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Lunar sodium exosphere observed by SELENE (KAGUYA)

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The Moon maintain thin atmospheres. The lunar atmosphere is called surface-bounded exosphere because it is thin enough to be regarded as an exosphere and it bounds on the solid surface differently from the terrestrial atmosphere-bounded exosphere. Although there have been only limited ion measurements by lunar orbiters, ground-based optical observations have succeeded in detecting the lunar sodium and potassium atmospheres. SELENE is a Japanese lunar orbiter whose altitude is 100 km. PACE-IMA on board SELENE is an ion energy mass spectrometer that can identify ion species. PACE-IMA have observed the heavy ions of the lunar origin and identified the ion species. It is confirmed that the ions include oxygen, sodium and potassium. Here, we focus on the sodium because sodium is predominant compared to other species and many detailed ground-based observations of the lunar sodium exosphere have been reported. We show that the sodium ions which originate from the lunar exosphere are accelerated by the solar wind electric field. We have estimated the sodium flux in a variety of the solar wind conditions and some meteor showers.