



Figure 1 – Region 9632 produced a long duration X 2.6 flare and associated CME on September 24, 2001, the region has now moved to a more favorable position on the solar disk. Large solar flare and CME activity over the next few days may cause large geomagnetic storm activity.

Solar Condition Update and Geomagnetic Activity Advisory

Metatech is issuing a *Geomagnetic Storm Advisory*, as conditions project high probabilities for moderate geomagnetic storm activity beginning as early as September 25. Active Region 9632 will be a possible source of additional concern as it continues to intensify and approaches a more favorable solar disk position. Additional large solar flare/CME activity from this region over the next few days may have the potential to cause large geomagnetic storm activity later this week.

This Active Region was also the source of many prior CME events since March-April timeframe of this year. The most recent advisory for activity from this region occurred 27 days ago when this region (then labeled Active Region 9591) produced an X 5 Flare at nearly the same location on the solar disk as today's event.

Metatech does not expect a large geomagnetic storm from this event, because the region was not as optimally positioned to be well-connected for large storm activity at Earth. However, these extrapolations are high in uncertainty.

Flare observations from active regions give a one to five day precursor of possible geomagnetic storms at the Earth. The solar wind conditions can be quite variable given the same solar energy input, and these conditions will ultimately determine the nature of the geomagnetic storm events that unfold. At a point approximately 1 million miles upstream, a solar wind monitoring satellite will be able to detect the strength of the solar wind and provide a nominal 45 minute warning time of geomagnetic storm conditions. For example the X 5.6 event on August 24, 2001 had a resulting solar wind cloud event that produced only a very minor geomagnetic storm event. This was due to a record-low geo-coupling of 1.2 % between the available energy in the solar wind and the amount of that energy that coupled with the Earth's

magnetosphere. This low-coupling suggests that other cloud events in the future could have very high coupling percentages producing much larger storms.

Our clients who are subscribers to our continuous forecast services will receive these updates each minute on solar wind condition changes and the resulting geomagnetic storm activity. The forecast service also provides region and time-specific forecast and observed disturbances over the course of the storm, including GIC-levels and impacts on the entire client power system.

If large flare and CME activity continues to occur over the next few days, then probabilities for a large geomagnetic storm will increase. Metatech will continue to provide updates as solar conditions warrant.

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