is its orientation in space. One of the jets happens to be aimed straight at us, so it is easy to spot when viewed from Earth.

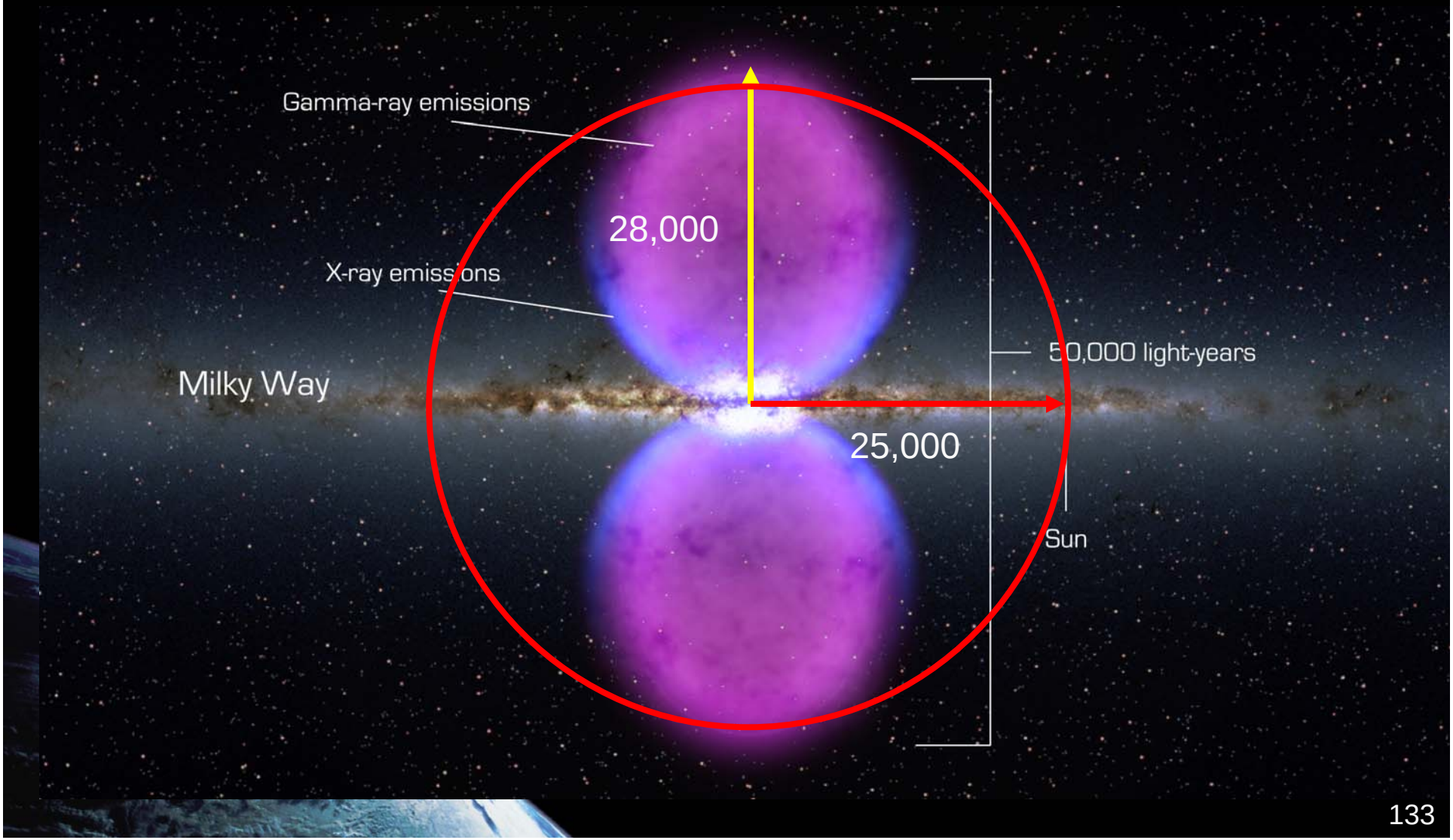

M87 Nucleus and Bright Knot in Extragalactic Jet
HST • STIS/MAMA • ACS/HRC
STIS
May 17, 1999
STIS
Feb. 27, 2002
STIS
Jul. 17, 2002
ACS
Apr. 17, 2003
ACS
May 9, 2005
ACS
Nov. 28, 2006
NASA, ESA, and J. Madrid (McMaster University)
STScI-PRC09-16

Detection of Giant Bubble in the Milky Way by Fermi Gamma-ray Space Telescope



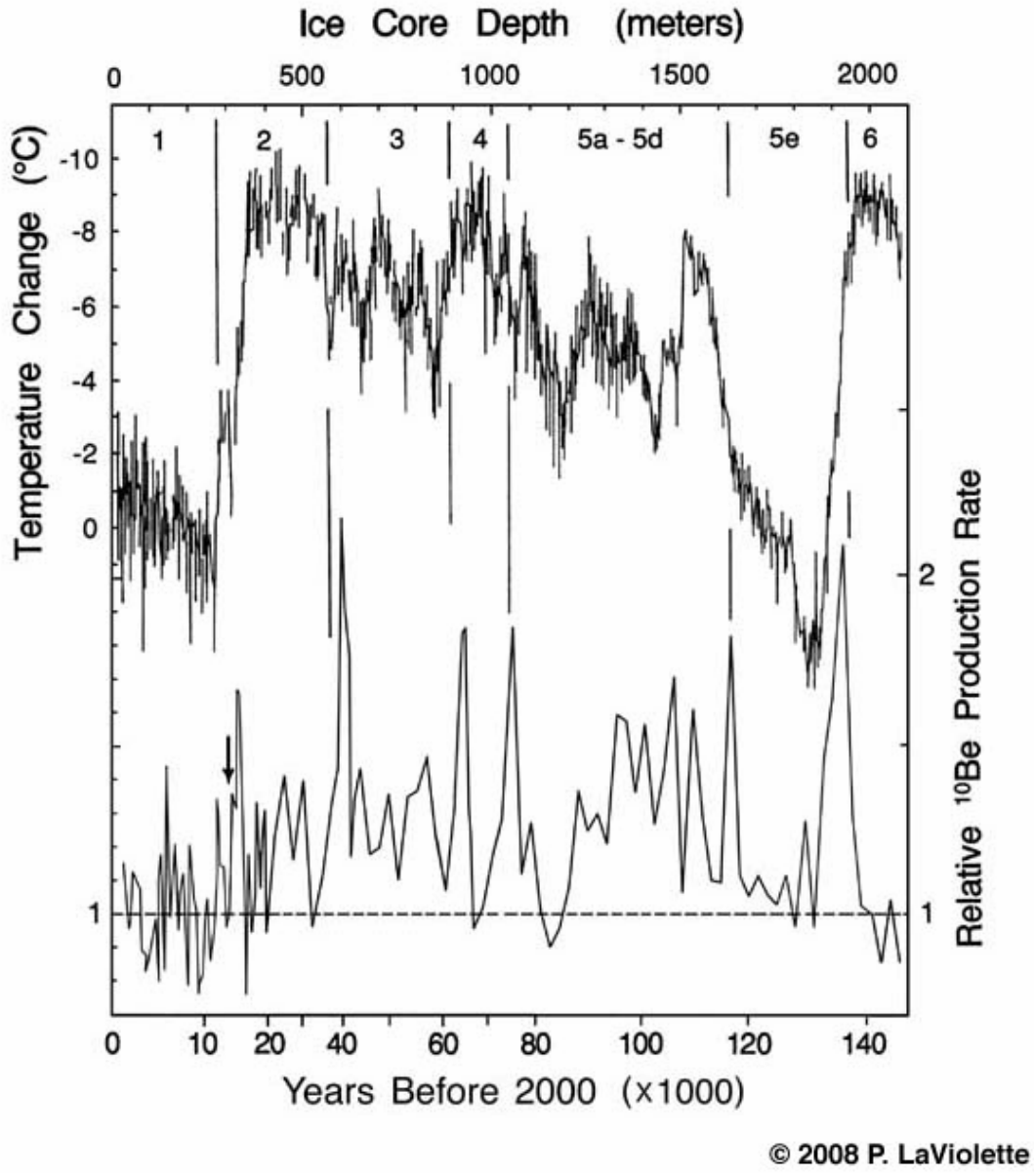
http://www.nasa.gov/mission_pages/GLAST/news/new-structure.html

Evidences of superwave in past
Gamma-ray bubbles extend 50,000 light-years

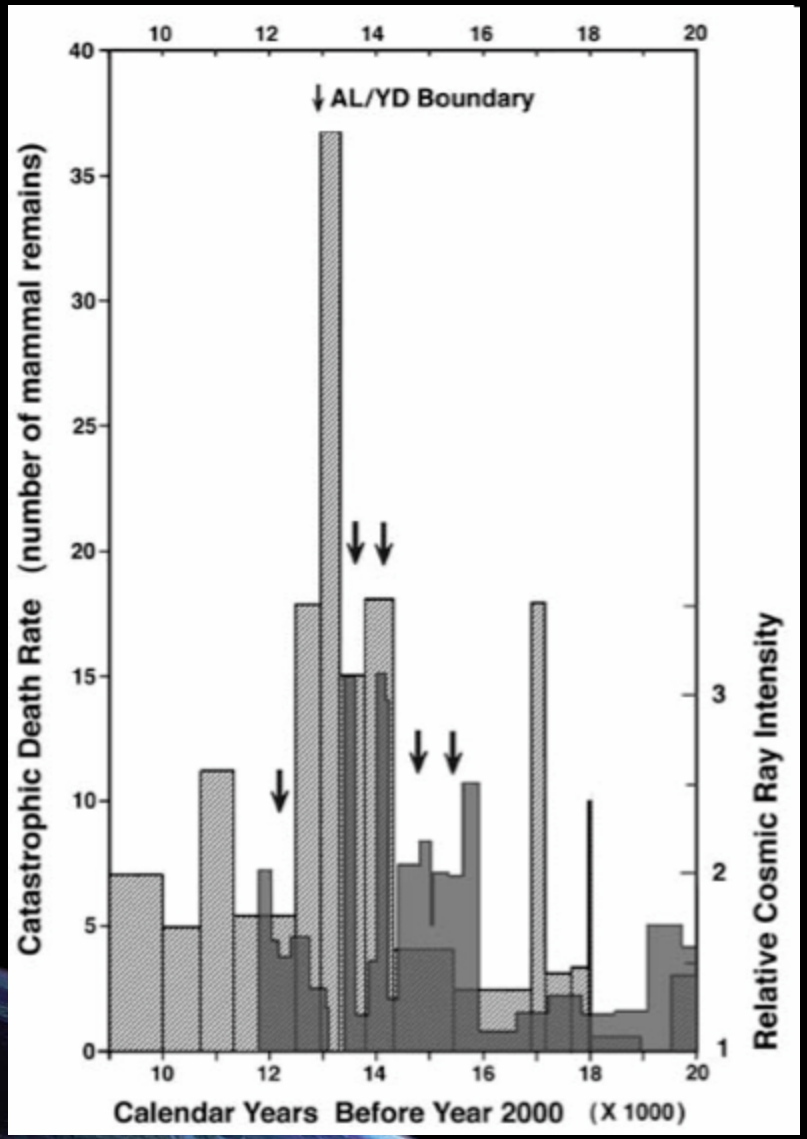


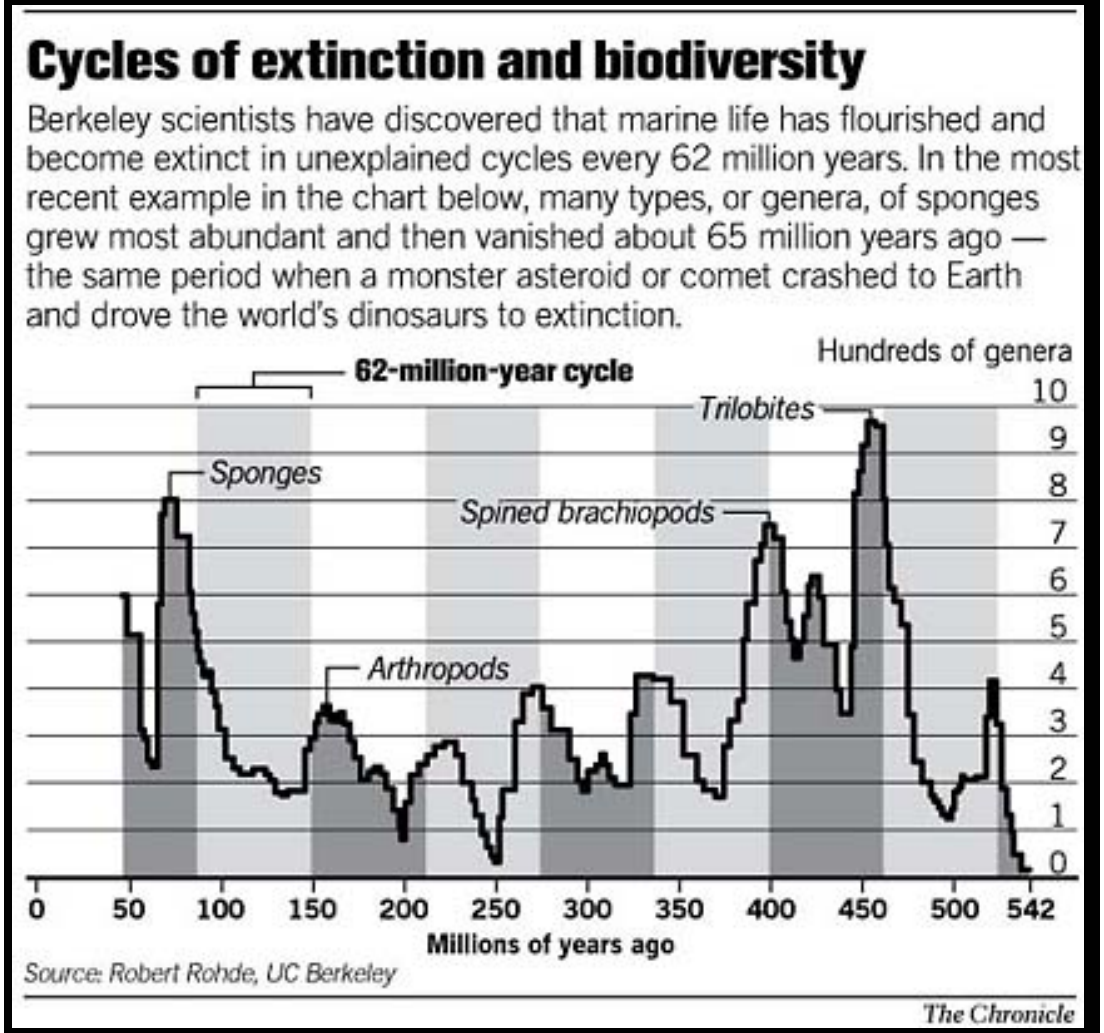
Scientists look for Beryllium10 which is an radioactive isotope of Beryllium. Beryllium10 is created in the atmosphere when the atmosphere is bombarded with cosmic rays

Ice Core Sample



when cosmic rays hit the atmosphere, they produce an isotope of beryllium, ^{10}Be, which is preserved in polar ice. By examining ice cores, it is possible to estimate cosmic ray fluxes more than a thousand years into the past. Even with the recent surge, cosmic rays today are much weaker than they have been at times in the past millennium.





High intensity of cosmic ray occurred during the time of the previous ice age and the cycle of extinction

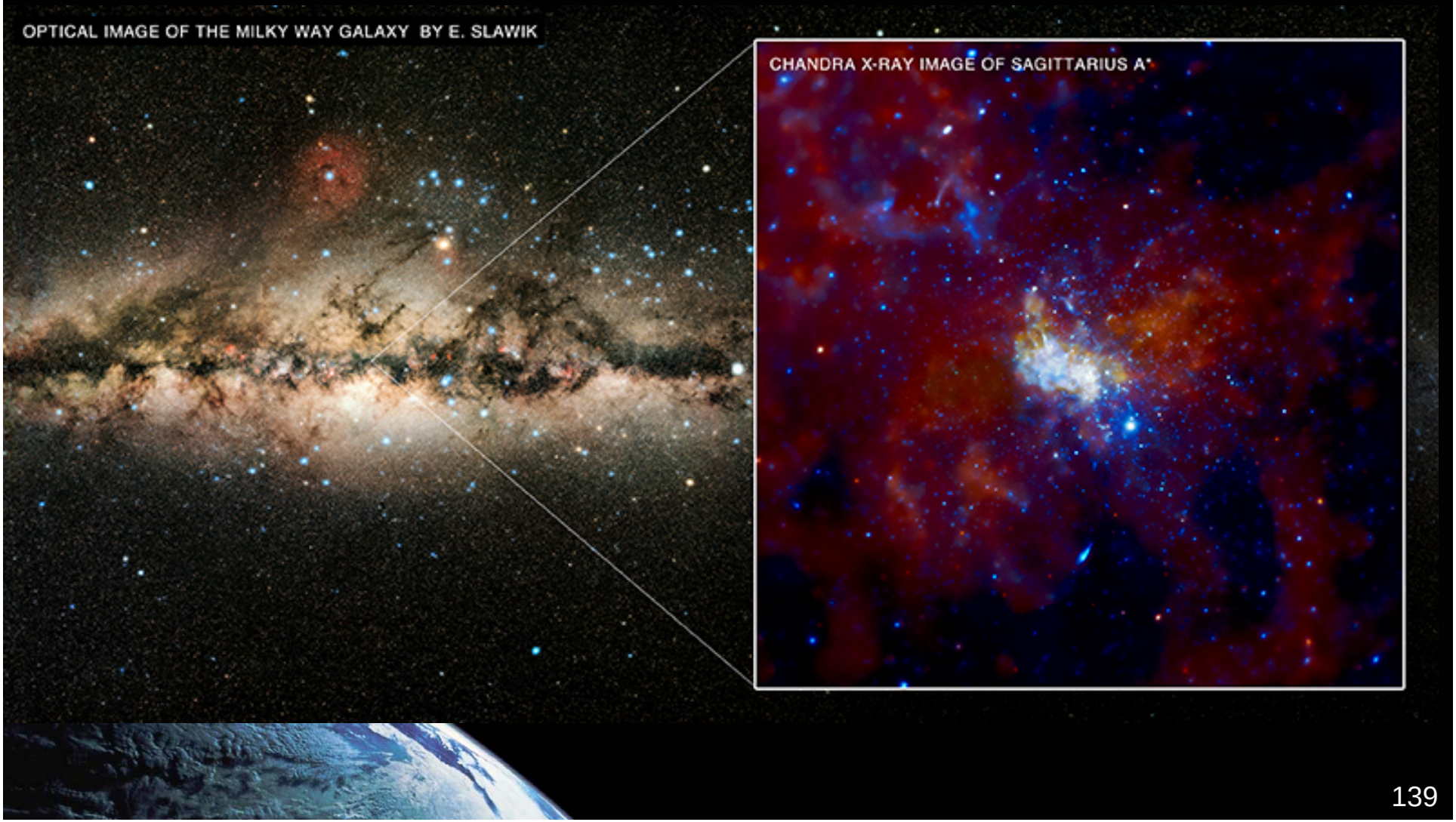
Frozen Mammoth

- Many theories have been postulated. One of the most popular is that the hairy elephants were peacefully grazing on grass and buttercups and were suddenly struck by a huge freezing storm blowing from the Arctic Ocean. Millions of them froze instantly.

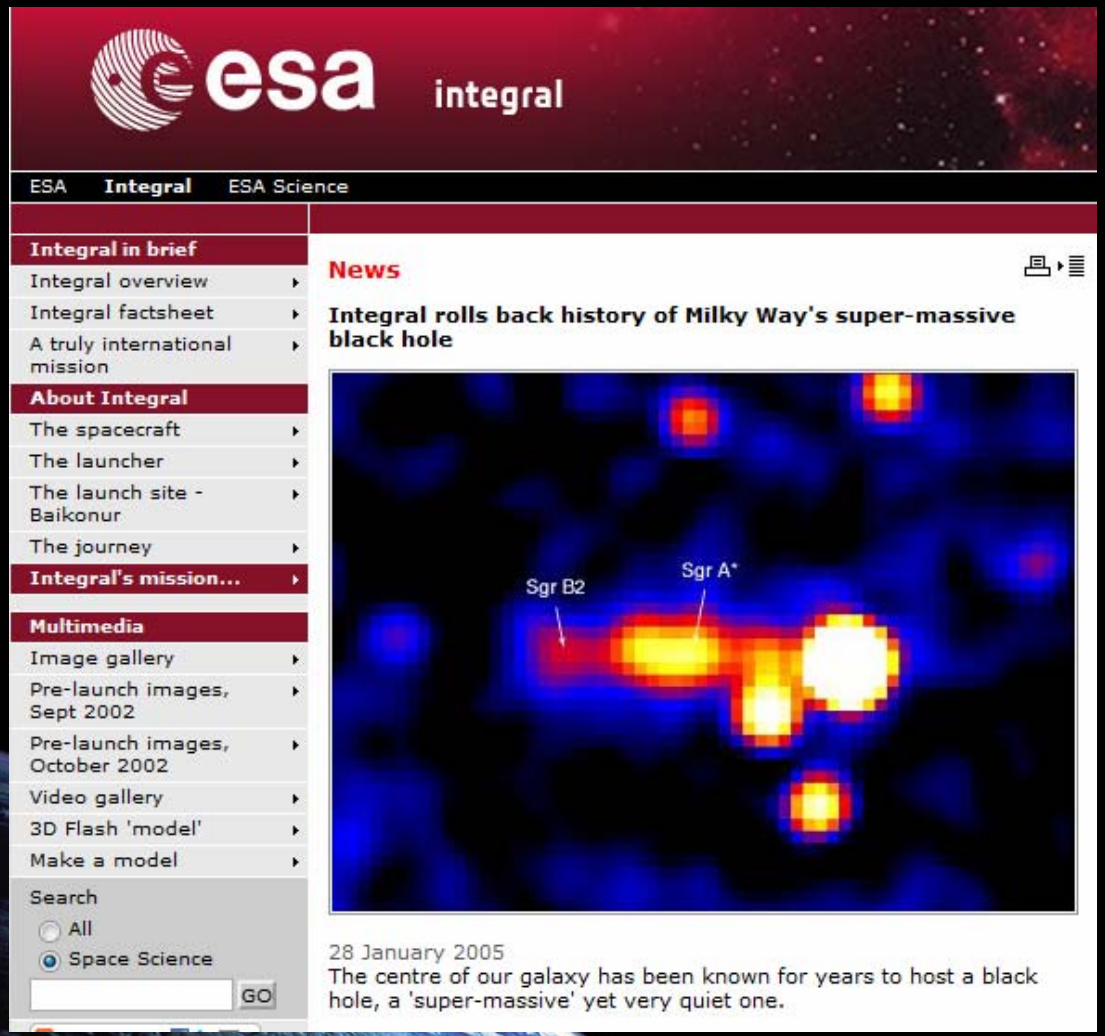
http://ngm.nationalgeographic.com/2009/05/mammoths/latreille-photography

The Current Superwave Event

Optical Image of the Milky Way with Chandra X-ray Pullout



Galactic Explosion ~ 26,000 years ago

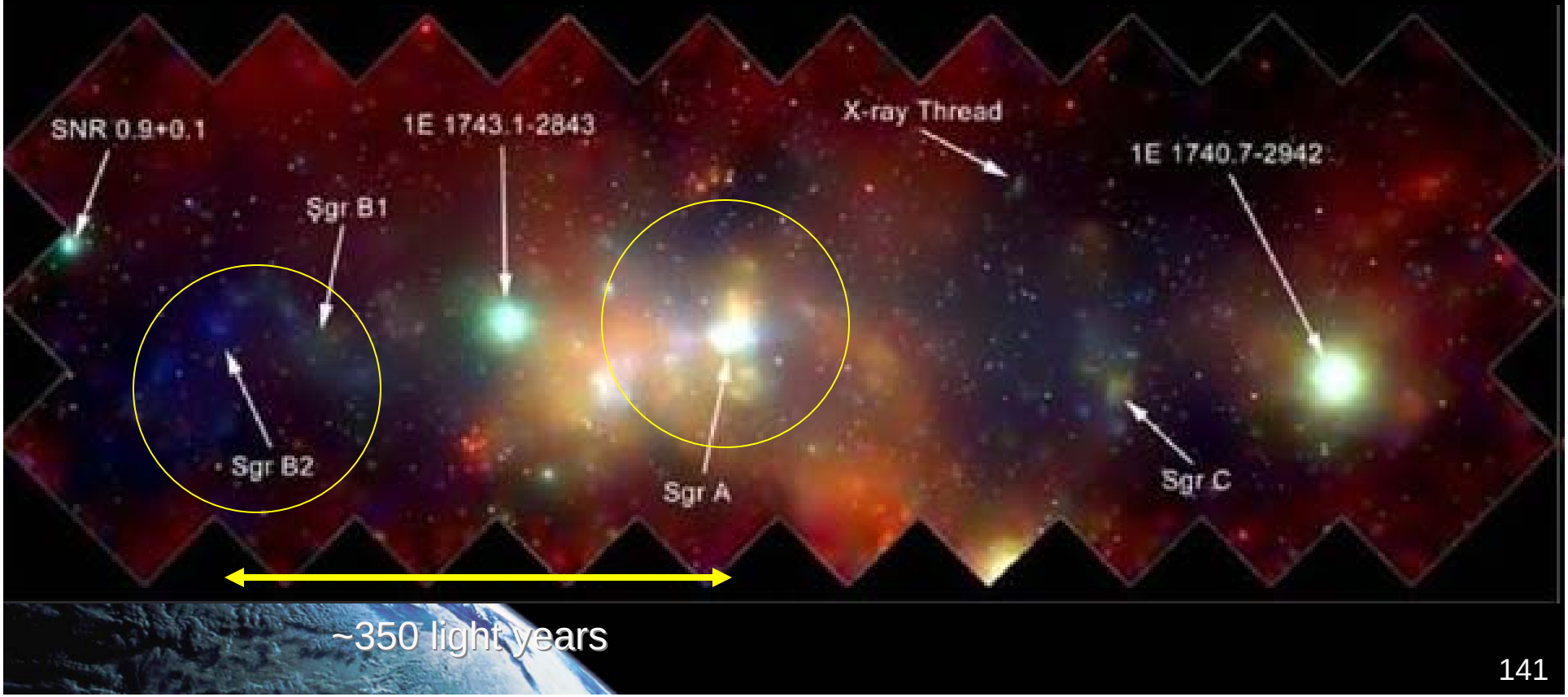


- the Milky Way, hosts a super-massive black hole at its centre. Astronomers call it Sgr A*
- This gamma-ray radiation is a direct consequence of Sgr A*'s past activity, in which gas and matter trapped by the hole's gravity are crushed and heated until they radiate X-rays and gamma rays, just before disappearing below the 'event horizon' - the point of no return from which even light cannot escape.

http://www.esa.int/esaMI/Integral/SEMSKPO3E4E_0.html

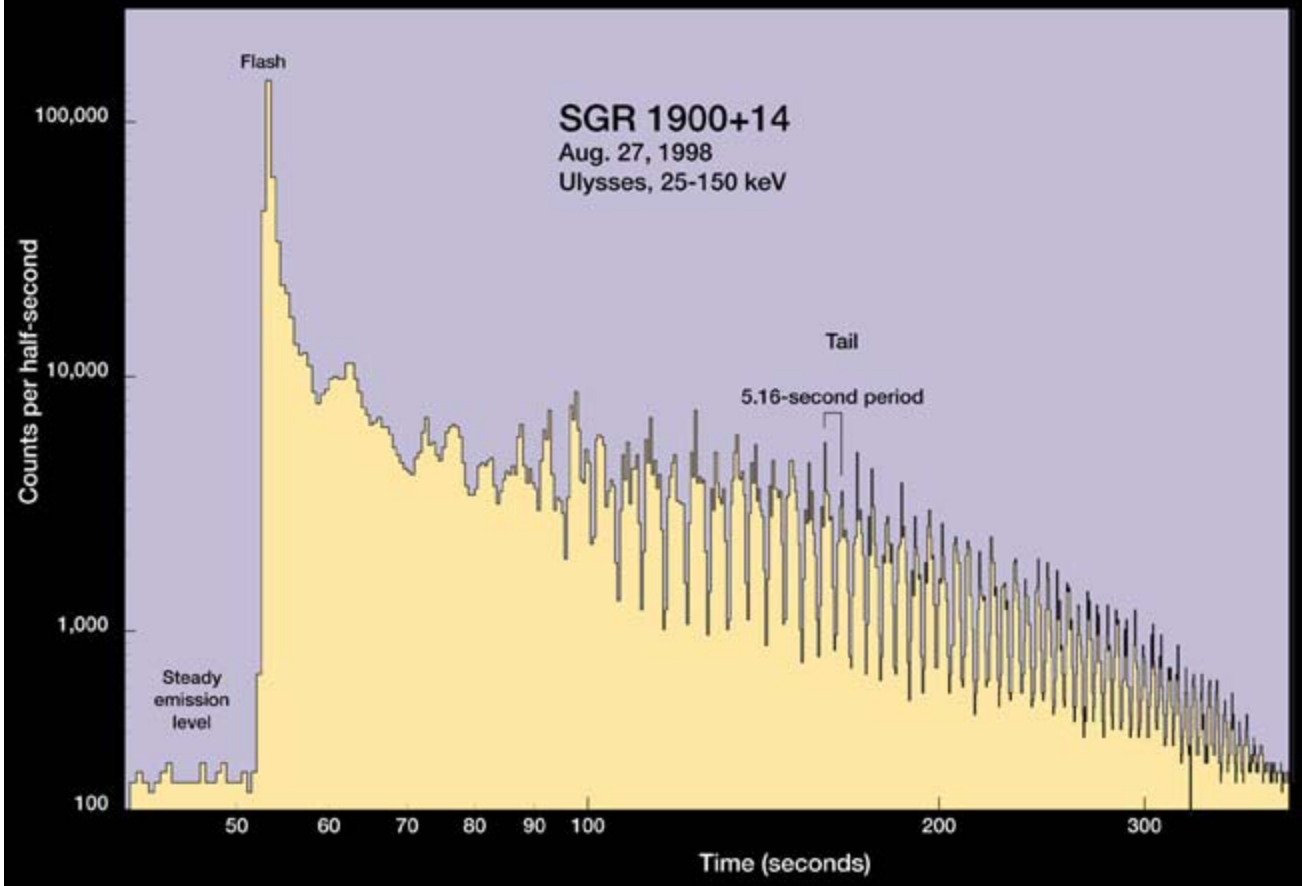
"We are now seeing an echo from a sort of natural mirror near the galactic centre - the giant cloud Sgr B2 simply reflects gamma rays emitted by Sgr A* in the past," says Revnivtsev. The flash was so powerful that the cloud became fluorescent in the X-rays and was even seen with X-ray telescopes before Integral.

Because of its distance from the black hole, Sgr B2 is only now being exposed to the gamma rays emitted by Sgr A* 350 years ago, during one of its 'high' states. This powerful radiation is absorbed and then re-emitted by the gas in Sgr B2, but this process leaves behind an unmistakable signature.



Gamma Ray Burst : Animation

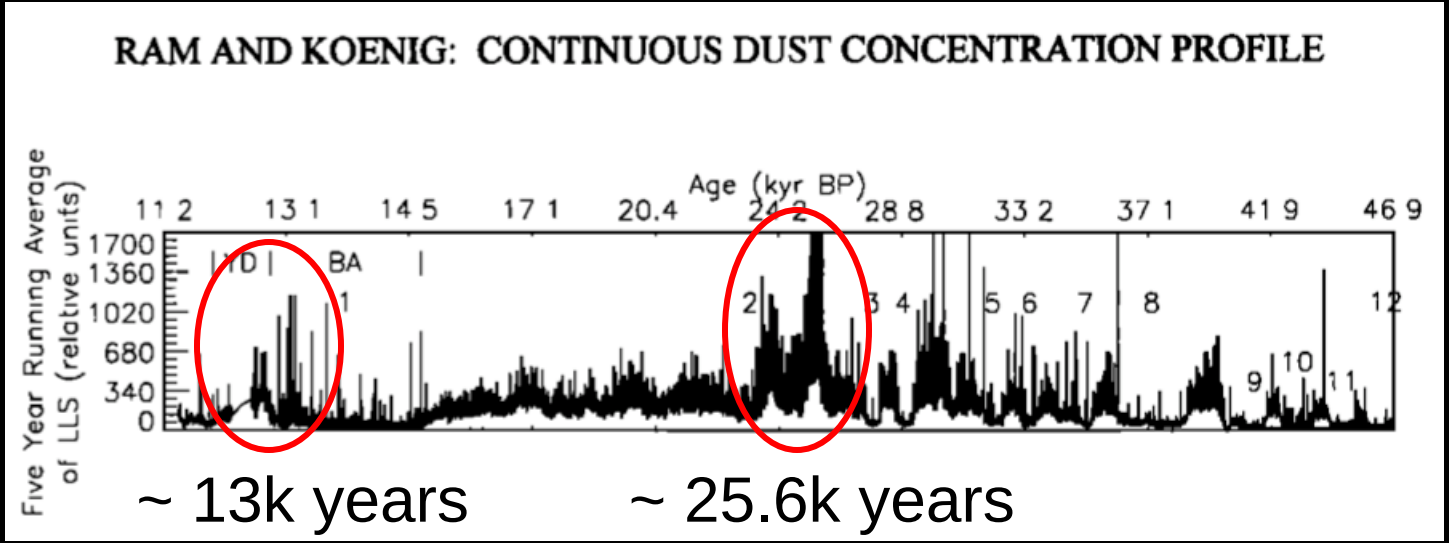
August 27, 1998 Event



On August 27, 1998 a giant flare from SGR 1900+14 set new records for the most intense flux of gamma-rays ever detected from a source outside our solar system. It blitzed gamma-ray and X-ray detectors on seven different spacecraft at locations throughout the solar system.

The 1998 event was close enough and strong enough to ionize Earth's upper atmosphere, damage a couple of spacecraft and disrupt global communication. Since then astronomers place gamma ray bursts from the Glaxy's core at the top of the list of things we *don't* want to happen.

The terrestrial cosmic ray flux : its importance for climate



Cosmic Ray Flux affects the electrical conductivity of the atmosphere through ion production and is the meteorological variable subject to the largest solar cycle modulation that penetrates into the denser layers of the atmosphere.
M. Ram, M.R. Stolz, and B. A. Tinsley, vol. 90, no. 44, Nov 2009.

Changes in nucleation processes in clouds associated with the CRF can provide necessary amplification [Dickinson, 1975; Burns et al. 2008; Tinsley 2008]

Summary

- Galactic Superwave occurred in the past around ~ 5,300, 13,000 , 26,000 and 40,000 years ago – more often than the conventional science belief.
- It cause major catastrophes on Earth : increase in volcanic activities, flood, high level of cosmic rays.
- The current explosion detected in 2002 and it is coming this way.
- The current Earth’s climate change could be caused by the front edge of this wave.