

Configuration of interplanetary magnetic field lines with Alfvén waves propagating toward the sun

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Sunward-propagating Alfvén waves in interplanetary space were investigated in relation to the closed loop structure of the interplanetary magnetic field. In 683 Alfvénic periods found in the magnetic field and the plasma data obtained by GEOTAIL in the solar wind during the period from February 2, 1995 to December 31, 1999, sunward-propagating Alfvén waves were found in 156 periods. Among 21 sunward-propagating Alfvén waves for which low energy particle data were available, 30% coincided with bidirectional electron events which are often used as indicators of closed loops of magnetic field lines. The association of sunward-propagating Alfvén waves and the closed loops of magnetic field lines suggest that the waves are useful in order to find magnetic loops which have both ends on the sun.

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