This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824135.

WP10 Virtual Access

Forum on Telescopes & Databases, November 2021

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5 data archives

- Hinode Science Data Centre Europe (Hinode SDC), UiO
- Belgian Web Incessant Screening for SDO Mission (BE-WISSDOM), ORB
- Stockholm SST Archive, SU
- IBIS Data Archive (IBIS-A), INAF
- GRIS Data Archive, KIS

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Hinode Science Data Centre Europe (UiO)

- Hinode
- IRIS
- Numerical simulations (Bifrost, MURaM, SOLARNET)
- SST (Oslo/Lockheed campaigns)
- ALMA
- New search interface
- Ingestion of events from HEK
- Detect spatial/temporal overlap

Hinode Science Data Centre Europe

Welcome

Welcome to the Hinode Science Data Centre Europe, a joint project between Norway and the European Space Agency (ESA). The data centre is run by the Institute of Theoretical Astrophysics at the University of Oslo on behalf of the Norwegian Space Centre (NSC).

Hinode (Sunrise in Japanese) is a project to study the Sun, led by the Japanese Aerospace Exploration Agency (JAXA) in collaboration with NASA, the Science & Technology Facilities Council (STFC), and the European Space Agency (ESA). Hinode is equipped with three solar telescopes (EIS, SOT and XRT), and was launched from Uchinoura Space Center on 22 September 2006 at 21:36 UT.

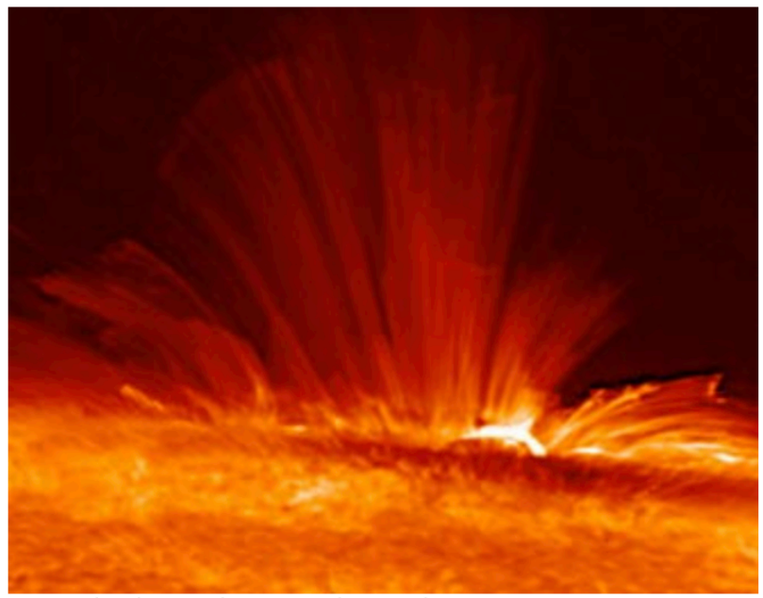

Image taken by Hinode SOT. Credit: Hinode JAXA/NASA

We now have IRIS level 2 data!

This means we are no longer a single-mission archive. The process of incorporating IRIS data into the archive has been an eye-opener – we think we have learned a lot from the many mistakes that became obvious during the process. The experience will be very useful for the future inclusion of other solar observations in the archive.

We now also have BIFROST and MURaM simulation data

There is another IRIS archive at Lockheed Martin Solar and Astrophysics Laboratory (LMSAL), which we think has some nice features that we hope to incorporate in our archive at some point. For details about the IRIS mission, go to iris.lmsal.com.

Feel free to go straight to our search page

If you wish to be kept informed about future developments and improvements at the Hinode Science Data Centre Europe, please subscribe to our email list. You may also want to:

- Check our web statistics
- Take our user survey
- Read about the release of version 1.9

When you publish your work on Hinode data, we would like to ask you to acknowledge the Hinode mission using one of the two following texts:

- *Hinode* is a Japanese mission developed and launched by ISAS/JAXA, with NAOJ as domestic partner and NASA and STFC (UK) as international partners. It is operated by these agencies in co-operation with ESA and NSC (Norway).
- *Hinode* is a Japanese mission developed and launched by ISAS/JAXA, collaborating with NAOJ as a domestic partner, NASA and STFC (UK) as international partners. Scientific operation of the Hinode mission is conducted by the Hinode science team organized at ISAS/JAXA. This team mainly consists of scientists from institutes in the partner countries. Support for the post-launch operation is provided by JAXA and NAOJ (Japan), STFC (U.K.), NASA (U.S.A.), ESA, and NSC (Norway).

See also the NAOJ page with instructions for Hinode data users.

http://sdc.uio.no/

Hinode SDC Europe – Archive Search

39.186 million files, 2006/10/18—2021/11/11, v 2.0

425107 groups w/21156449 matching files (53.99% of all files) – 0.35 seconds.

Search | Reset | Full reset | TinyURL!

Instruments: IRIS/SJI | IRIS/SPEC | EIS | XRT | SOT(all) | SOT/NFI(NB) | SOT/BFI(WB) | SOT/SP

EPOCH_START :
EPOCH_END : +1.0 day

POINT_xy :
CEN_RADIUS :
FOVX :
FOVY :
MAX_RADIUS :
MIN_RADIUS :
XCEN :
YCEN :
EXPTIME :

EIS line fit thumbs selection

Ca XVII 192.82
Fe XII 195.12
He II 256.32
Fe XI 180.40

... or max: 3

Maps: Velocity

Add field to show (*?[] allowed)

STATUS:
Quicklook
Level 0
Level 2

TR_MODE:
FIX
MISSING
NA
TR1
TR2
TR3

Show (deselect to remove):
FILE
INSTRUME
DATE_OBS
EXPTIME
IR__SUMSPAT
IR__SUMSPTRF
CDELT3

Auto-include search fields
Show thumbnails

SOT/SP level 1/1D options

Show level 1 leads only

Continuum intensity
Long. apparent flux density
Transv. apparent flux density
Velocity (6301.5)
Stokes I [lines]/conti

Grouping: Fine

Expand result to include whole group: None

Sort order: DATE_OBS | Descending

Lines/page: 10

Quick hints

Each box like this forms a single criterion

- Blank/unfilled criteria are ignored
- There are ***no mandatory criteria***
- It's ***perfectly fine*** to select millions of files
- Used criteria (i.e. all boxes) are combined with AND
- Instrument-specific criteria only rejects among its 'own' files
- Enable tooltips & hover over a keyword/texbox for more info
- Criterion colour coding after checking w/server:

Blank/ignored | Used, ok | Orthogonal | Empty | Malformed

'Orthogonal' criteria reject all files when combined with all other criteria. 'Empty' criteria reject all possible files (separately).

Examples/recommended searches

Find more search criteria: Add new search criteria (*?[] allowed)

More search criteria:

FITS | Plan | Quality | Misc | EIS | IRIS | XRT | SOT

Save as: Search 1

Search | Reset | Full reset | Home | User Survey | Hinode Europe

http://sdc.uio.no/search/form

```
Search statistics:
*** Ran 7 queries.
*** 0 queries used more than 0.1 seconds.
*** Total query time:    0.044 seconds.
*** Total elapsed time:  0.076 seconds.
```


Problems, questions, suggestions and comments to: oslo-sdc@astro.uio.no

Step 1: Select simulation

The following simulations are available, please select one (BIFROST simulations unless otherwise specified in the description)

(•) en024048_hion	24 x 24 x 17 Mm^3 with 48 km horizontal resolution and 19–100 km vertical resolution. 504x504x496 grid points. Average unsigned magnetic field strength in the photosphere is 5 mT (50 G) with two dominant opposite polarity regions 8 Mm apart – enhanced network. Non-equilibrium hydrogen ionization included.
( ) ch024031_by200bz005	24 x 24 x 17 Mm^3 with 31 km horizontal resolution and 12–82 km vertical resolution. 768x768x768 grid points. Average unsigned magnetic field strength in the photosphere is 4 mT (40 G) with no large scale magnetic field. The average signed magnetic field strength is 5 G mimicking a coronal hole. At the bottom boundary (2.5 Mm below the surface), a horizontal field of 200 G along the y-axis is fed into the inflows such that the field-strength is slowly increasing with time and there are interactions between the existing field and the flux emergence. Hydrogen is treated in LTE.
( ) en096014_gol	2D run: 96 x 43 Mm with 14 km horizontal resolution 12–70 km vertical resolution 6930x1554 grid points. The mean unsigned field at the photosphere is ~19 mT (190 G) with two dominant medium size opposite polarity regions (~5–10 Mm) 40 Mm apart Hydrogen and Helium are treated in LTE. Ion neutral interaction effects are taken into account using a Generalized Ohm's Law which includes the ambipolar diffusion and Hall term. Time series. Time step 280 includes the artificial diffusion, for easy comparison with the figures in the Science paper (Martinez-Sykora et al 2017). Time step 308 includes synthetic intensities included for Fe IX 171, SI IV 1402, Mg II h & k and Ca II 8542.
( ) en096014_nongol	As en096014_gol but without Ion-neutral interaction effects.
( ) qs006005_dyc	3D run: 6 x 6 x 10.5 Mm with 5 km horizontal resolution 4–20 km vertical resolution 1200x1200x1736 grid points. The mean unsigned r.m.s. field at the photosphere is ~5.6 mT (56 G) developed via local dynamo. Hydrogen and Helium are treated in LTE. Ion neutral interaction effects are not taken into account.
( ) qs024048_by3363	24 x 24 x 17 Mm^3 with 48 km horizontal resolution and 19–100 km vertical resolution. 504x504x496 grid points. Initial atmosphere with very weak field (0.1 G). At the bottom boundary (2.5 Mm below the surface), a horizontal field of 3363 G along the y-axis between x=4 Mm and x=16 Mm is fed into the inflows such that the field-strength is slowly increasing with time and there are strong interactions between the existing field and the flux emergence, giving rise to Ellerman Bomb and jet like phenomena. Hydrogen is treated in LTE.
( ) ar098192	98 x 49 x 49 Mm^3 with 192 km horizontal resolution and 64 km vertical resolution. 512x256x768 grid points. Simulation made with the **MURaM** code in the Heliophysics Grand Challenge Research project. The simulation box contains an active region and a flare (equivalent to a GOES M class) driven by an emerging eruption. The setup is inspired by NAOAA Active region 12017 that appeared in late March and early April 2014. Gray radiative transfer and hydrogen treated in LTE.

Hansteen et al 2017, ApJ 839:22

Cheung et al 2019, Nature Astronomy 3:160

Step 2: Select variables/radiative transfer products for en024048_hion

Atmospheric variables (481MB per time step per variable)

- [ ] lgr $\log_{10}$(mass density)
- [ ] ux bulk velocity in x
- [ ] uy bulk velocity in y
- [ ] uz bulk velocity in z
- [ ] lge $\log_{10}$(internal energy)
- [ ] bx magnetic field strength in x
- [ ] by magnetic field strength in y
- [ ] bz magnetic field strength in z
- [ ] lgne $\log_{10}$(electron density)
- [ ] lgp $\log_{10}$(gas pressure)
- [ ] lgtg $\log_{10}$(temperature)
- [ ] lgn1 $\log_{10}$(population density in ground state of hydrogen)
- [ ] lgn2 $\log_{10}$(population density in n=2 state of hydrogen)
- [ ] lgn3 $\log_{10}$(population density in n=3 state of hydrogen)
- [ ] lgn4 $\log_{10}$(population density in n=4 state of hydrogen)
- [ ] lgn5 $\log_{10}$(population density in n=5 state of hydrogen)
- [ ] lgn6 $\log_{10}$(population density of protons)

Radiative transfer products (550MB–650MB per time step per product)

Atomic model: Mg_II with 10 levels, Mg_III with 1 level

- [ ] intensity intensity as a function of wavelength
- [ ] zt1 height of tau=1 as a function of wavelength

Proceed to select time steps

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Numerical Simulations

Simulation name	Domain (Mm)	(x,y) resolution (km)	Timespan (minutes)
en024048_hion	24 x 24 x [-2.5, 14]	48	26
en024048_hion	MgII h&k synthetic obs	48	26
en096014_gol	90 x [-2.5, 40]	14	15
ch024031_by200bz005	24 x 24 x [-2.5, 14]	31	103
qs006005_dyc	6 x 6 x [-2.5, 8]	5	5
qs024048_by3363	24 x 24 x [-2.5, 14]	48	17
ar098192 flare (MURaM)	98 x 49 x [-7.5, 41.6]	192	36 11 snaps, Δt=10-800s