Feasibility of data assimilation of multi-satellite measurements for ring current modeling

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A data assimilation scheme for incorporating multiple in-situ plasma measurements into a kinetic ring current model (CRCM) has been developed. This scheme is devised for the purpose

to estimate the distribution of ring current ions and inner magnetospheric electric potential. The scheme is similar to the scheme for assimilating ENA imaging measurements which we presented previously. The magnetospheric electric potential distribution is represented by the sum of the Volland-Stern type field and a deviation from it, and the deviation is estimated through the data assimilation process. According to the estimated electric potential distribution, an estimate of the ring current ion distribution is also obtained. We perform data assimilation experiments using an artificial data set taken along orbits of virtual satellites in the CRCM as a first step. The result suggests that the ring current distribution is satisfactorily reconstructed if sufficient satellites are available.