

Scientists capitalize on extended solar eclipse

July 22 2009

Scientists at this observatory outside Hangzhou joined residents and tourists across China and India in observing the longest total solar eclipse in a century and probably the most-viewed ever.

The moon's shadow traced a path across the world's two most populous countries before racing across the Pacific, providing a view of totality for five minutes and 36 seconds for scientists gathered here from around the world as part of the Williams College Eclipse Expedition.

"We saw it! The clouds kept getting thinner, and we even had a pretty good-sized hole in the clouds for the five minutes of totality," reported Expedition Leader Jay Pasachoff, Field Memorial Professor of Astronomy at Williams and chair of the International Astronomical Union's Working Group on Solar Eclipses.

"Everyone saw all the coronal phenomena. The diamond rings were spectacular. Just before totality, the clouds were just the right thickness that allowed us to see partial phases without filters.

"All our equipment seems to have worked, so now we still have an hour or so of [partial eclipse](#) to image, and then we will download photos and start looking at them. The oscillation experiment has a lot of data through two filters, and we will assess later whether comparison of the two channels allow us to account for the cloud cover," Pasachoff said by email from China.

He was observing his 49th solar eclipse.

Pasachoff and his colleagues are capturing data over many eclipses to understand better why the Sun's corona, the outer halo of million-degree gas, shines hotter than the Sun itself. Most of the corona is visible from Earth only for the fleeting time that the moon totally blocks the Sun's direct rays.

They use a special rapid-readout electronic camera and single-color filters chosen to show only coronal gas, looking for oscillations with periods in the range of one second, which would signify certain classes of magnetic waves. The detailed structure of the corona, revealed by imaging in the visible and x-ray regions of the spectrum, and the correspondence of bright coronal regions with sunspot groups, shows that magnetism is the cause of coronal heating and the coronal structure. Competing explanations involve relatively tiny solar flares going off all the time.

Pasachoff's work with Miloslav Druckmuller of the Brno Institute of Technology in the Czech Republic and with Vojtech Rusin and Metod Saniga of the solar observatory in Slovakia has led to several joint papers in the *Astrophysical Journal* on views of the changing corona.

The expedition includes Bryce Babcock, staff physicist, and several undergraduate students from Williams and has been supported mainly by a grant from the Committee for Research and Exploration of the National Geographic Society.

The next total eclipse of the Sun, on July 11, 2010, will occur in the South Pacific and hit land only in the Cook Islands, Easter Island, and a small section of southern Chile and Argentina.

Source: Williams College

Citation: Scientists capitalize on extended solar eclipse (2009, July 22) retrieved 24 April 2024 from <https://phys.org/news/2009-07-scientists-capitalize-solar-eclipse.html>

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