CCMC community scoreboards

https://ccmc.gsfc.nasa.gov/challenges/

• Scoreboards collect forecast before event is observed
• Allow a consistent **real-time** comparison of various operational and research forecasts. Complementary to non-real time model assessments.

Leads:
- **Flare Scoreboard**: Trinity College Dublin (S. Murray), ROB (J. Andries)
- **SEP Scoreboard**: BIRA-IASB (M. Dierckxsens, N. Crosby), GSFC (I. Richardson), UK Met Office (M. Marsh)
- **CME Scoreboard**: CCMC (L. Mays), UK Met Office
- **IMF Bz Scoreboard**: GSFC (N. Savani), PredSci (P. Riley), CCMC (L. Mays)
Flare Scoreboard & Working Team

- Allows a consistent real-time comparison of various operational and research flare forecasts.
- Automated system; model developers can routinely upload their predictions to an anonymous ftp.
- Forecast data is parsed and stored in a database which accessible to anyone via an API.
- This project is led by Sophie Murray (TCD) and the planning group includes expert scientists as well as operational space weather prediction centers.
- Collaborating with ISEE/PSTEP "BenchMarks for Operational Flare Forecasts Workshop" study.

https://ccmc.gsfc.nasa.gov/challenges/flare.php
Flare Scoreboard: Probability Timeseries

Full Disk 24 Hour Predictions

https://ccmc.gsfc.nasa.gov/challenges/flare.php
Flare Scoreboard: Sep 2017

Solar Flare Scoreboard

S08W16 Region Flare Predictions (24 hour)

NOAA_1  C : 95%  M : 60%  X : 20%
AMOS_v1 C+ : 94%  M+ : 48%  X+ : 10%

Averages  C : 95%  M : 60%  X : 15%

Region Location Details

NOAA_1
NOAA ARF: 12673 (S08W16), R: 2.99, Beta-Gamma

AMOS_v1
NOAA ARF: 12673 (S08W16), R: 2.99, Beta-Gamma
AMOS_v1 ARF: 0 (S08W16, 2017-09-05 00:00:00.0)

Full Disk 24 Hour Predictions

https://ccmc.gsfc.nasa.gov/challenges/flare.php
Flare Scoreboard: Sep 2017

Full Disk 24 Hour Predictions

Start time (and issue time) of 24-hour prediction window

https://ccmc.gsfc.nasa.gov/challenges/flare.php
Flare Scoreboard: original planning mockup

Solar Flare Scoreboard
Snapshot for prediction window: 2016-08-07 00:00 - 2016-08-07 00:00 from issue time: 2016-08-07 00:00

NOAA Active Region: #12571
Lat: 12 Lon: 4 Radius: 0.7
Mag Class: Beta
NOAA Generated: 2016-08-07

Region Flare Predictions (24 hour)
NOAA.1 [triangle C: 10% M: 1% X: 1%]
AMOS_v1 [C+: 25% M+: 3% X: 0%]
BoM_flare1 [triangle C+: 10% M+: 1% X: 1%]
Averages [triangle C: 10% M: 1% C+: 25% M+: 2% X: 1%]

Full Disk Predictions (24 hour)
MO_TOT1 [circle M: 5% M+: 1% X: 1%]
BoM_flare1 [circle M: 1% X: 1%]
ASSA_24H_1 [square C: 68% M: 15% X: 0%]
AMOS_v1 [circle M: 44% M+: 6% X: 0%]
NOAA_1 [circle M: 1% X: 1%]
Averages [square C: 68% M: 7% C+: 44% M+: 4% X: 1%]

Full Disk 24 Hour Predictions
MC CCC
- [triangle C]
- [triangle C+]
- [circle M]
- [circle M+]
- [circle X]

24 hour - Probability for Full Disk
0% 50% 100%

Issue time and start time of 24-hour prediction window
- [circle M]
- [triangle C]
- [circle M+]
- [circle X]
- [square C+]
- [circle X]

Download Data
{  "HAPI": "1.1",  "catalog": [  {  "id": "SIDC_Operator_FULLDISK",  "title": "SIDC human operator moderated",  "type": "FULLDISK",  "version": "2"  },  {  "id": "SIDC_Operator_REGIONS",  "title": "SIDC human operator moderated",  "type": "REGION",  "version": "2"  },  {  "id": "MO_TOT1_FULLDISK",  "title": "Met Office",  "type": "FULLDISK",  "version": "1"  },  {  "id": "BoM_flare1_FULLDISK",  "title": "Australian Bureau of Meteorology, Space Weather Services Flarecast automatic forecast",  "type": "FULLDISK",  "version": "1"  },  ...
}
The Heliophysics Application Programmer's Interface (HAPI) data access specification is a RESTful API and streaming format specification for delivering digital time series data. The HAPI specification describes a minimum set of capabilities needed for a server to allow access to the time series data values within one or more data collections.
Solar Flare Scoreboard API – DATA (JSON)

&id=NOAA_1_FULLDISK
&time.min=2017-10-25 00:00:00.0
&time.max=2017-10-31 00:00:00.0
&format=json

```json
{
  "HAPI": "1.1",
  "data": [
    [
      "2017-10-25T00:00:00.0",
      "2017-10-26T00:00:00.0",
      "2017-10-22T22:00:00.0",
      0.1,
      0.01
    ],
    [
      "2017-10-25T00:00:00.0",
      "2017-10-26T00:00:00.0",
      "2017-10-24T22:00:00.0",
      0.01,
      0.01
    ],
    [
      "2017-10-26T00:00:00.0",
      "2017-10-27T00:00:00.0",
      "2017-10-24T22:00:00.0",
      0.01,
      0.01
    ],
    [
      "2017-10-27T00:00:00.0",
      "2017-10-28T00:00:00.0",
      "2017-10-24T22:00:00.0",
      0.01,
      0.01
    ]
  ]
}
```

**Input Parameter:**
- id (required)
- time.min (required)
- time.max (required)
- format (csv or json)
- parameters (optional)

**JSON returned:** Data + Info
&id=NOAA_1_FULLDISK
&time.min=2017-10-25 00:00:00.0
&time.max=2017-10-27 00:00:00.0
&format=csv

#{
  "HAPI": "1.1",
  "format": "csv",
  "parameters": [
  {
    "fill": null,
    "length": 22,
    "name": "start_window",
    "type": "isotime",
    "units": "UTC"
  },
  {
    "fill": null,
    "length": 22,
    "name": "end_window",
    "type": "isotime",
    "units": "UTC"
  },
  {
    "fill": null,
    "length": 22,
    "name": "issue_time",
    "type": "isotime",
    "units": "UTC"
  },
  {
    "fill": null,
    "name": "M",
    "type": "double",
    "units": "probability"
  }
  
  
}

startDate: "2016-05-02T00:00:00.0",
status: {
  "code": 1200,
  "message": "OK"
},
stopDate: "2017-11-02T00:00:00.0"
}
Summary of flare scoreboard status

- Available since Fall 2016
- Probability time series plot now available
- API to download original files via iSWA
- Scoreboard specific API to download datastream (HAPI compliant)
- FTP server back online, more streams will be visible in real-time and old data backfilled

Future & Discussion

- Improve probability time series plot: your ideas?
- Adding new prediction methods/participants (e.g. from Flarecast, A-EFFORT)
- Create flare scoreboard mailing list for discussion
- Collaborate/support verification projects using the scoreboard