

A long-term all-sky imager observation of lunar sodium tail

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The Moon possesses long tail of neutral sodium atoms that are emitted from the lunar surface and transported anti-sunward by the solar radiation pressure. Since the earth crosses the lunar sodium tail for a few days around the new moon, the resonant light emission from sodium atoms can be detected from the ground. Here we show a long-term (over 15 years) observation of the lunar sodium tail using all-sky imager at Shigaraki Observatory (35N, 136E), Japan. We have surveyed our database of all-sky sodium images at a wavelength of 589.3 nm to find more than 20 events in which a bright spot emerges around the anti-lunar point during the new moon periods. So far, we could not find clear correlation between the sodium brightness and solar wind parameters (density, speed, dynamic pressure, and F10.7 index). In particular, no enhancement of the sodium spot brightness is detected even under high density solar wind conditions (80/cc), which suggests that solar wind sputtering is not effective for the formation of the lunar sodium exosphere. We will present the latest results of our data analysis to discuss signatures of the lunar sodium tail as well as the possible origin of the lunar sodium exosphere.