Elemental Abundances of Plume and Interplume Regions: Identifying the coronal source of the fast solar wind

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Plumes are relatively bright, narrow structures in coronal holes that extend along open magnetic field lines far out into the corona. It is not known whether the plume or interplume regions are the preferred channel for supplying material into the fast solar wind from coronal holes. Elemental composition is one way to identify the source region of solar wind observed in-situ. Extensive coronal measurements show abundances anomalies in the solar corona, in which elements with a low first ionization potential (FIP) < 10 eV are enhanced relative to the high FIP elements. In-situ measurements show that the composition of the fast solar wind is nearly photospheric. Remote sensing spectroscopic measurements show that interplume regions also have a photospheric composition. In contrast, the elemental composition of plume material is still unclear, in particular whether or not they are subject to the FIP effect. In this work, we measured the FIP bias, i.e. the ratio of coronal to photospheric abundances, in both interplumes and plumes using Hinode/EIS data. Using spectral line intensities and Differential Emission Measure analysis, we access the chemical composition of plumes and interplumes over one week in March, 2007. Previous measurements in active regions indicate that the magnitude of the FIP bias seems to depend on the plasma confinement time. We analyzed the evolution in time of the plume FIP bias, and then compared our results with the age and lifetime of the plume.