

# User-defined Statistical Estimators as Virtual Observatory Search Parameters

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## Abstract

Finding and retrieving space physics data is often a complicated task even for publicly available data sets: Thousands of relatively small and many large data sets are stored in various formats and, in the better case, accompanied by at least some documentation. Virtual Heliospheric and Magnetospheric Observatories (VHO and VMO) help researches by creating a single point of uniform discovery, access, and use of heliospheric (VHO) and magnetospheric (VMO) data.

The VMO and VHO functionality relies on metadata expressed using the SPASE data model. This data model is developed by the SPASE Working Group which is currently the only international group supporting global data management for Solar and Space Physics. The two Virtual Observatories (VxOs) have initiated and lead a development of a SPASE-related standard named SPASE Query Language for provided a standard way of submitting queries and receiving results.

The VMO and VHO use SPASE and SPASEQL for searches based on various criteria such as, for example, spatial location, time of observation, measurement type, parameter values, etc. The parameter values are represented by their statistical estimators calculated typically over 10-minute intervals: mean, median, standard deviation, minimum, and maximum. The use of statistical estimators enables science driven data queries that simplify and shorten the effort to find where and/or how often the sought phenomenon is observed.

We have recently developed an interface that allows users to define new parameters, which are then used as statistical estimators in data searches. The interface offers a selection of existing parameters and

mathematical functions to chose from. After a new parameter request is submitted, the VxO then calculates the statistical estimators and when completed, the user can use them for data queries.

The user-defined parameters provide a customized search tool that allows for more specific science-driven queries.