

Radial evolution of stream interactions and interplanetary coronal mass ejections from 0.72 AU to 1 AU

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Based on the Wind and ACE solar wind data, we have made comprehensive surveys of two classes of large-scale solar wind structures, stream interaction regions (SIRs) and interplanetary coronal mass ejections (ICMEs), at 1 AU during 1995-2004. In our 1 AU studies, we have found that the total perpendicular pressure (P_{tp}), the sum of magnetic and thermal pressures, is a very effective complementary criterion to distinguish these two structures, and provides a quantitative measure of the interaction strength. We extend our 1 AU identifications to 0.72 AU with the Pioneer Venus Orbiter (PVO) data, using P_{tp} as a diagnostic parameter together with other traditional indicators of the features of ICMEs and SIRs. Through the comparison of the 0.72 and 1 AU properties, we find many shocks associated with either SIRs or ICMEs form within the short separation between 0.72 and 1 AU. Herein we will also give the variations of the occurrence rate of events, interaction strength, and other properties of SIRs and ICMEs with the heliocentric distance in the inner heliosphere.