UV/EUV solar spectral imaging data for space weather
Datasets and tools at MEDOC

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with:

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Solar UV data for space weather

- UV solar data is *relevant for space weather*
  - Space weather-generating solar dynamic *events* are *visible in UV*: flares, filament eruptions, CMEs...
  - *UV flux is a component of space weather*: ionosphere conductivity, upper atmosphere heating and chemistry...
- *Continuous coverage* by space UV imagers and spectrographs, data publicly accessible, possibly with *short delays*.
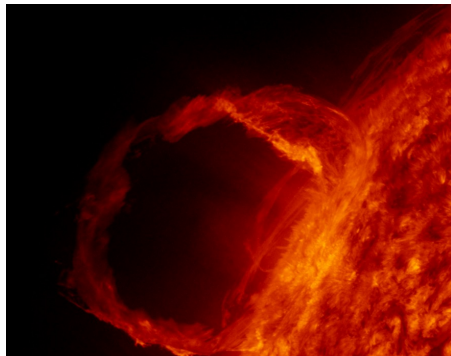
SDO/AIA 30.4nm, 30 Mar 2010

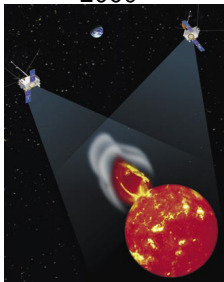# Data at MEDOC and redistribution tools

Data currently available at MEDOC

Focus on *UV and EUV* from space instruments: images, spectroscopy (+some visible, magnetometry, and particle data):
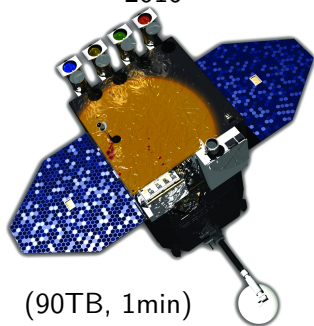
SOHO
1995–

STEREO/SECCHI
2006–

SDO/AIA
2010–

(all instruments)

(40TB)

(90TB, 1min)

and also TRACE, CORONAS-F/SPIRIT.

Data redistribution by web interfaces

Reliable, ergonomic, and responsive web interfaces
based on the CNES SiTools framework. Try it at the fair!

Data redistribution by web services

- ▶ SiTools has integrated *web services*
- ▶ IDL and Python *clients for these web services* have been developed for advanced uses

```
1  from sitools2.clients.sdo_client_medoc import *
2  d1 = datetime (2012, 11, 21, 0, 0, 0)
3  d2 = d1 + timedelta (days=1)
4  sdo_data_list = search (DATES=[d1,d2], WAVES=['335'], CADENCE=['6 h'])
5  for item in sdo_data_list:
6      sdo_metadata = item.metadata_search (KEYWORDS=['quality', 'cdelt1', 'crval1'])
7      if (my_meta_search['quality'] == 0):
8          item.get_file (TARGET_DIR='data/')
```

Processed and value-added data

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- ▶ *SOHO/EIT and combined SOHO+STEREO UV imagers movies*

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▶ *Database of solar wind model profiles (Grappin et al.)*

Processed and value-added data

- SOHO/EIT and combined SOHO+STEREO UV imagers movies
- Database of solar wind model profiles (Grappin et al.)
- *(EM, T) maps computed from SDO/AIA (Guennou et al. 2012)*

Temperature
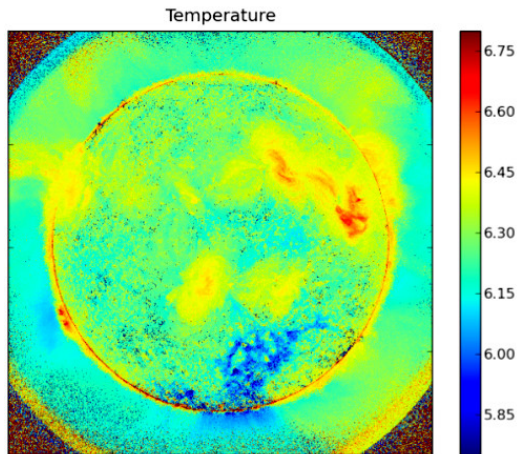
Processed and value-added data: coming soon

- ▶ SDO/AIA synoptic maps, and on-demand movies
- ▶ Database of automatically-detected filaments
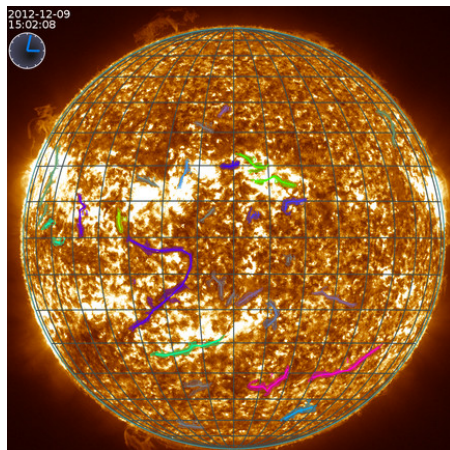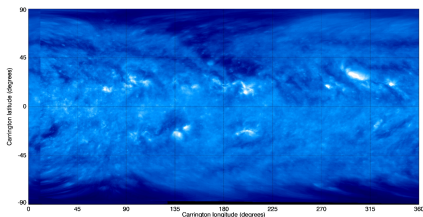
Filament detections in He II 30.4 nm

- ▶ Filament material can be ejected ⟶ CME ⟶ space weather
- ▶ Need to *predict* or at least *detect* eruptions in real-time
- ▶ *30.4nm* vs. H α: more challenging, but perfect data availability!

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1. SDO/AIA 2. Image processing

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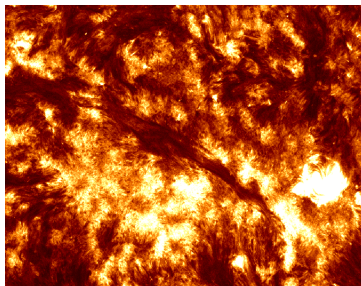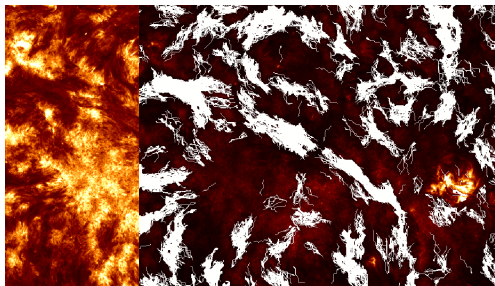1. SDO/AIA 2. Image processing

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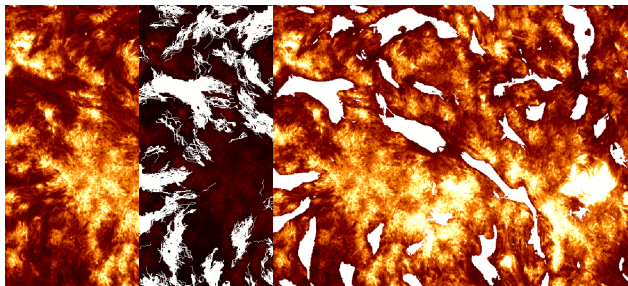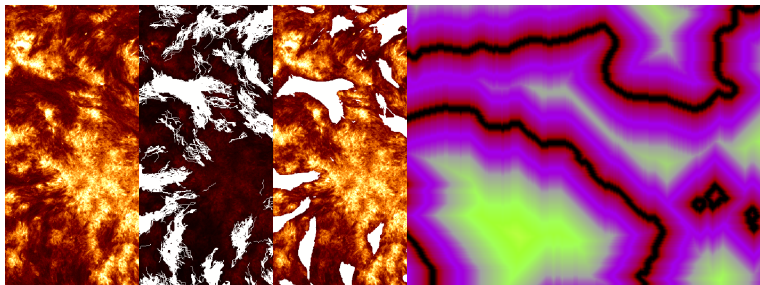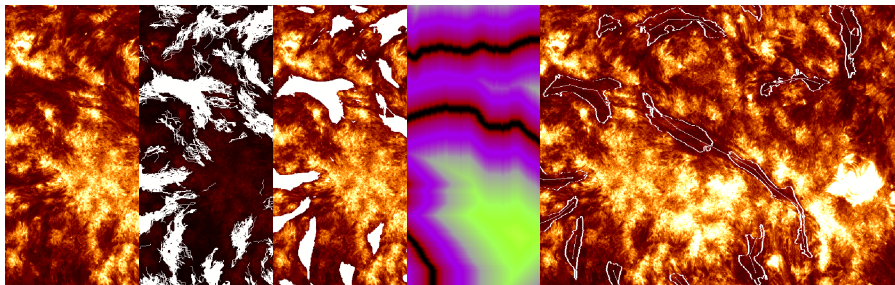
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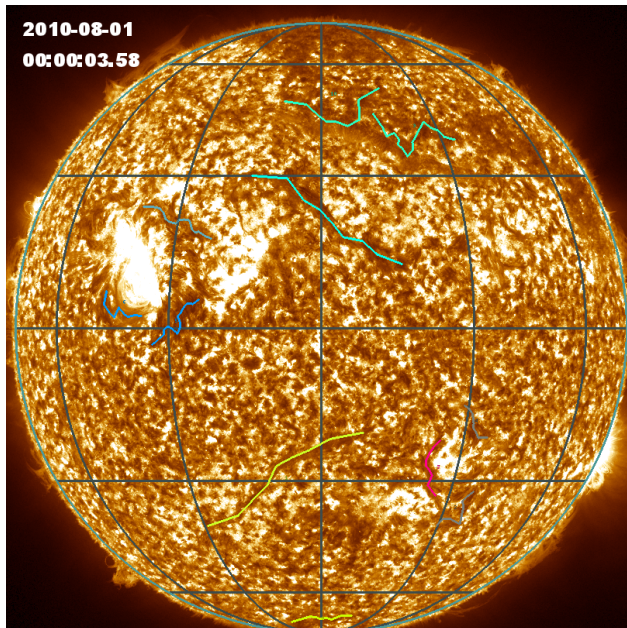1. SDO/AIA   2. Image processing   3. SDO/HMI PIL   4. Filaments

Result of filament detections and tracking

2010-08-01
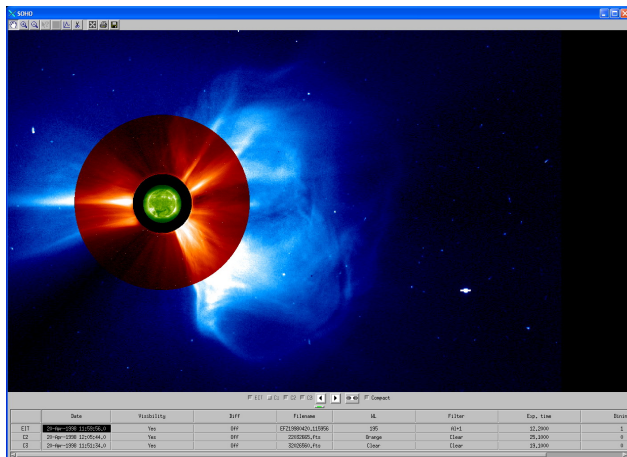00:00:03.58

Visualization and analysis tools

Tools for data visualization and analysis

▶ FESTIVAL: multi-instrument visualization and data analysis

▶ Coming soon: a Helioviewer server (for redundancy / load balancing)

Conclusion

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- ▶ *UV data* are not only useful for science,
  they are also *strategic for space weather*,
  and *continuous observations should be made perennial*
- ▶ Data are *available to space weather users*
  (and sometimes with short enough delays — not always…)
- ▶ The MEDOC data and redistribution system are a *valuable asset*
  for the scientific community and space weather users, thanks to
  - ■ *long-term commitment* between all partners
    (CNES, INSU/CNRS and Univ. Paris-Sud).
  - ■ *technical mutualization* with IDOC at IAS
    (CoRoT, Mars Express, Planck, Herschel…)

Visit us at our fair stand on Wednesday
and at
`https://idoc.ias.u-psud.fr/MEDOC`