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中・低緯度トップサイド電離圏でのプラズマ密度に対する電子温度とイオン温度の傾向
Temperature trend of electron and ion with plasma density in middle and low latitude in the topside ionosphere

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It is important to understand energy flow from electron to ion and neutral species because main heat source of ionospheric plasma is photoelectron created by solar EUV. First, electrons are heated by photoelectrons, then heated electrons reduce their energy through the Column collision with ions. Finally, ions are cooled by inelastic collision with neutral species. Temperatures of electron (Te), ion (Ti) and neutral species (Tn) get close to each other during night time due to lack of significant heat source. Heating rate of electron by photoelectron is proportion to ambient plasma density while cooling rate of electron is proportion to square of the plasma density. Therefore, Te decreases with increase of electron density (Ne) in general. However, some satellite results show Te increases with increase of Ne when Ne is high enough (more than about 10^6 cm^{-3}). To understand the unexpected Te, it is also important to know Ti variation because ion plays as a heat sink of electron. In this paper, we summarized correlation of Ne with Te and Ti observed by HINOTORI, CHAMP and ROCSAT-1 in the topside ionosphere. Since these satellites did not observe Te and Ti simultaneously, Te, Ti and Ne measured with the incoherent scatter radars at Jicamaruca and Millstone Hill are also shown. Using these data, we discuss possible cause of unexpected high Te in high Ne region.

キーワード: トップサイド電離圏, 電子温度, 電子密度, イオン温度, 光電子加熱, 中低緯度電離圏
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