

VARIATION OF THE OBSERVED CORONAL CALCIUM ABUNDANCE
FOR VARIOUS X-RAY FLARE PLASMAS

J. Sylwester
Space Research Center
Polish Academy Of Sciences

J.R. Lemen
Mullard Space Science Laboratory

R. Mewe
Laboratory for Space Research, Utrecht

We present the first observational evidence for the variation of the coronal calcium abundance in the high-temperature solar flare plasmas. The analyzed data consists of the X-ray flare spectra observed by the Solar Maximum Mission satellite with the Bent Crystal Spectrometer. From BCS spectra we derived the ratio of the line to continuum flux I_L/I_C for the resonance line of Ca XIX $\lambda = 3.1781\text{\AA}$ and the continuum at the same wavelength as a function of the temperature. The studies of 13 flares showed similar temperature dependence during the decay phases, but the agreement of the I_L/I_C ratio from flare to flare could only be achieved by adjusting an overall normalization factor. As the continuum flux depends weakly on the heavy elemental abundance, this variation of the I_L/I_C ratio can be attributed to the variation in the calcium abundance. For the flares considered, the variation between the extreme cases represented the factor of 2.5. We stress the consequences of the observed abundance variation for the analysis and interpretation of XUV and X-ray spectra.