Comprehensive Assessment of Models and Events Based on Library Tools (CAMEL)

Framework to combine tools to perform model execution, postprocessing, and model-data comparisons.

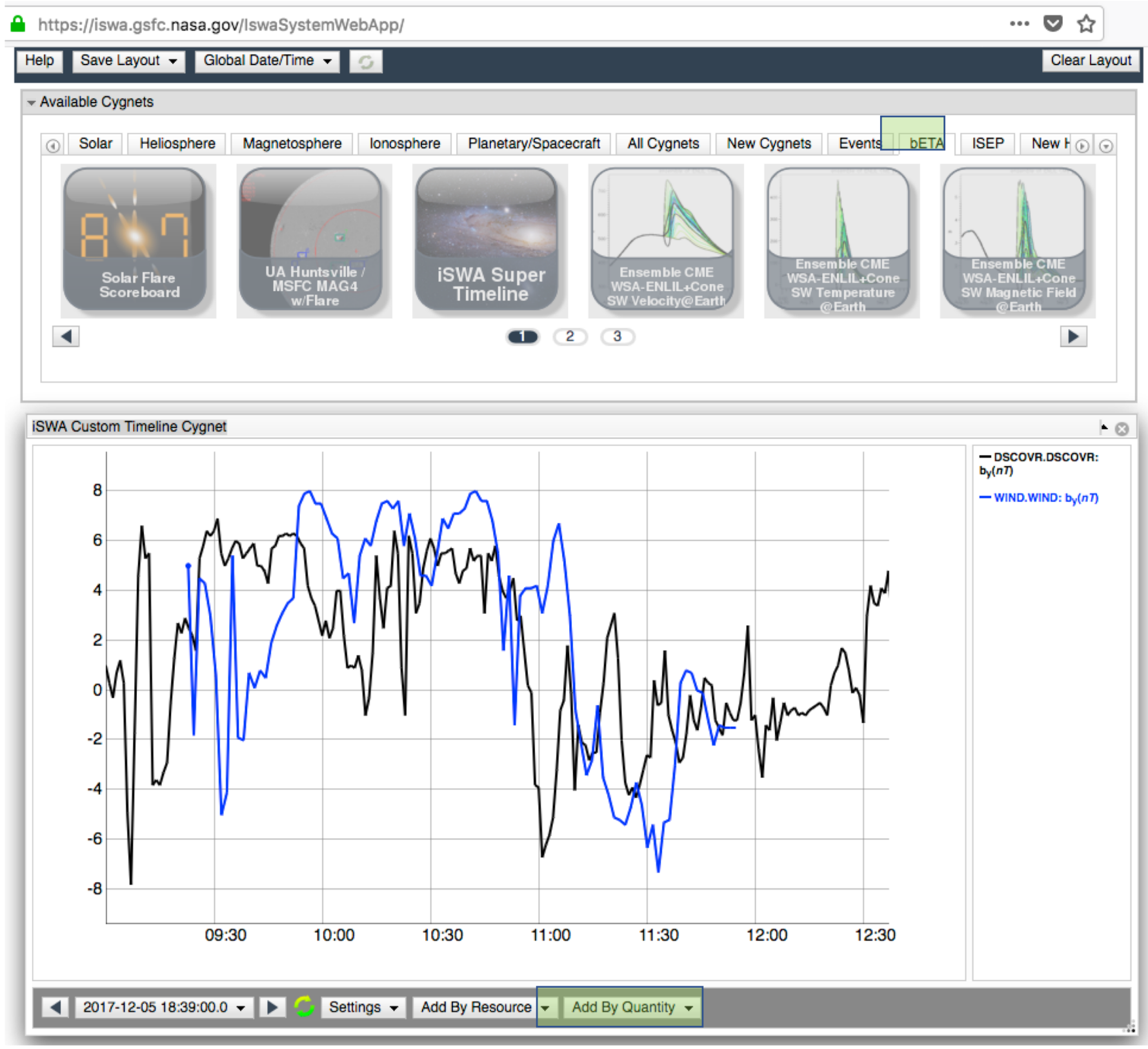
- Extract model-data comparisons
- Data Visualization (iSWA)
- Output Data Visualization (Metrics Vis)

Existing Model-Data Comparisons

- **Virtual Model Repository** visualization Satellite tracks:
  - Tracking implemented in model (SWMF, OpenGGCM) or time series interpolations in CCMC Visualization (most 3D models)
  - Using AutoPlot
  - VMR now fully integrated on CCMC web server
- **CalcDeltaB** – magnetic perturbations on the ground (coupled magnetosphere-ionosphere models)
- **RECONX**: Separator surface between closed, open and solar wind magnetic flux
  - Visualization using Plotly application.
  - Time series of surface/separatrix distance from satellite position.
- **Time series data comparisons**
  - Time series text files from ionosphere, magnetosphere and heliosphere simulations
  - Use library of comparison metrics
    - run_metric.vis.cgi – IDL algorithms exist for wide range of scores: Root-Mean Square error, Prediction Efficiency, Event-Based skills (Probability of Detection, Prob. of False Detection, Heidke Skill)
    - Log-scale display for Ring Current/Radiation Belt fluxes – skills applied to log(flux)

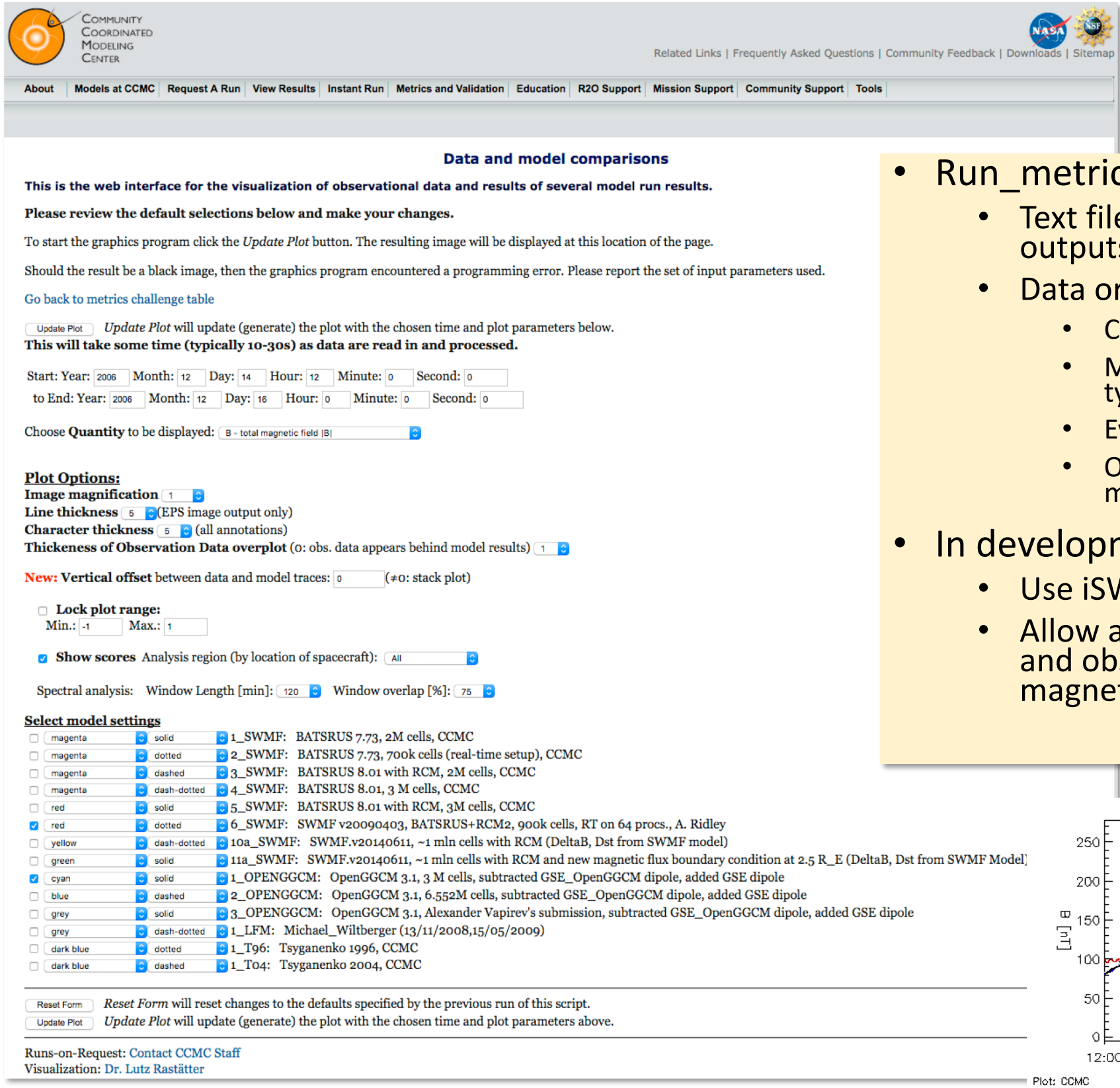
Data Visualization: iSWA

- Database-driven
- Super Timeline supports multiple types of data
- Data of same type (e.g., B_y) can come from different sources (observatory or model).

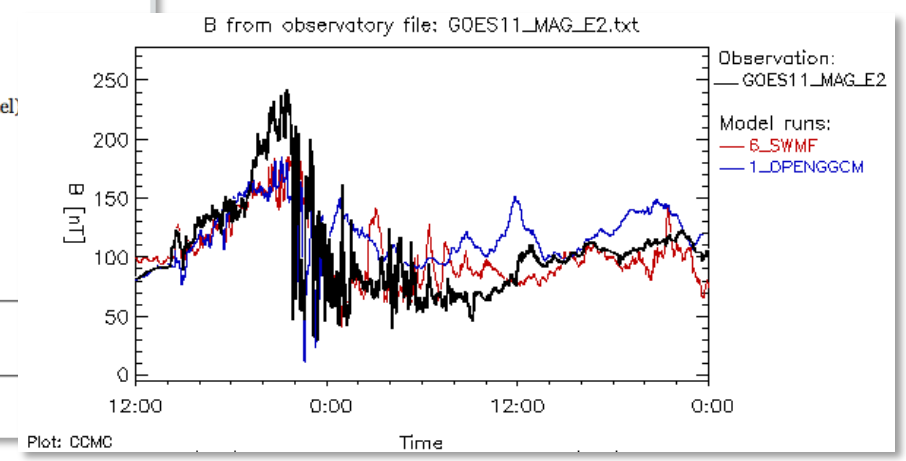


Developer: Richard Mullinix

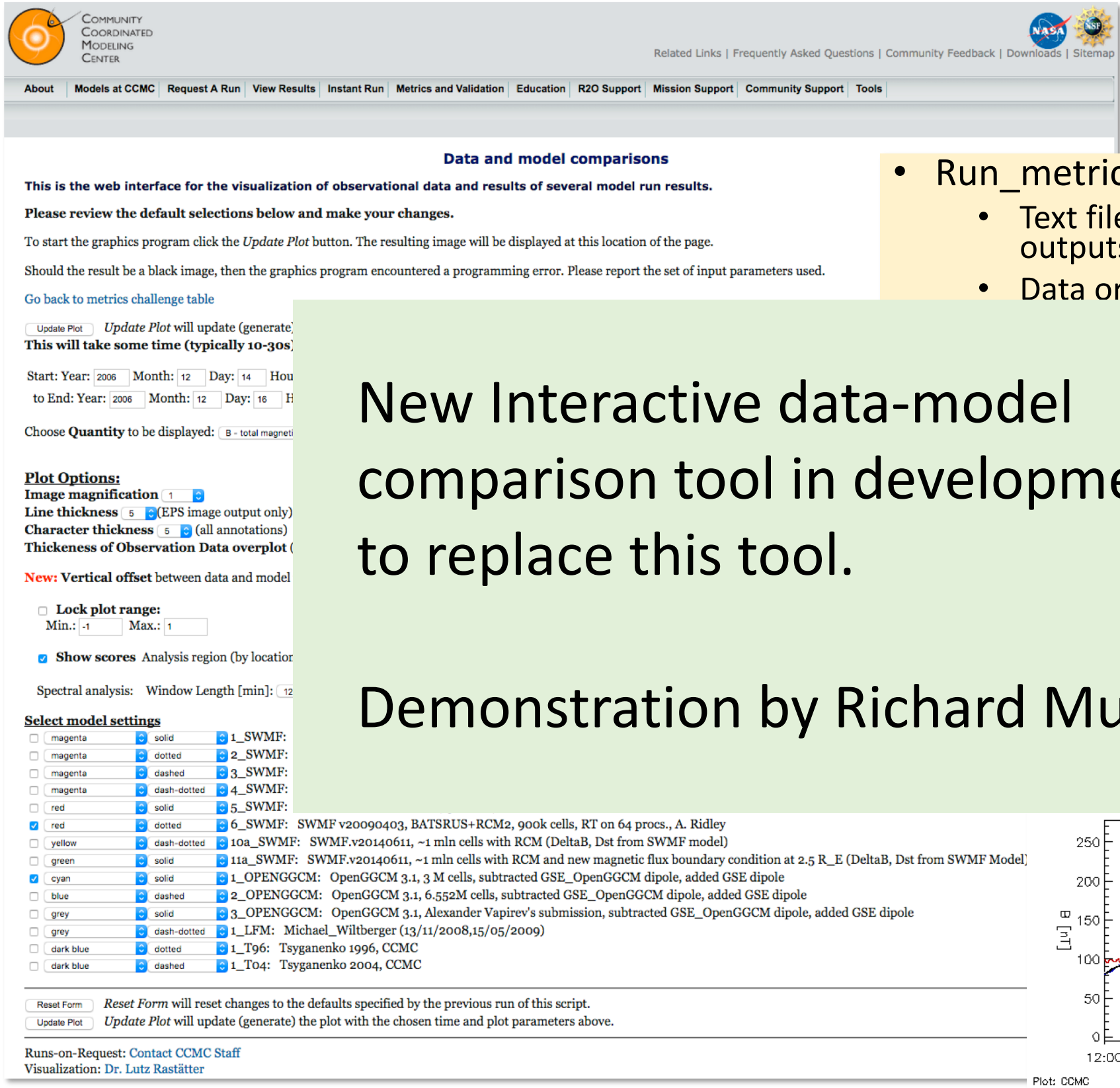
Output Data Visualization: Metrics Vis



- Run_metrics_vis.cgi
  - Text file based (observations or model outputs)
  - Data organized by:
    - Campaign,
    - Metric (type of observed quantity and type of analysis),
    - Event (time interval) and
    - Observatory (spacecraft, magnetometer,…)
- In development:
  - Use iSWA database
  - Allow analysis across multiple events and observatories (e.g. latitude range of magnetometers).



Output Data Visualization: Metrics Vis



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New Interactive data-model comparison tool in development to replace this tool.

Demonstration by Richard Mullinix