



“Solar Flare ” Flip Book

Image Credit: The SOHO-EIT Consortium: SOHO is an ESA-NASA program of international cooperation..



**14 July
2000**

Basic Facts About Solar Flares

Solar flares are explosions of incredible power and violence that release energy equivalent to about 100 hurricanes in a matter of tens of minutes.

The strong and twisted magnetic fields in the vicinity of active sunspot groups are thought to provide the power that is released in the solar flares. It is not known as yet exactly how this occurs.

The strongest flares occur only several times per year even in solar maximum. Weaker flares are relatively common. Several tens of these weaker flares can occur in one day during active periods.

Effects of Solar Flares at Earth

Large quantities of x-rays and high energy particles may strike the Earth following a solar flare. The x-rays arrive in just 8 minutes time and the high energy particles follow several hours later.

Enhanced levels of solar radiation (x-rays and ultraviolet light) cause heating and expansion of the neutral atmosphere and increase the amount of atmospheric drag that satellites experience in an unpredictable manner. This degrades the orbit.

These types of radiation increase the density of ionized plasma at high altitudes in the Earth’s atmosphere. Short wave radio signals experience increased absorption under these conditions. Loss of signal due to this absorption is called a “short wave fadeout”.

Dangerous levels of high energy solar particles build up in the magnetosphere that can damage spacecraft micro-

electronics and pose a serious threat to the safety of astronauts.

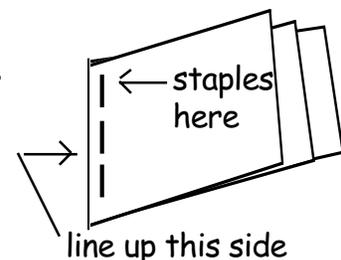
High energy protons penetrate the Earth’s magnetic field in the polar regions, crash into atmospheric particles and temporarily increase the density of ionized plasma there. This causes absorption of short wave radio signals and wide-spread blackout of communications at high latitudes, called a “polar cap absorption event”.

About the 14 July 2000 Flare

One of the brightest flares of the last 6 years exploded near the solar disk center on 14 July 2000. It peaked at 10:24 UT (6:24 a.m. Eastern Daylight Time). It was categorized as an X5.9 flare. The X classification is applied only to the most powerful flares. Bright spots and streaks in the images starting at 11:03 UT are produced by particles (expelled by the flare at the sun) finally arriving in the near-Earth space region and striking the SOHO spacecraft instruments.

Assembly Instructions

Print the following 3 pages. It works best if you can use stiff paper but standard printer paper is fine. Cut out each of the pages for the flip book along the solid line. All of the pages will be slightly different lengths. This makes it easier to flip through the book



when it is finished. Arrange them in order according to the number in the left hand corner of each image. Line up all the pages by the edge that has a broken line marking the staples. Staple the left edge along the broken line. Your flip book is ready.

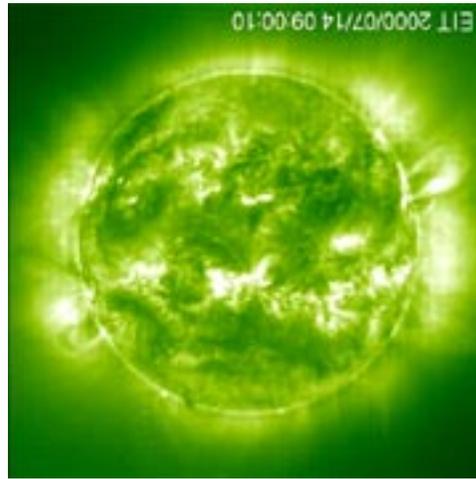
"Solar Flare" Flip Book



Spectacular
Flare of 14
July 2000

Images courtesy of the SOHO-EIT Consortium: SOHO is an ESA-NASA program of international cooperation Project.

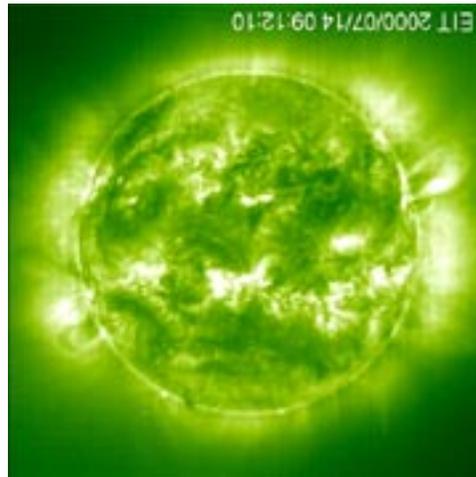
Developed in partnership with: 



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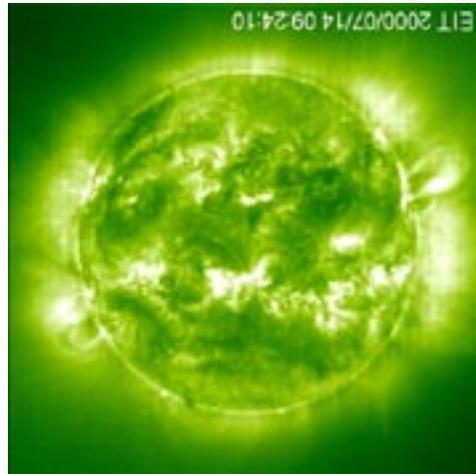
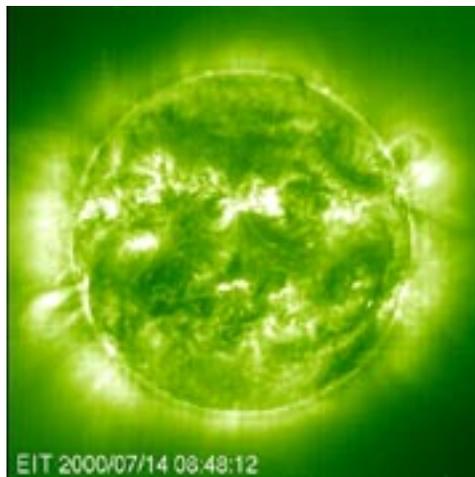
Flip Book Facts

What are flares? Solar flares are explosions of incredible power and violence that release energy equivalent to 100 hurricanes in a matter of minutes. The strong and twisted magnetic fields in the vicinity of active sunspot groups are thought to provide the power that is released in the solar flares. Large quantities of xrays and hot particles may strike the Earth following a solar flare event. The xrays arrive in 8 min. and the hot particles follow by several hrs. **The spectacular 14 July 2000 flare:** One of the brightest flares of the last 6 years exploded near disk center. It peaked at 10:24 UT. It was categorized as an X5.9 flare. The X classification is applied only to the most powerful flares. Bright spots and streaks in the images starting at 11:03 UT are produced by particles (expelled by the flare) striking the SOHO spacecraft instruments.



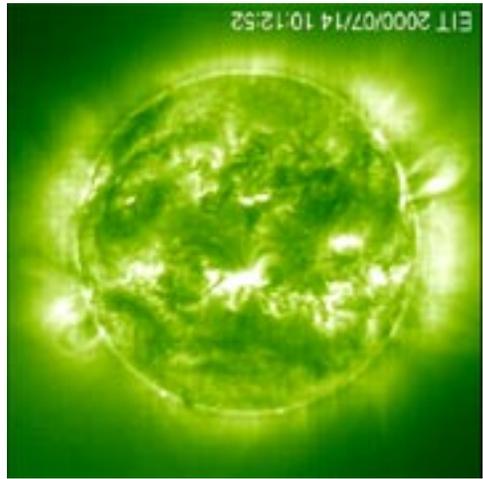
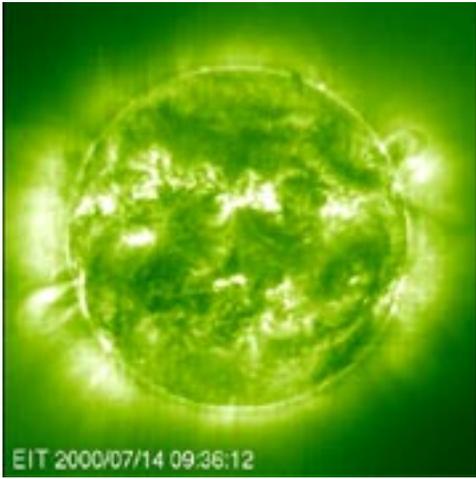
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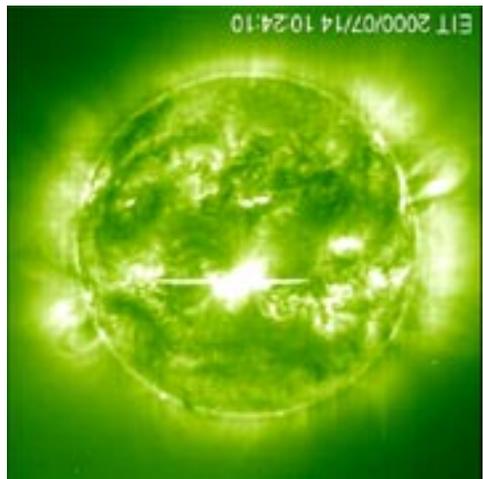
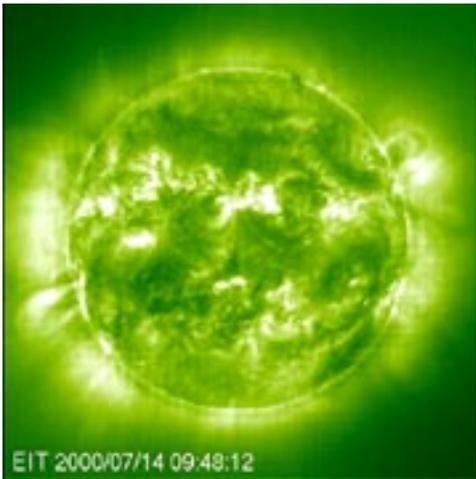
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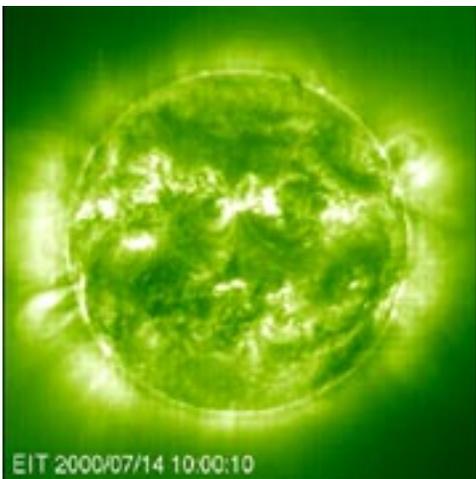
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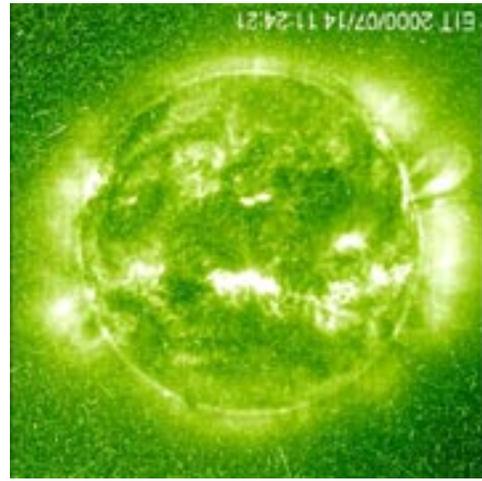
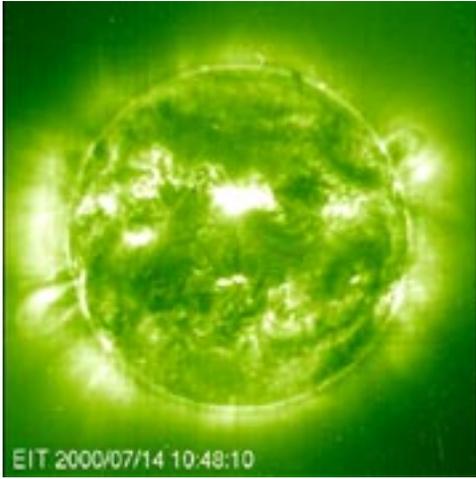
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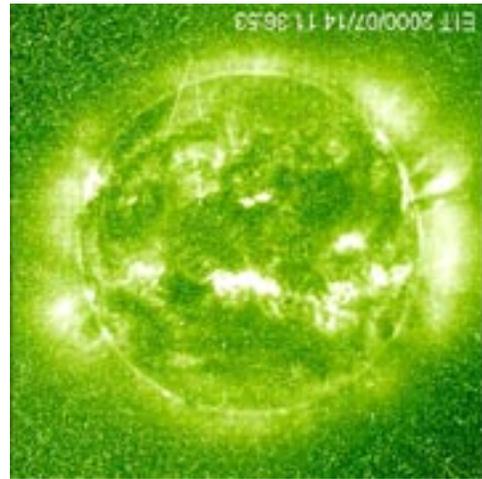
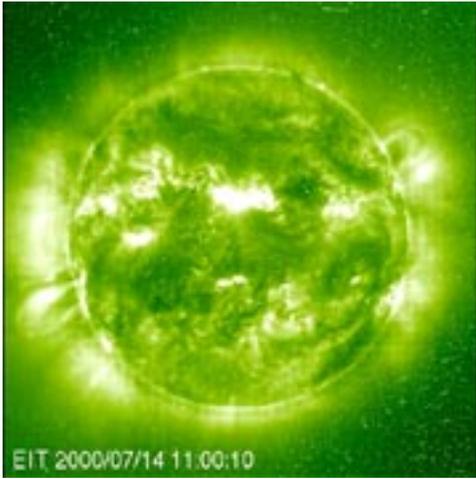
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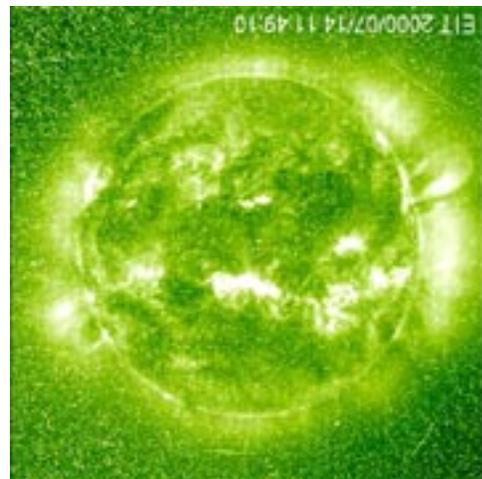
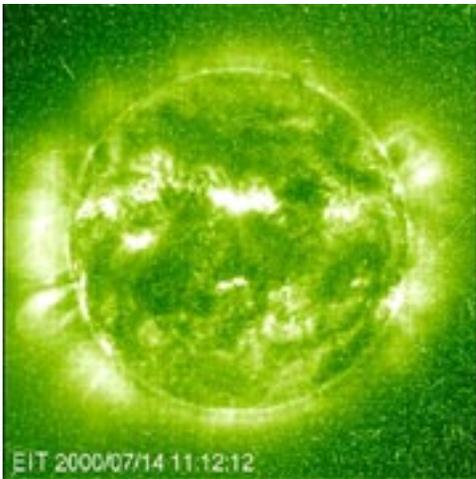
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