CMEs show more of a whimper than a bang

Coronal mass ejections from the Sun make headlines, especially when the effects are felt on and around Earth, and the past few months have seen some of the biggest such events ever recorded. But researchers are now concerned about the smallest such events recorded, which could play a part in unravelling the Sun’s inner workings, writes Sue Bowler.

Coronal mass ejections (CMEs) are thought to form when the magnetic field of the Sun becomes twisted, and a portion of the magnetic flux is ejected into the solar wind, as the field reconfigures itself like an elastic band snapping back into shape. But all ideas about CMEs focus on their formation in huge active regions on the Sun, hundreds of thousands of kilometres across. Now an international team from the UK, Argentina, Finland, France and Hungary has shown that CMEs can come from much smaller areas, around the size of the Earth.

The tiny CME that is causing the fuss reached Earth and was observed by satellites on its way (NASA/ESA’s SOHO spacecraft, NASA’s TRACE satellite and from the now defunct Japanese/US/UK Yohkoh satellite). The surprise came when it was tracked back to an active region on the Sun’s photosphere that was just 16,000 km across. And, although the flux through the active region was 100 times less than for a normal CME, the magnetic field lines were 10 times more twisted than is usual for the larger areas.

Lucie Green of UCL’s Mullard Space Science Laboratory said: “Previously coronal mass ejections were thought to be huge, involving massive portions of the Sun’s magnetic field and all the theoretical models are based around this assumption. However, this one was amazing in that it came from a tiny magnetic region on the Sun that normally would have been overlooked in the search for CME source regions. This will be an exciting area for further study.”

Ancient observatories go online

In honour of Sun–Earth Day 2005, Space Imaging created an IKONOS satellite image gallery of 13 ancient observatories around the world, including Abu Simbel, Angkor Wat (above), Stonehenge, Machu Picchu and Easter Island. All the images were taken by IKONOS from 675 km. Users can zoom in and out to see the architecture in relationship to its surroundings and explore details of these iconic landmarks. The Ancient Observatories gallery is an adjunct to the NASA and Exploratorium multimedia project Ancient Observatories: Timeless Knowledge, which focuses on the link between ancient and modern observatories.

http://www.aaas.org/agg/aaasnews/2005/06/15/astronomy/astronomy060506_02.html

Geological recognition for a geophysicist

The Geological Society of London has awarded its senior medal for 2005, the Wollaston medal, to Ted Irving, a pioneer of palaeomagnetism whose work was an important piece of the jigsaw of data that underpins plate tectonic theory.

Ted Irving started his career measuring the magnetic field directions recorded in rocks and deducing the apparent positions of the poles. The variations he found – known as polar wander paths – meant that either the rocks had moved, or the poles had. Distinctly different paths found in rocks from different parts of the world made it more likely that the continents had moved. Irving’s apparent polar wander curve for Australia provided vital hard evidence for continental drift.

Irving’s career began in the UK, but took him to distinction in Australia and Canada; the Wollaston Medal is a sign of recognition for his contribution to geology through geophysics.

Rovers go until 2006

NASA has approved continued operations until September 2006 for Spirit and Opportunity, the twin Mars rovers that have been exploring two different sites since January 2004. By April 2005 the rovers had already completed 11 months of extensions on top of their successful three-month prime missions, and were approaching targets that a year ago seemed well out of reach. Opportunity has covered more than 4.9 km – eight times the original goal.

Missions under threat

NASA has told scientists working on some of the longest-running space missions that they may have to shut down operations in October to save money. The decision, which NASA officials say is not yet final, has angered scientists, who say it is being made without the usual formal review by the science community. Division officials informed the managers of seven missions – Voyager, Ulysses, Polar, Wind, Geotail, FAST (Fast Auroral Snapshot) and TRACE (Transition Region and Coronal Explorer) – that there is no more money after the current fiscal year ends in October. The proposed shutdowns of the Voyagers and Ulysses have caused particular dismay in the scientific community. The agency’s Earth–Sun System division originally planned to spend $74 million next year on spacecraft that study the Sun’s environment and to pay for data analysis. The budget has been cut to $53 million.

http://www.nature.com/nature/journal/v434/n7030/full/434125a_fs.html

New moon for Saturn

Cassini continues to provide a rich harvest of data about Saturn and its satellites. Data from the spacecraft has now confirmed that there is a moon in a gap in the outer A ring. This is the second moon found within Saturn’s rings. S/2005 S1 is just 7 km across and orbits within the Keeler gap. Researchers interpreted wisps and trails in the ring material at the edge of the gap as the effects of a nearby moon; now they have found it. The disturbance of the ring material is like that seen adjacent to the Enke gap in the F ring, where the moon Pan orbits.

http://www.nasa.gov/cassini

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