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This study provides a comprehensive statistical characterization of the solar wind environment experienced by planets across the heliosphere (0.1–30 au). Integrating multi-spacecraft observations from PSP, Solar Orbiter, MAVEN, the Voyagers, and so on, we evaluate both the interplanetary magnetic field (IMF) and plasma parameters (velocity, density, and temperature). Our analysis reveals that while the IMF generally aligns with the Parker spiral, its directional and intensity deviations from the Parker spiral model get more significant with heliocentric distance. Furthermore, we quantify the dynamical variability of these properties through auto-correlation analysis, showing that the stability of solar wind structures varies by component and distance, likely due to flux tube evolution and large-scale interactions. By establishing these radial scaling laws and variability patterns, this work provides a global empirical framework for understanding the upstream conditions at various planets, offering critical constraints for modeling solar wind-planetary coupling where real-time monitoring is unavailable.
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