

# Direct evidence of higher sodium content on the lunar surface from remote sensing C1XS observations

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**Abstract.** Studying the diversity of plagioclase (An#) in the lunar highlands is an outstanding question in lunar science. Recent observations from the Lunar Diviner experiment<sup>1,2</sup> indirectly suggest an evidence of sodic feldspar over a wide range of lunar terrains. Here, we report the direct evidence of higher levels of sodium content on the Moon as observed by Chandrayaan-1 X-ray spectrometer (C1XS). C1XS was designed to map and study the surface elemental chemistry of the Moon using X-ray Fluorescence (XRF) technique along with simultaneous measure of solar X-rays inducing the XRF by X-ray Solar Monitor (XSM) on-board Chandrayaan-1. During the nine months of operation (Nov.2008- Aug.2009), C1XS had observed the Moon only with handful of solar flares (few C, B and A class flares) due to extended solar minimum. We present results from C1XS observations during weak solar flares (ie., B1 to C1) showing the presence of sodium. These observations span over a large area on the nearside lunar southern highland region and also around the crater Tycho. We also discuss the surface elemental abundances of rock forming elements (viz., Mg, Al, Si, Ca & Fe) including Na derived for these observations using an XRF inversion code 'x2abundance<sup>3</sup>'.

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<sup>1</sup> B. T. Greenhagen et al., *Science*, 17, 1507 (2010)

<sup>2</sup> K. N. Kusuma et al., *Planet. Sp. Sci.*, 67, 46 (2012)

<sup>3</sup> P. S. Athiray et al., *Planet. Sp. Sci.*, 75, 188 (2013)

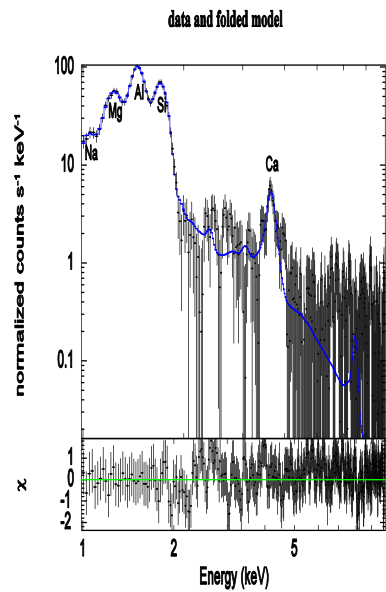


Figure 1: Lunar XRF spectrum - C1 flare on 6 July 2009 - characteristic elemental lines are labeled