AGU Press Conference

ERUPTIONS FROM THE FAR-SIDE: NEW GLOBAL VIEWS OF THE SUN
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For decades we have seen giant eruptions flying off the Sun. The events are huge and spectacular. For the better part of 75 years, scientists have speculated that violent events like flares and coronal mass ejections (CMEs) were triggered by “outside” events. There was even a name for such coincidences “sympathetic flares.” There also has been decades of discussions, some fairly heated, about whether flares caused CMEs or the reverse. And if flares cause CMEs, why are there CMEs without flares?

Today Karel Schrijver will show evidence that a sequence of events that cover a large fraction of the solar surface are associated with the emergence of remote magnetic regions.

After all these years of discussion, why are we making this discovery now? The reason is many fold. The Solar Dynamics Observatory (SDO) makes full disk images that cover the temperature range 6000 to 20,000,000 K – from the solar surface to the core of flares and out into the corona. SDO is fast. The temperature range is sampled every 12 seconds with four extremely sensitive 16 megapixel cameras. SDO also contains a magnetograph that maps the magnetic field every 45 seconds. As a result, we can see large scale structures with high spatial resolution as they heat and cool through different regions of the solar atmosphere. We can understand more of the solar puzzle because we can see pieces that never could be seen together before.

One of the exciting things about the events we are discussing here is that the causal region was not visible to SDO. It was behind the east limb of the Sun. However, it was in full view of the STEREO Behind spacecraft. Both STEREO spacecraft captured CMEs, and the Heliospheric Imagers followed their progress through the Heliosphere and beyond. An active scientific collaboration is now being carried out to discover as many pieces as possible of this solar puzzle.

Critical to these observations was the communication, storage, and computer capabilities that are now available. SDO delivers about 3 terabytes of data a day, each single image requires 6 HDTV screens to display fully.