



## **Magnetopause orientation: comparison of constrained minimum variance and multi-spacecraft triangulation methods**

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Knowledge of orientation, motion and dimensions of plasma structures in space is essential to study these structures. The advent of multi-spacecraft missions such as Cluster have provided new opportunities to determine these parameters using multipoint observations. Multi spacecraft methods are computationally more complicated and require more data than traditional single spacecraft methods though, and also typically imply strict assumptions about planarity and stationarity of the plasma structure studied. In this paper, we have utilised a large number of Cluster magnetopause crossings to compare normal directions estimated using triangulation methods with a constrained minimum variance method. Earlier statistical studies comparing multi and single spacecraft methods did not quantify the uncertainty in the normal direction from multispacecraft methods as they did for minimum variance methods. We present a statistical study comparing magnetopause normals and their angular uncertainties from both methods by quantifying the uncertainty in timing estimates.