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A statistical analysis of the occurrence of upstream waves in the foreshock region.

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We studied the occurrence of the upstream waves in the foreshock region and their relationship with the solar wind (SW) and interplanetary magnetic field (IMF) parameters (velocity, density and IMF orientation). We developed a method for a careful identification of the upstream waves occurrence. The results of the statistical analysis conducted on Cluster data (2003-2010 years) confirm θnb (the angle between the bow shock normal direction and IMF) the key element for the wave appearance and also shows some relationship between the wave occurrence and the SW speed and density.