Solar Wind Speed and Density Turbulence Changes in the Inner Heliosphere during Solar Cycle 23

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The peculiar prolonged low solar activity, observed during the recently passed minimum phase of the cycle 23, eventually led to a heliosphere of low density, speed, and magnetic field. In principle, the 3-D view of the inner heliosphere can be inferred by the interplanetary scintillation (IPS) technique, which provides an estimate of the solar wind speed and density turbulence integrated along the radio path. In this study, the large-scale features of the inner heliosphere obtained from a large number of solar wind measurements at each phase of the solar cycle 23 reveal a chaotic magnetic configuration than an expected nearly-dipole geometry at the minimum phase. The overall scattering diameter of the solar corona has significantly shrunk after about the year 2004 and resulting in a less turbulent heliosphere towards the end of the cycle. These findings may be related to the slowing down of the dynamo that generates the solar magnetic field.