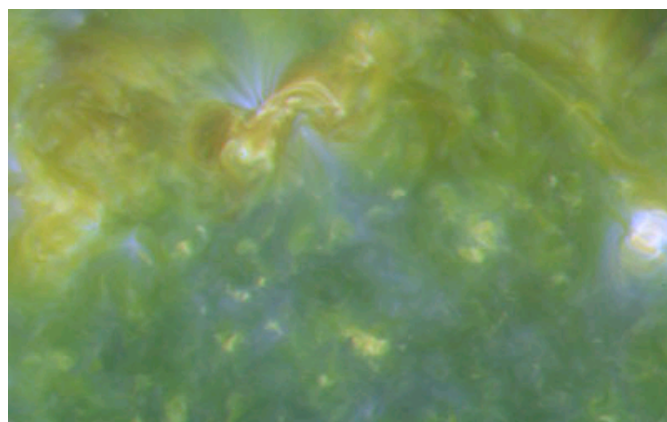
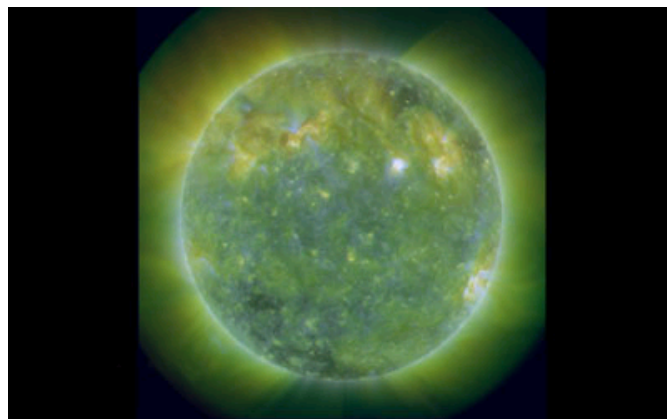


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First stunning images from NASA's Sun gazer

Apr 22, 2010 7 comments



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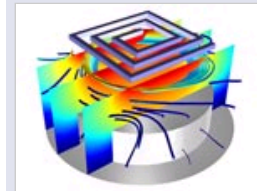
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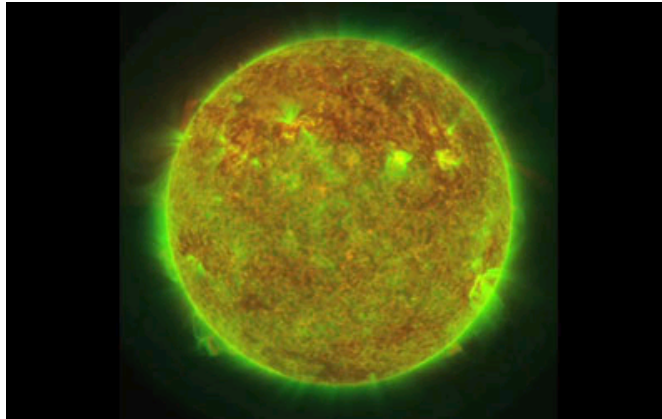
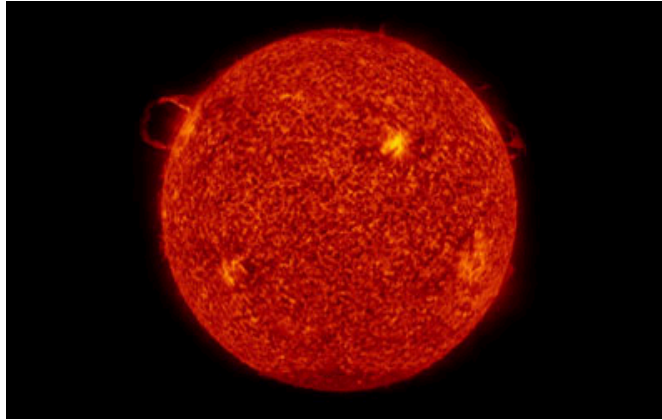
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The first high-resolution images of the Sun have been returned from NASA's Solar Dynamics Observatory (SDO), which was launched in February.

The \$850m mission will investigate the causes of solar variability and how this creates a weather system in space. It is the first mission in NASA's "Living With a Star" programme, which was established in 2001 to try and obtain a better understanding of how the Sun's activity can impact on life on Earth.

These first images reveal a dynamic landscape, showing the Sun's surface in the highest resolution to date. The images reveal clouds of charged particles streaming from prominences on the Sun's surface in events known as coronal mass ejections. They also show solar flares, which are bright X-ray bursts caused by energetic explosions in active regions of the Sun.

"These initial images show a dynamic Sun that I had never seen in more than 40 years of solar research," says Richard Fisher, director of the Heliophysics Division at NASA headquarters in Washington, DC. "This mission will have a huge impact on science, similar to the impact of the Hubble Space Telescope on modern astrophysics."

Magnetic mayhem

The cause of the Sun's volatility is connected to its magnetic activity, which is known to vary over a cycle of approximately 11 years. Greater magnetic activity leads to more "sunspots", or darker patches visible on the solar surface. These sunspots are regions where the magnetic-field lines have become twisted because of differential rotation in the outer layers of the Sun.

Particularly violent sunspots can lead to coronal mass ejections from the solar surface, and some of these particles can reach the Van Allen radiation belt – the outer region of Earth's own magnetic field – where they are accelerated to approaching the speed of light. During solar maxima, when sunspot numbers are at their peak, the

abundance of particles shooting around in the radiation belt can become a real hazard to the satellites that are positioned there.

The SDO mission comes at a particularly interesting time for solar physics. We were expecting to reach the next solar maxima in around 2011–2012, but space-weather experts have been surprised over the past few years to report few signs that the number of sunspots has been increasing since the last solar minimum in 2006. This has prompted some space scientists to forecast that we are heading towards another prolonged spell of quiet sunspot activity, the last of which was observed between 1645 and 1715 in a period called the "Maunder minimum".

Three instruments in one

The SDO will initially operate for five years with the option to extend this for a further five years after that. "It will observe the Sun faster, deeper and in greater detail than any previous observatory," says astrophysicist Madhulika Guhathakurta, the mission's programme scientist.

The SDO craft sits in a geosynchronous orbit, which enables it to continuously observe the Sun and makes it easier to transmit data to a ground-based station. It carries three sensitive instruments for viewing the Sun.

One instrument is the Atmospheric Imaging Assembly (AIA), an array of four telescopes that will observe the surface and atmosphere of the Sun over 10 different wavelength bands. Another is the Extreme Ultraviolet Variability Experiment (EVE), which will track the powerful outbursts that can affect the Earth's upper atmosphere. Finally, there is the Helioseismic and Magnetic Imager (HMI), which will map solar magnetic fields and peer beneath the Sun's opaque surface to study the magnetic dynamo.

All images courtesy of NASA/Goddard Space Flight Center Scientific Visualization Studio

About the author

James Dacey is a reporter for *physicsworld.com*

7 comments

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1 **jjeherrera** Now, THIS is NASA at its best.
Apr 22, 2010 5:39 PM
Ciudad Universitaria, Mexico

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2 **a.bhulai** Applause is due.
Apr 23, 2010 5:12 AM

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3 **GigiGalaxyz** Now, these are fascinating pictures.
Apr 23, 2010 10:45 AM

Edited by GigiGalaxyz on Apr 23, 2010 10:49 AM.

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4 **Dalena**
Apr 23, 2010 5:52 PM

Quote:

*Originally posted by **jjeherrera***
Now, THIS is NASA at its best.

Agreed. The US government has been spending alot of money lately; however this spending advanced science and our understanding of our place in the universe.

If you can check out: www.news.com...hi-def-images-of-sun it provides some more details about the program and some cool images.

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5 **Oliver K. Manuel**
Apr 23, 2010 7:41 PM
United States

NASA Confirms Violent Sun: Congratulations!

The photos show the type of activity expected at about 700 million meters (i.e., $\sim 7 \times 10^8$ m) or 0.00465 AU from the compact, energetic neutron star that is at the core of the Sun.

How unlike the mild, even-tempered object that supposedly has no influence on Earth's climate changes [Al Gore, the UN's IPCC, and their army of Nobel Prize winning climatologists].

Keep up the good work, NASA!

With kind regards,
Oliver K. Manuel
Emeritus Professor
Nuclear & Space Science
Former NASA Principal Investigator for Apollo

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6

Gaina Alex

Apr 26, 2010 6:23 PM
Chisinau, Moldova

Solar activity and world History

I have studied a diagram of solar activity since 1750 till present and I have found few interesting corellations of the maximums of the Solar activity with world History.

The maximum around 1789 coincides with French revolution

One follow 3 less maxima

The next maximum from 1848 coincides with the revolution of 1848,

The maximum of 1870 coincide with the Franco-Prussian War (1870–1871), and a besieged Paris under heavy bombardment surrendered on the 28th of January 1871. The Parisian "Commune"

The maximum of 1917 coincides with the October Revolution wich put the beggining of communist totalitarianism.

The maximum of 1937 coincides with the turnure of socialist Adolf Hitler to Nazism, the beggining of the purges of hebrews, tzigans and slaves. The same year coincides with the maximum of the Stalinist Purges in the Soviet Union.

Thw maximum of 1949 - Cold War and the recrudescence of Stalinist purges in the USSR and in the newly "democratic countries" of the Eastern Europe. The Chinese Revolution.

The maximum of 1959-1961 - The Revolution in Cuba and the Carribbean Crisis.

The events in Prague in 1968 coincides with the increasing of the Solar activity and approach to maximum.

The maximum of 1980-1984- the finish of the Governance of L.I. Brezhnev in the USSR, the subsequent political instability during the governance by Chernenko and KGB lieder Andropov.

The maximum of 1989-1992, the disintegration of the Communist system. Due to Gorbachev this disintegration was peaceful. Some local conflicts (Lithuania 13 January 1991, the Transdnestrian conflict which has followed to the secessionism of the Pridnestrovian Moldavian Republic (which has no a logic national basis) to a military conflict in 1992.

The involvement of the ISAF/NATO in Afganistan and

the Iraq War of 2003 coincides with the respective maximum of the Solar activity in 2001-2003.

If we will come back to the beggining of the XYI century we shall find that the year of 1519 when the Spanish dominance on indigene peoples in Southern and Central America was established (Hernan Cortez) was a year of maximum Solar activity. The same refers to the year of 1532 (battle of Cajamarca). I have no an exact diagramme of the solar activity for that years, bat I have extrapolated the known diagramme by a period of 11, 765 years. I offer to astronomers and historians to check this hypothesis. In this sense, the recent address

[news.yahoo.com...raterrestrialhawking](#)

by Steven Hawking represents a continuation of the Conquista to ours days and Aliens

I can't explain the invasion of Hungary in 1956 and Afganistan by Soviets in 1978 only.

By contrary:

The minimum of 1956 in the USSR coincides with the XX-th Congress of the Communist Party of the USSR, when the stalinism was convicted and a few years of Peace and wellbeing followed.

The minimum of 1965 coincides with the Directives of the Prime-Minister Kosighin concerning the redressement of the Soviet Economy.

In my oppinion the corellation could be explained by the influence of the perturbabions of the Earth's magnetic field (due to increasing of the Solar activity) on the neurons of political liederes. The political liederes should be more compliant during the maximums of the Solar activity, while during the minimums of the solar activity the world is more stable and peaceful, in spite of any bad (argressive) political decisions.

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7

jsobry

May 6, 2010 12:15 AM

Quote:

*Originally posted by **Oliver K. Manuel***

The photos show the type of activity expected at about 700 million meters (i.e., $\sim 7 \times 10^8$ m) or 0.00465 AU from the compact, energetic neutron star that is at the core of the Sun.

How unlike the mild, even-tempered object that supposedly has no influence on Earth's climate changes [Al Gore, the UN's IPCC, and their army of Nobel Prize winning climatologists].

Professor, I do not think that Al Gore, IPCC and other nobel prize winners have ever said that the sun has no influence on Earth's climate changes. Indeed the contrary is true.

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