Integration of EUHFORIA within the SWOP environment

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10th CCMC Workshop
10th June 2022
Team of 9 scientists covering 7/7, 12/24 + on call during night shifts

Transitioning to full 24/7 monitoring by partnership with the Belgian Defence weather room

We collect, manage and process data

Disseminate SWx information into bulletins, plots, alerts and advisories through ESA, PECASUS, ...
Space weather services, alerts and bulletin

Daily bulletin

Weekly SIDC SWx briefing

Observations

And many more
Data processing, models and tools

Cactus automated CME detection

Jhelioviewer

Dedicated forecaster interfaces

EUHFORIA

And many more
Integration of euHoria

- Automatic daily solar wind run
- Allows forecasters to submit a run (in a similar way to VSWMC)
- Simplified interface containing only key parameters
- Alerts forecasters on progress of run

The form is valid and can be submitted.

Euhoria

RunType
CME Forecast

Time
2022-06-09T15:01:25Z

HeliosphericModelInfo
Low resolution model

Cone_CMEs

Launch_time
2021-09-01T00:00:00.000Z

Latitude_HEEQ

Longitude_HEEQ

Half_width
30

Speed
600

Mass_density
1e-18

Temperature

Today

rwc BOT 3:23 PM
CME run with eventname EUHFORIA_Simulation_2022-06-08T18:00:00Z has started running the empirical model. It is expected that the run is submitted to Spacepole within 15 minutes.

rwc BOT 3:35 PM
CME run with eventname EUHFORIA_Simulation_2022-06-08T18:00:00Z job submitted to SpacePole.
CME run with eventname EUHFORIA_Simulation_2022-06-08T18:00:00Z running at SpacePole.

rwc BOT 4:01 PM
CME run with eventname EUHFORIA_Simulation_2022-06-08T18:00:00Z finished at SpacePole.
Event database collects all run information including all EUHFORIA input parameters, as well as status of the run.

Two-way communication with SpacePole cluster where simulations run.
The event database consists of a larger set of data ranging from sunspots, coronal holes to flares and automated CME detection by Cactus.

Future work:
- Addition of observed CME database including CME kinematics (similar to CCMC DONKI)
- Coupling of the different events within the event database: flares, coronal holes, high speed streams, observed CMEs, simulated CME arrivals and observed CME arrivals
- Preliminary results of EUHFORIA 2.0 project

- Consider observed CME events in August 2010 and July 2012 with speed above 350 km/s and angular width above 60 degrees (74 events)

- RMSE arrival time: 15h
Collaboration ideas

- Scoreboards:
  - Currently SIDC addition to scoreboards is manual. Ideally, this will be automated.
  - Also send to ambient solar wind scoreboard

- A strong need for an updated, easy and ready-to-use GCS fitting tool that automatically pulls data. We hope to be able to collaborate with all interested parties.

- Event database has similarities to DONKI. We can learn from CCMC/M2M knowledge on this matter.

- We want to gain more insight on how flux-rope CMEs affect our prediction capabilities in a forecasting environment.
Thank you. Questions?