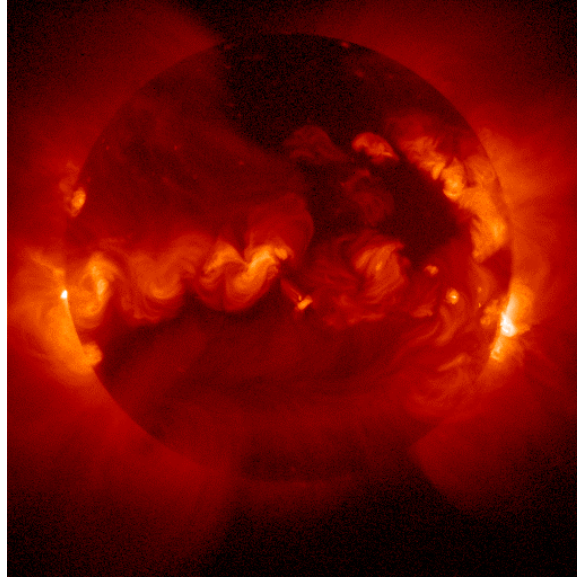


Solar flares

By: Gustavo Romero



Although the cause of solar flares is not completely understood, they are known to be associated with magnetic field of the sun. One favored explanation is that they occur when magnetic fields in the sun pointing in opposite directions interact strongly with each other.

Such a situation can be brought about by the churning motion of solar material near the surface, and is more likely during periods of the active sun. Thus, there typically is a correlation between frequency of flares and the number of sunspots.

A solar flare is magnetic energy that has built up in the solar atmosphere that is suddenly released. Radiation is emitted across the entire electromagnetic spectrum from radio waves at the long wavelength end, through optical emission to x-rays and gamma rays the short wavelength end.

The amount of energy released is the equivalent of millions of 100-megaton hydrogen bombs exploding at the same time. The first solar flare recorded in astronomical literature was on September 1, 1859.

As the magnetic energy is being released, particles, including, electrons, protons and heavy nuclei are heated and accelerated in the solar atmosphere. There are typically three stages to a solar flare. The first is the precursor stage, where the release of magnetic energy is triggered. Soft x-ray emission is detected in this stage.

In the second or impulsive stage, protons and electrons are accelerated to energies exceeding 1 MEV. During the impulsive stage, radio waves, hard x-rays, and gamma rays are emitted. The gradual build up and decay of soft x-rays can be detected in the third, decay stage.

The duration of these stages can be as short as a few seconds or as long as an hour. Solar flares extend out to the layer of the sun called the corona. The corona is the outermost atmosphere of the sun, consisting of gas. The corona is visible in soft x-rays. The frequency of flares coincides with the sun's eleven-year cycle. When the solar flares are detected. These increase in number as the sun approaches the maximum part of its cycle.

The sun will reach its next maximum in the year 2000 or 2001.

From what I learned on the news and just read at

<http://hesperia.gsfc.nasa.gov/sftheroy/flare.htm> I learned that solar flares can release energy stronger than ten million volcanic explosions.

And also that you can only see them with a special microscope but they have to be a specific type of microscopes so that you can detect them much easier and that energetic emissions such as x-rays and gamma rays require telescopes located in space, since these emissions do not penetrate the earth's atmosphere