



Radiation belt measurements strategy for space weather applications

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In the framework of the EU-FP7 MAARBLE project, the Salammbô code and an ensemble Kalman filter is being used to reproduce the electron radiation belt dynamics during storms.

One of the most widely used and reliable methods of assessing a data assimilation scheme is that of the twin experiments. The identical-twin experiments consist in a numerical procedure where synthetic data can be generated by the model to which data assimilation is applied, subject to a specified stochastic forcing term. The data with assigned errors are then evaluated for their effectiveness in obtaining optimal state estimates. The convergence of the unassimilated model fields from the second run towards those of the first run ("true" state) can then be measured.

This set up is used here to define what is the minimum data required and along which orbits to still ensure a good estimate of the true state. The number of data being assimilated (cadence as well as distinct orbits) will be considered as a parameter such as to check data assimilation tool performance in each case. This analysis will be very useful in the case of optimizing a space surveillance system for ionizing particles.

MAARBLE has received fundings from the European Community's Seventh Framework Programme (FP7-SPACE-.2010-1, SP1 Cooperation, Collaborative project) under grant agreement n284520.

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