



Modelling the negative chlorine ion chemistry of the Earth's mesosphere

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An ion chemistry model is used to investigate the negative chlorine ion chemistry of the mesosphere for quiet ionospheric conditions. Model results are presented for high latitudes in February as well as for the equator in Summer. For nighttime, Cl^- , $\text{Cl}^-(\text{HCl})$, and $\text{NO}_3^-(\text{HCl})$ are the most abundant chlorine anions in the mesosphere. The concentration of ClO_3^- depends significantly on its stability against collision-induced dissociation. In contrast to previous model predictions, the abundance of $\text{Cl}^-(\text{H}_2\text{O})$ is small. For daytime, photoelectron detachment and photodissociation have pronounced impact on the negative chlorine ion chemistry in the mesosphere. The abundance of all anion cluster is considerably smaller than at night. While Cl^- decreases in the upper mesosphere, its abundance increases at lower altitudes.