



Statistical study of influence of ULF waves and their compressibility on the solar wind velocity in the Earth's foreshock

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The parameters of solar wind (SW) ion populations are modified upstream the Earth's bow shock, in the ion foreshock region, which is typically observed ahead of the quasi-parallel bow shock. The interaction of the incoming SW with the ions reflected at the bow shock generate ULF waves, among them fast magnetosonic waves with an in-phase relationship between the ion flux and magnetic field fluctuations. Using cautiously selected SW proton population from the THEMIS ion 3D distributions, we present statistical maps of a modification of the SW proton velocity due to foreshock processes. We evaluated both electric and magnetic field fluctuation levels associated with ULF waves and their compressibility. A special attention is devoted to evaluation of a contribution of alpha particles to the proton moments using intervals of the solar wind unaffected by the foreshock processes.