Largest solar flare in 12 years observed

A file photo of a solar flare. Photo courtesy: NASA | Photo Credit: AP

The largest solar flare in more than 12 years — and the eighth largest since modern records began in 1996 — has been captured in high detail by scientists.

The huge burst of radiation, which was not harmful to humans due to the Earth's protective atmosphere and distance from the Sun, occurred unexpectedly on September 6, 2017, researchers, including those from the University of Sheffield and Queen's University Belfast in the United Kingdom, said.

The flare was one of three X-category flares — the largest type of flare — observed over 48- hour period, they said.

Large solar bursts have energies comparable to one billion hydrogen bombs and can drive plasma away from the solar surface at speeds of up to 2,000 kilometres per second (km/s) in phenomena known as coronal mass ejections.

These powerful events, known as space weather, can lead to disruption of satellites and Global Positioning System (GPS) signals, as well as spectacular aurora through their interaction with the Earth's atmosphere.

The largest X-class flare was measured to have an energy level of X9.3 (where X9 is nine times more powerful than X1).

The team observed these historic events in extremely high detail using the Swedish Solar Telescope in La Palma.

One of the most difficult aspects of flare observation using ground-based telescopes is the short time-scales over which flares evolve.

X-class flares can form and reach their peak intensities in little over five minutes, meaning observers, who only see a small part of the Sun at any one moment, must act fast to ensure they catch the crucial opening moments of the flares evolution.

"It is very unusual to observe the opening minutes of a flare's life," said Chris Nelson from the Solar Physics and Space Plasma Research Centre (SP2RC).

"We can only observe about 1/250th of the solar surface at any one time using the Swedish Solar Telescope, so to be in the right place at the right time requires a lot of luck. To observe the rise phases of three X-classes over two days is just unheard of," said Mr.Nelson.

"The Sun is currently in what we call solar minimum," said Aaron Reid, a research fellow at at Queen's University Belfast.

"The number of Active Regions, where flares occur, is low, so to have X-class flares so close together is very usual. These observations can tell us how and why these flares formed so we can better predict them in the future," said Mr. Reid.

Using the data collected during this observation, researchers will be able to probe the conditions in the solar atmosphere as these powerful events are formed, allowing more accurate predictions

about when and where X-class flares might occur in the future.

This information can be channelled into the multi-billion pound space weather industry to better protect satellites from the dangers of the Sun.

A study of nearly 300 people living in different parts of India found that nine single-base variants (single-nucleotide polymorphisms or SNPs) account

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