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# Long-term evolution of solar wind speed distribution during the solar cycles 22 and 23

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The evolution of solar wind speed distribution during the period 1985-2009, which covers two solar cycles (22 and 23), has been investigated using multi-station interplanetary scintillation (IPS) measurements at 327 MHz. The results obtained here clearly demonstrate that fast (slow) wind areas increase (decrease) systematically as the solar activity diminishes, reaching the maximum (minimum) value at the minimum phase. The intermediate speed wind areas appear to remain constant over the solar cycle. The preponderance of slow wind at low latitudes was confirmed from our IPS observations throughout the period, while a slight increase in the fast wind area was revealed in the declining to minimum phases. In contrast, the high-latitude solar wind was mostly dominated by the fast wind except for a few years around the maxima. An important point to note is the clear difference in the solar wind speed distribution between the 199 6 and 2008 minima. The fast wind areas in 2008 showed a marked increase at low latitudes, which is consistent with in situ observations at 1 AU, and a distinct decrease at high latitudes, resulting in a net decrease at all latitudes, as compared with those in 1996. This difference is ascribed to the weaker polar fields during the 2008 minimum. An excellent positive (negative) correlation between fast (slow) wind areas and the polar fields is revealed from a comparison between IPS and magnetograph observations. The results obtained here suggest a strong control of the sun's polar field in determining the solar wind acceleration and structure.

Keywords: solar wind, interplanetary scintillation, solar activity cycle, Sun's magnetic field