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GLOBAL SOLAR ACTIVITY IN CYCLE 24

K Shibasaki*

**Solar Physics Research Inc., Matsushin 2-24, Kasugai, Aichi 486-0931, Japan
Email: shibasaki.kiyoto@md.ccnw.ne.jp*

The solar activity cycle 24 has two peaks, the first one around 2012 and the second one around 2014. Activities of the first peak are mainly in the northern hemisphere and that of the second peak are in the southern hemisphere. We study these activities and high latitude activities using a butterfly diagram synthesized from daily radio images at 17 GHz observed by the Nobeyama Radioheliograph.

In the northern hemisphere, low latitude activity started to decline after the peak in 2012 but the decline slowed down after mid-2013. On the other hand, high latitude activity does not show any sign of increase after the minimum in 2012. These situations can be easily identified in a hysteresis curve (plot of high latitude average brightness vs low latitude average brightness). The data points in the curve continue to approach to the lower left corner, which means activity (both at high and low latitudes) is declining. Also, activity rhythm seems to be lost in the northern hemisphere.

On the other hand, southern hemisphere seems to keep activity rhythm and the current activity level is close to that of the cycle 23. Low latitude activity started to decline after the peak in 2014 and high latitude activity started to increase. The hysteresis curve after 2014 mimics that of the declining phase of the 23 cycle. EUV full disk images taken by AIA/SDO show that the south polar region is covered by well-developed coronal hole, but not the north pole yet.

Solar activity indices such as relative sunspot numbers and total microwave fluxes show that the cycle 24 is low activity. With the help of the radio butterfly diagram, we can see that activities in the northern and the southern hemisphere are quite different. The southern hemisphere seems to be keeping its activity level compared to the previous cycle but the activity in the northern hemisphere seems to be weakening and losing activity rhythm.