



MAVEN observations of localized spikes in electron temperature at low altitudes in the sub-solar Martian ionosphere

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The electron temperature is an important aspect of planetary ionospheres, controlling several key photochemical reaction rates that directly influence the structure, energetics and composition of the ionosphere. The first electron temperature profiles of the Martian ionosphere were obtained by the Viking landers in the 1970s, however, these profiles did not extend below about 200 km altitude. The Langmuir Probe and Waves instrument carried by the MAVEN spacecraft measures two electron temperature profiles every orbit (inbound and outbound) down to periapsis altitudes of around 150 km. Several “deep dip” campaigns undertaken by MAVEN have lowered periapsis to even lower altitudes (~130 km) for approximately week-long periods. We present here observations of localized spikes in electron temperature that were measured by MAVEN on two separate deep dip campaigns in 2015 and 2017. Both campaigns were close to the sub-solar point, and these temperature spikes were observed below 150 km altitude. The size and altitude of occurrence of these spikes differ between each campaign, and the same features are not observed on other deep dip campaigns further away from the sub-solar point. We discuss the likely origin of these temperature spikes.