



Resources for JULES*

Heather Ashton, Kerry Day

JULES Short Course

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*Or what do I need to run JULES?



Overview

- What do I need to run JULES?
- FCM
- Rose and Cylc
- Virtual Machine
- Support

What do I need?

Code

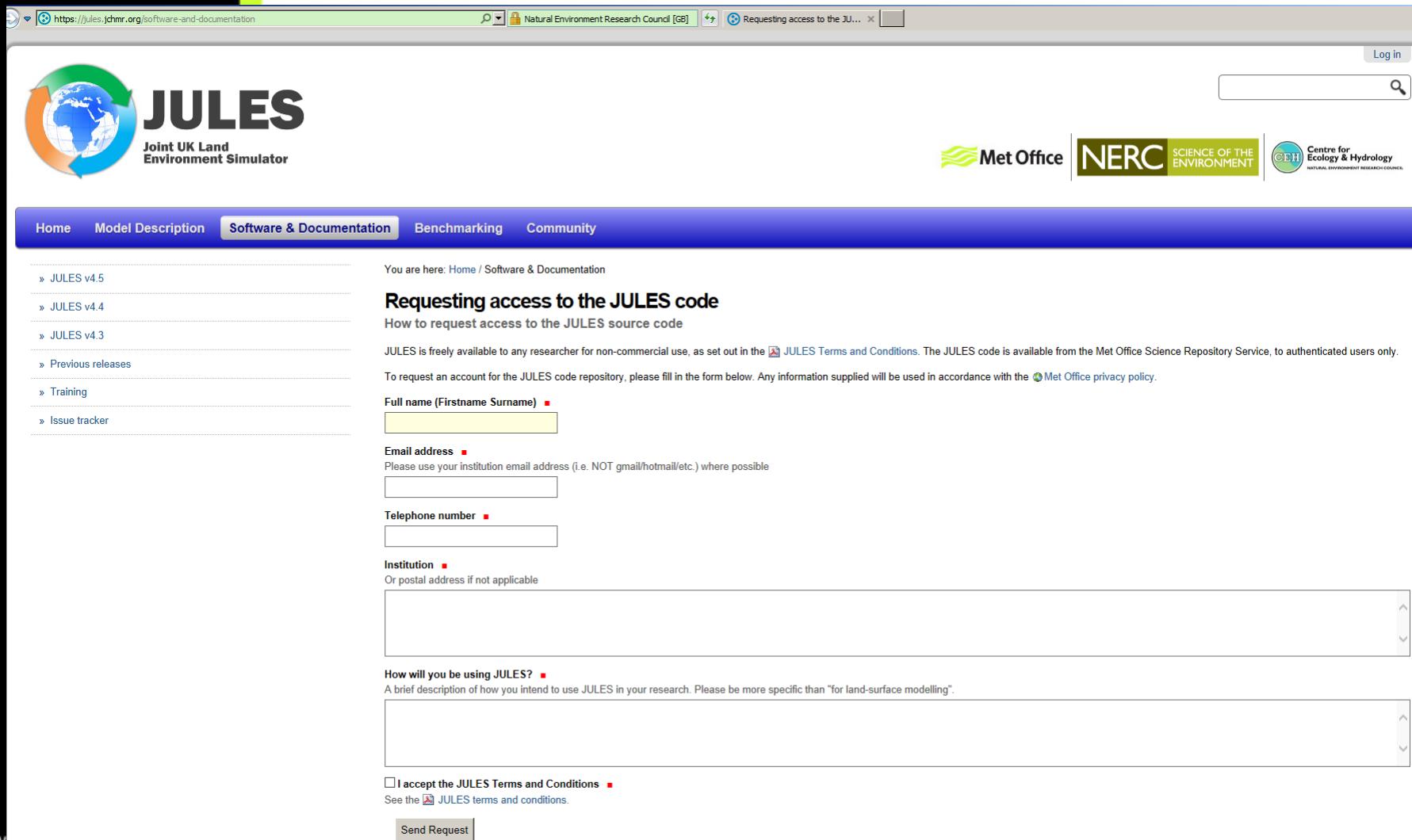
Driving data

Ancillaries

Configurations

Getting the code

<https://jules.jchmr.org/software-and-documentation>



The screenshot shows a web browser window with the URL <https://jules.jchmr.org/software-and-documentation>. The page features the JULES logo (Joint UK Land Environment Simulator) and navigation links for Home, Model Description, Software & Documentation, Benchmarking, and Community. The main content area is titled "Requesting access to the JULES code" and includes a form for requesting access. The form fields are: Full name (Firstname Surname), Email address, Telephone number, Institution, and How will you be using JULES?. There is also a checkbox for accepting the JULES Terms and Conditions and a "Send Request" button.

You are here: [Home](#) / [Software & Documentation](#)

Requesting access to the JULES code

How to request access to the JULES source code

JULES is freely available to any researcher for non-commercial use, as set out in the [JULES Terms and Conditions](#). The JULES code is available from the Met Office Science Repository Service, to authenticated users only.

To request an account for the JULES code repository, please fill in the form below. Any information supplied will be used in accordance with the [Met Office privacy policy](#).

Full name (Firstname Surname)

Email address
Please use your institution email address (i.e. NOT gmail/hotmail/etc.) where possible

Telephone number

Institution
Or postal address if not applicable

How will you be using JULES?
A brief description of how you intend to use JULES in your research. Please be more specific than "for land-surface modelling".

I accept the JULES Terms and Conditions
See the [JULES terms and conditions](#).



Met Office Science Repository Service (MOSRS)

<https://code.metoffice.gov.uk>



[Login](#) | [Preferences](#) | [Help/Guide](#) | [About Trac](#)

[Wiki](#) | [Timeline](#) | [Search](#)

[Start Page](#) | [Index](#) | [History](#)

wiki: [WikiStart](#)

Met Office Science Repository Service

This system supports collaborative development between the Met Office and partner organisations. To register for an account please see the instructions in the [general questions & answers](#).

General Information

[Getting Started + General Questions & Answers](#) (last modified: 2016-04-11)

[List of Projects](#) (last modified: 2016-06-07)

[List of Users](#)

Useful information on password caching

Service Announcements

Maintenance Window

Planned maintenance usually takes place between the hours of 09:00 and 12:00 UK time on the second Tuesday each calendar month

Reminder: changing your password

If you cache your password using GNOME keyring, remember to [update this cache](#) when you change your Science Repository Service password.

News

Notice date	Item
2016-06-16	Cube Browser version 1.0 released in June 2016
2016-06-08	The Joint UM Partner Science programme (JUMPS) Trac environment is now live
2016-06-08	The LFRic Trac environment is now live
2016-05-27	The Global Seasonal Forecasting System (GloSea5) Trac environment is now live
2016-05-05	The Regional Model Evaluation and Development (RMED) Trac environment is now live
2016-03-03	Updated advice on setting up FCM keywords
2016-02-22	The GMED and Air Quality for Copernicus Trac environments are now live.
2016-01-05	The VER , SURF NWPscience and VarPy Trac environments are now live.
2015-09-10	The VAR and OPS Trac environments are now live.
2015-06-17	A minor upgrade to Trac was applied to fix a problem with truncated files (see admin:#53).
2015-04-24	The socrates Trac environment is now live.
2015-04-20	Updated guidance on Rose suites has been issued.
2015-03-23	Instructions for password caching on Monsoon & JASMIN added + updated gpg-agent instructions.
2015-02-02	The GA , GL , GO , GSI and ModelEval Trac environments are now live.
2015-01-13	The Technical Infrastructure Programme Trac environment is now live.
2014-12-18	The UK Earth System Model Trac environment is now live.
2014-11-26	The GCOM project is now live.
2014-11-07	The JULES project is now live.
2014-11-03	First live project: um:/ .

Support



FCM

Q. **What is it?** A. **version control system (subversion)**

Allow users to:

- Share code and encourage collaboration.
- Track the progression and incremental changes to versions/revisions of code.
- Allow multiple flavours of the some code to investigate the impact of a change.
- Traceability of work, for example what version of the code was used and when.
- To revert a change, branch from a version, merge in changes etc.

FCM is simply a wrapper for the version control system with features added to make it easier for the user to manage the code.

More info at: http://metomi.github.io/fcm/doc/user_guide/



Met Office

Accessing to the Repository...

```
$ fcm ls https://code.metoffice.gov.uk/svn/jules/main/trunk
benchmark/
bin/
etc/
includes/
rose-meta/
rose-stem/
src/
utils/
$
$ █
```

It is useful to set up FCM location keywords for the JULES code and documentation projects. This enables the usage of:

```
$ fcm ls fcm:jules.x_tr
```

Instead of:

```
$ fcm ls https://code.metoffice.gov.uk/svn/jules/main/trunk
```

See <https://code.metoffice.gov.uk/trac/jules/wiki/JULESKeywords> for setup



Accessing to the Repository...

Met Office

1. `fcms branch-create <branch name> <source>`

```
$ fcms bc jules_training https://code.metoffice.gov.uk/svn/jules/main/trunk
[info] Source: https://code.metoffice.gov.uk/svn/jules/main/trunk@4225 (4229)
[info] emacs: starting commit message editor...
Change summary:
-----
A https://code.metoffice.gov.uk/svn/jules/main/branches/dev/heatherashton/r4225_jules_training
-----
Commit message is as follows:
-----
branch created for demo'ing
Created /main/branches/dev/heatherashton/r4225_jules_training
-----
Create the branch?
Enter "y" or "n" (or just press <return> for "n") :
-----
Committed revision 4230.
[info] Created: https://code.metoffice.gov.uk/svn/jules/main/branches/dev/heatherashton/r4225_jules_training
$
```



source: **main / branches / dev / heatherashton**

Name ▲
↑ ../
▶ r359_vanilla
▶ r2248_jules_shetran
▶ r2875_jules_shetran
▶ r3853_vn4_5_vanilla
▶ r4225_jules_training
▶ vn3.1_lisfloodjules
▶ vn3.4.1_vn3.4.1_1km_soiltiling



Met Office

Accessing to the Repository...

2. fcm checkout <JULES URL> <branch name>

```
$ fcm co https://code.metoffice.gov.uk/svn/jules/main/branches/dev/heatherashton/r4225_jules_training
```

```
A r4225_jules_training/utils
A r4225_jules_training/utils/mpi_dummy
A r4225_jules_training/utils/mpi_dummy/mpi_mod.F90
A r4225_jules_training/utils/mpi_dummy/mpi_routines.F90
A r4225_jules_training/utils/drhook_dummy
A r4225_jules_training/utils/drhook_dummy/yomhook.F90
A r4225_jules_training/utils/drhook_dummy/parkind1.F90
A r4225_jules_training/utils/netcdf_dummy
A r4225_jules_training/utils/netcdf_dummy/jules_netcdf_dummy.F90
A r4225_jules_training/includes
A r4225_jules_training/includes/shared
```

■ ■ ■

```
A r4225_jules_training/rose-stem/include/queues.rc
A r4225_jules_training/rose-stem/include/variables.rc
A r4225_jules_training/rose-stem/rose-suite.conf
A r4225_jules_training/rose-stem/meta
A r4225_jules_training/rose-stem/meta/rose-meta.conf
A r4225_jules_training/rose-stem/bin
A r4225_jules_training/rose-stem/bin/gen_gswp2_drive_file
A r4225_jules_training/rose-stem/bin/suite_report.py
A r4225_jules_training/rose-stem/bin/compare_all
A r4225_jules_training/rose-stem/suite.rc
```

```
U r4225_jules_training
Checked out revision 4230.
```

```
$ █
```

```
$ pwd
/data/local/hashton/code/jules/external_repos/r4225_jules_training
$ ls
benchmark bin etc includes rose-meta rose-stem src utils
```

Driving Data

Some examples...

WFDEI: WATCH Forcing Data methodology applied to ERA Interim reanalysis data.

- 33 years (1979 – 2012), 3 hourly, half-degree (~ 50 x 50 km) global forcing dataset.

Weedon *et al.* (2014), The WFDEI meteorological forcing data set: WATCH Forcing Data methodology applied to ERA-Interim reanalysis data, *Water Resour. Res.*, 50, 7505–7514

CHES-met: Climate Hydrology Ecology Support System

- 52 years (1961 – 2012), daily 1km UK forcing dataset.

<https://catalogue.ceh.ac.uk/documents/80887755-1426-4dab-a4a6-250919d5020c>

Robinson *et al.* (2016) Trends in evaporative demand in Great Britain using high-resolution meteorological data. *Hydrology and Earth System Sciences Discussions*.

Loobos: Fluxnet site, Netherlands. 20 year (1996-2015), hourly single point dataset. <http://fluxnet.ornl.gov/site/667>

Ancillaries

- Met Office is currently working on a new ancillary toolkit, 'ANTS', which is Python-based, work in progress.
- Currently putting together global ancillaries to work with WFDEI driving data.
- Existing ANCIL is on MOSRS but needs MONSOON
- Suggested (gridded) datasets:

Soil – HWSD soil textures + functions by Cosby et al. (1984)

<http://webarchive.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/>

Vegetation fractions – Various datasets that use IGBP vegetation classes. These can be mapped onto JULES surface types (see Jones 2008) e.g. MODIS

Domain latitude/longitude/land – Also required but can be derived from driving data dimensions.

Configurations

- Settings, switches, parameter values etc.
- **NOT** the code!
- Contained within the JULES namelists
- Details in the JULES Users Guide (here for vn4.5):

<http://jules-lsm.github.io/vn4.5/namelists/contents.html>

- Examples on the JULES MOSRS page:

<https://code.metoffice.gov.uk/trac/jules/browser/doc/trunk>

Standard Rose suites- Please add your own here to help others!

There are some standard Rose suites for standalone JULES, all hosted in the MOSRS `roses-u` repository:

Suite ID	Configuration / GL version	Forcing	Platform	Suite revision for JULES versions
u-ad408	N/A	CRU-NCEP	Met Office Cray XC40	4.5
u-aa797	GL6.0	WFDEI	Met Office Cray XC40	4.5 : r7346
u-aa798	GL6.0	WFDEI	Met Office Linux	4.5 : r7351
u-aa799	GL6.0 (no TOPMODEL)	GSWP2	JULES VM	4.5 : r7352
u-ae053	GL4.0	Loobos	JULES VM	4.5 : r13659
u-ab236	N/A	WFDEI	Met Office Cray XC40	4.4 : r4821

Rose and Cylc

What is Cylc?

- A scheduling system for running suites, initially designed for meteorological data.
- cylc makes your Rose stuff happen!

What is Rose?

- A user friendly interface to Cylc
- Provides useful tools such as;
- Rosie go - a GUI based browser for finding suites
- Rose edit - a GUI based suite editor
- Rose Bush - a web browser for looking at output from suites
- roses/ - a directory where the suite can be edited and run from

A Rose suite is a collection of events (tasks/applications) that need to be performed in a specific order.

(where and 'event' can be: triggering JULES to compile, setting a parameter, reading in a file etc.)

Why Rose?

Advantages:

- Traceability, means you can prove the exact configuration and version that was run
- Everything is text based
- Nothing is hidden
- Useful GUI's to support changes
- GUI's to check that the suite matches the metadata and the suite can run
- rose-stem tests
- Helpful tools
- Can be run/demo'd on a Virtual Machine
- A big database of examples, previously run suites and standard configurations



Met Office

Why not Rose?

Disadvantages:

- New so takes effort to learn
- Needs to be configured at your site (but support can be provided).
- Need an (MO)SRS account (but you need this anyway to access JULES!)

create_rose_app

Script which creates a JULES Rose suite from existing namelists (vn3.4 or later)

Two arguments:

- The JULES version that the namelists work at (vn3.4 or later)
- The JULES version that the Rose suite should be at (vn4.0 or later)
- To convert namelists to a Rose suite without upgrading the version, just give the same version for both.

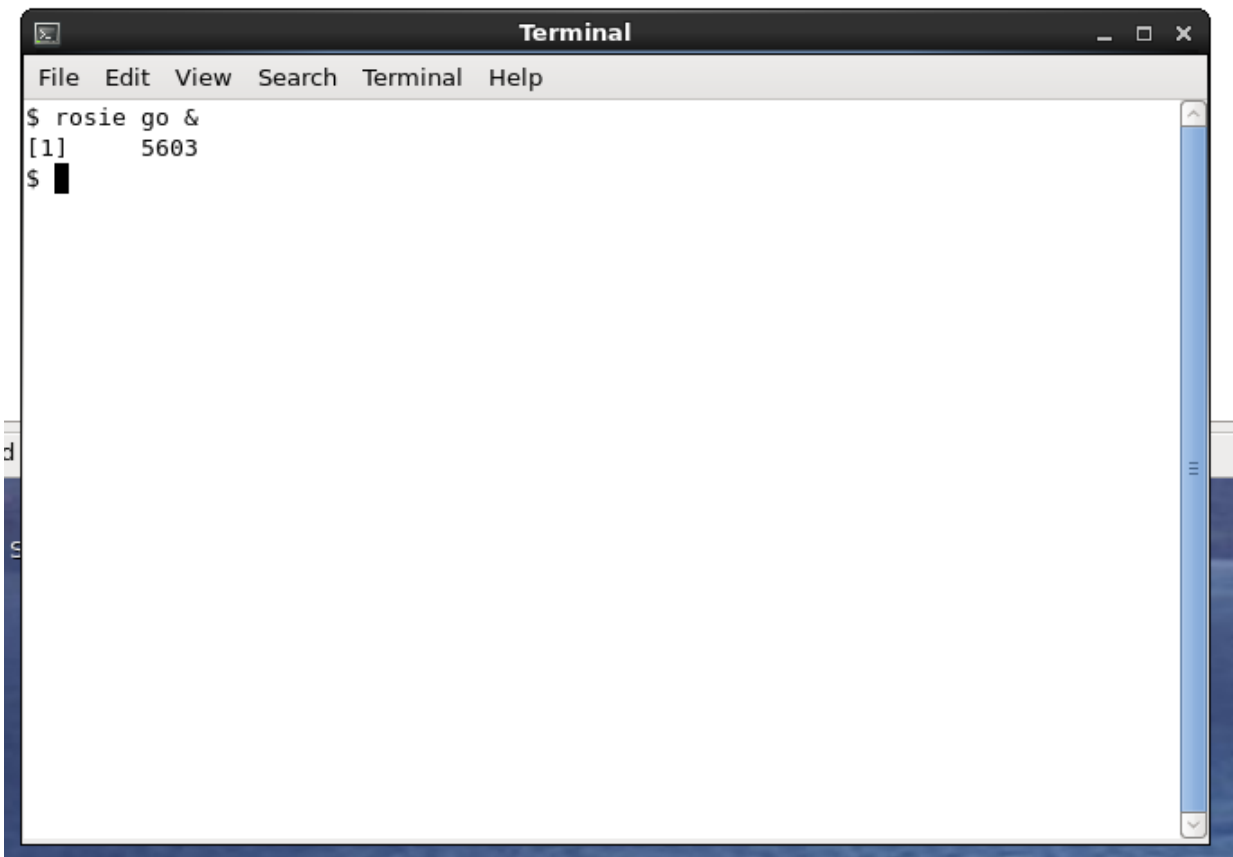
```
# This will convert vn3.4 namelists to a vn4.1 Rose suite  
$JULES_ROOT/bin/create_rose_app vn3.4 vn4.1  
  
# This will convert vn4.1 namelists to a vn4.1 Rose suite  
$JULES_ROOT/bin/create_rose_app vn4.1 vn4.1
```

\$JULES_ROOT = <path to jules source>

Using an existing Rose suite

Rose suites for JULES standalone live in their own repository

We will use 'rosie go' to get hold of an appropriate suite....

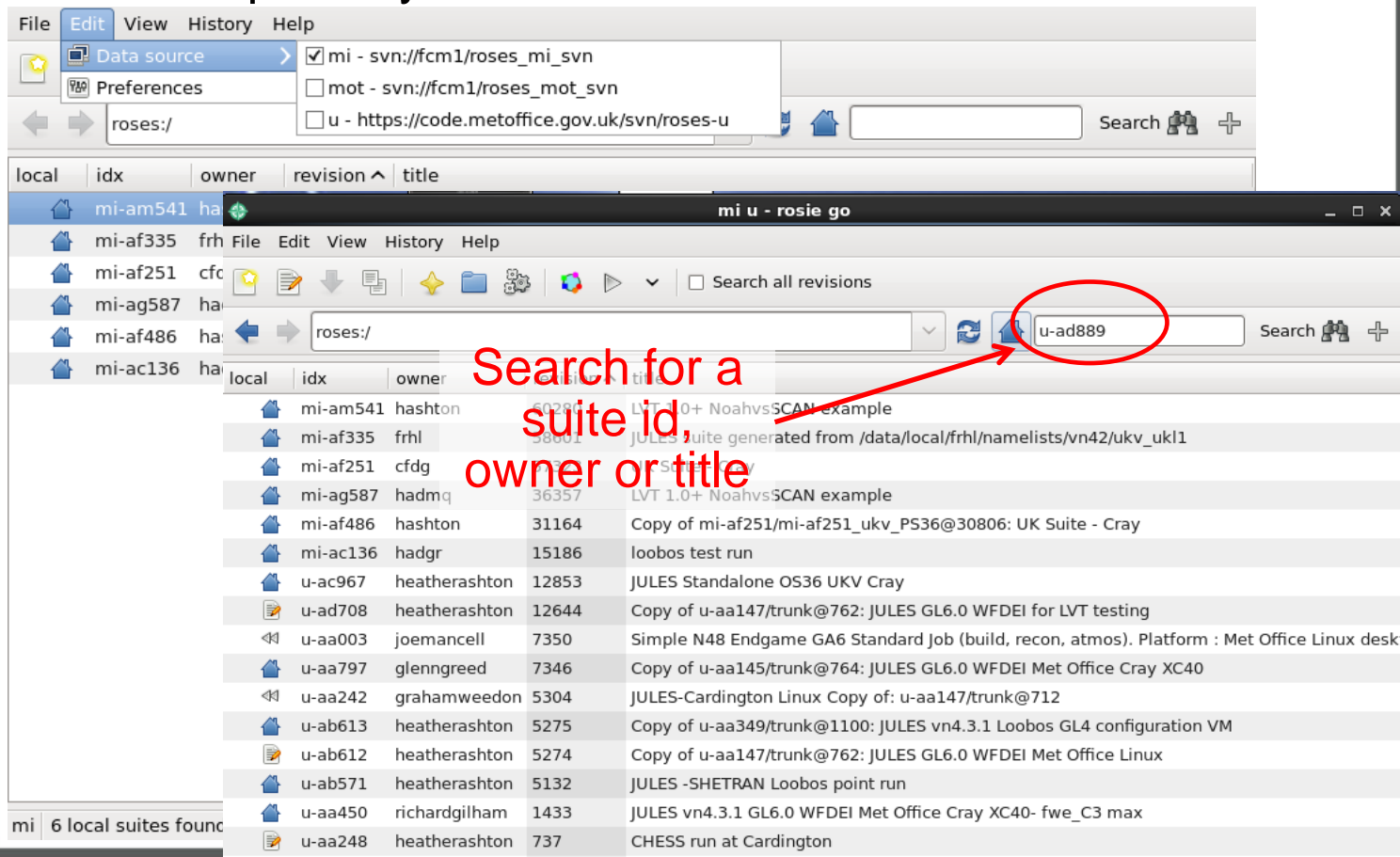


```
Terminal
File Edit View Search Terminal Help
$ rosie go &
[1] 5603
$ █
```

Using an existing Rose suite

The GUI should start up. This allows us to browse various rose suite repositories.

Select the 'u' data source. This is the roses repository on the shared repository service...



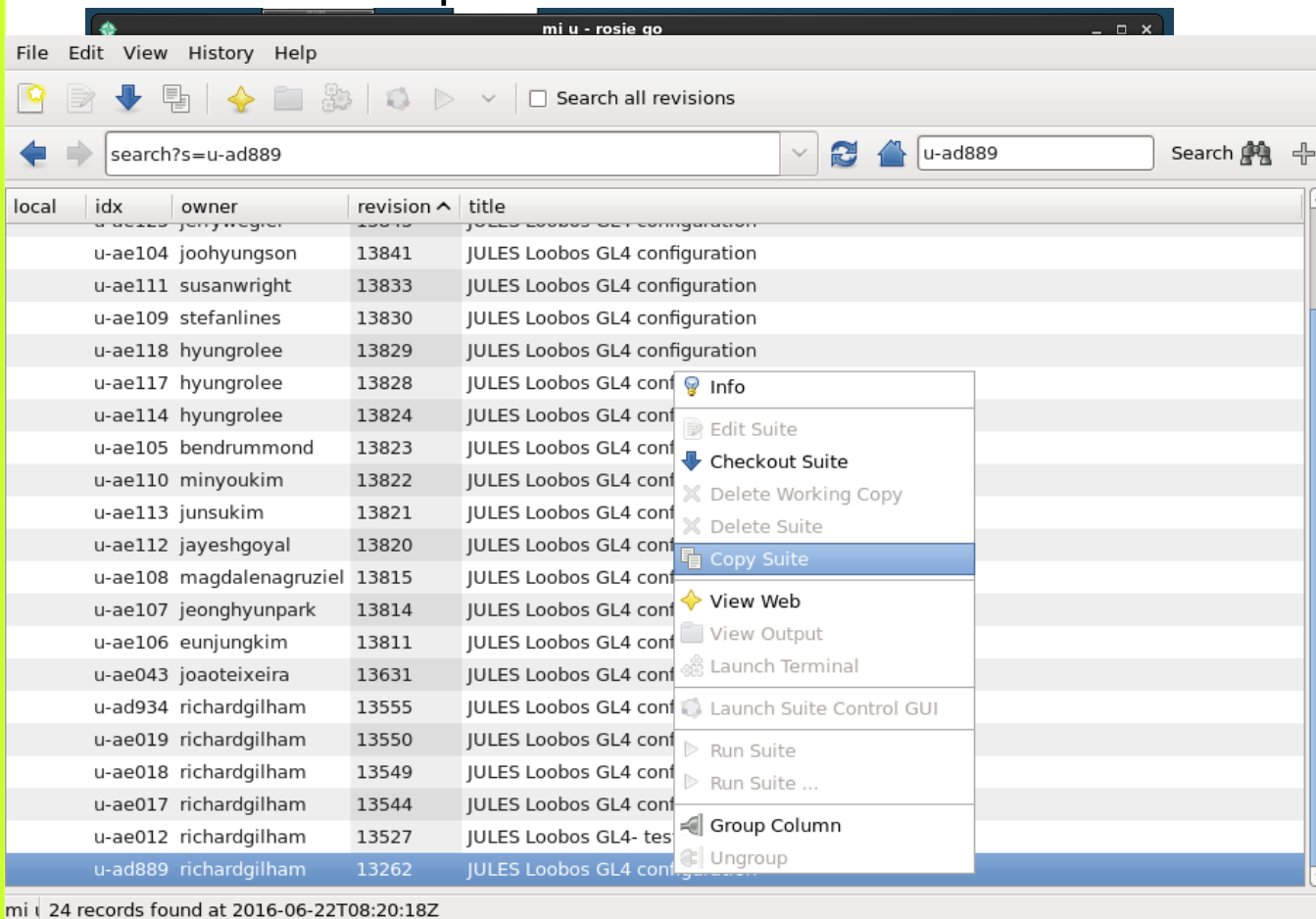
The screenshot shows the Rose GUI interface. The 'Data source' menu is open, and the 'u' option is selected. The search bar contains the text 'u-ad889'. A red circle highlights the search bar, and a red arrow points to it with the text 'Search for a suite id, owner or title'.

local	idx	owner	revision	title
mi-am541	ha			
mi-af335	frh	File		
mi-af251	cfg			
mi-ag587	hadm			
mi-af486	ha			
mi-ac136	hadgr			
mi-am541	hashton		60281	LVT 1.0+ NoahvsSCAN example
mi-af335	frhl		58001	JULES suite generated from /data/local/frhl/namelists/vn42/ukv_uk11
mi-af251	cfg			
mi-ag587	hadmq		36357	LVT 1.0+ NoahvsSCAN example
mi-af486	hashton		31164	Copy of mi-af251/mi-af251_ukv_PS36@30806: UK Suite - Cray
mi-ac136	hadgr		15186	loobos test run
u-ac967	heatherashton		12853	JULES Standalone OS36 UKV Cray
u-ad708	heatherashton		12644	Copy of u-aa147/trunk@762: JULES GL6.0 WFDEI for LVT testing
u-aa003	joemancell		7350	Simple N48 Endgame GA6 Standard Job (build, recon, atmos). Platform : Met Office Linux desk
u-aa797	glennreed		7346	Copy of u-aa145/trunk@764: JULES GL6.0 WFDEI Met Office Cray XC40
u-aa242	grahamweedon		5304	JULES-Cardington Linux Copy of: u-aa147/trunk@712
u-ab613	heatherashton		5275	Copy of u-aa349/trunk@1100: JULES vn4.3.1 Loobos GL4 configuration VM
u-ab612	heatherashton		5274	Copy of u-aa147/trunk@762: JULES GL6.0 WFDEI Met Office Linux
u-ab571	heatherashton		5132	JULES -SHETRAN Loobos point run
u-aa450	richardgilham		1433	JULES vn4.3.1 GL6.0 WFDEI Met Office Cray XC40- fwe_C3 max
u-aa248	heatherashton		737	CHESS run at Cardington

Using an existing Rose suite

Right-click to make a copy of the suite.

Double-click to open the new suite.



mi u - rosie go

File Edit View History Help

Search all revisions

search?s=u-ad889

local	idx	owner	revision	title
	u-ae104	joohyungson	13841	JULES Loobos GL4 configuration
	u-ae111	susanwright	13833	JULES Loobos GL4 configuration
	u-ae109	stefanlines	13830	JULES Loobos GL4 configuration
	u-ae118	hyungrolee	13829	JULES Loobos GL4 configuration
	u-ae117	hyungrolee	13828	JULES Loobos GL4 conf
	u-ae114	hyungrolee	13824	JULES Loobos GL4 conf
	u-ae105	bendrummond	13823	JULES Loobos GL4 conf
	u-ae110	minyoukim	13822	JULES Loobos GL4 conf
	u-ae113	junsukim	13821	JULES Loobos GL4 conf
	u-ae112	jayeshgoyal	13820	JULES Loobos GL4 conf
	u-ae108	magdalenagruziel	13815	JULES Loobos GL4 conf
	u-ae107	jeonghyunpark	13814	JULES Loobos GL4 conf
	u-ae106	eunjungkim	13811	JULES Loobos GL4 conf
	u-ae043	joaoteixeira	13631	JULES Loobos GL4 conf
	u-ad934	richardgilham	13555	JULES Loobos GL4 conf
	u-ae019	richardgilham	13550	JULES Loobos GL4 conf
	u-ae018	richardgilham	13549	JULES Loobos GL4 conf
	u-ae017	richardgilham	13544	JULES Loobos GL4 conf
	u-ae012	richardgilham	13527	JULES Loobos GL4- tes
	u-ad889	richardgilham	13262	JULES Loobos GL4 configuration

- Info
- Edit Suite
- Checkout Suite
- Delete Working Copy
- Delete Suite
- Copy Suite
- View Web
- View Output
- Launch Terminal
- Launch Suite Control GUI
- Run Suite
- Run Suite ...
- Group Column
- Ungroup

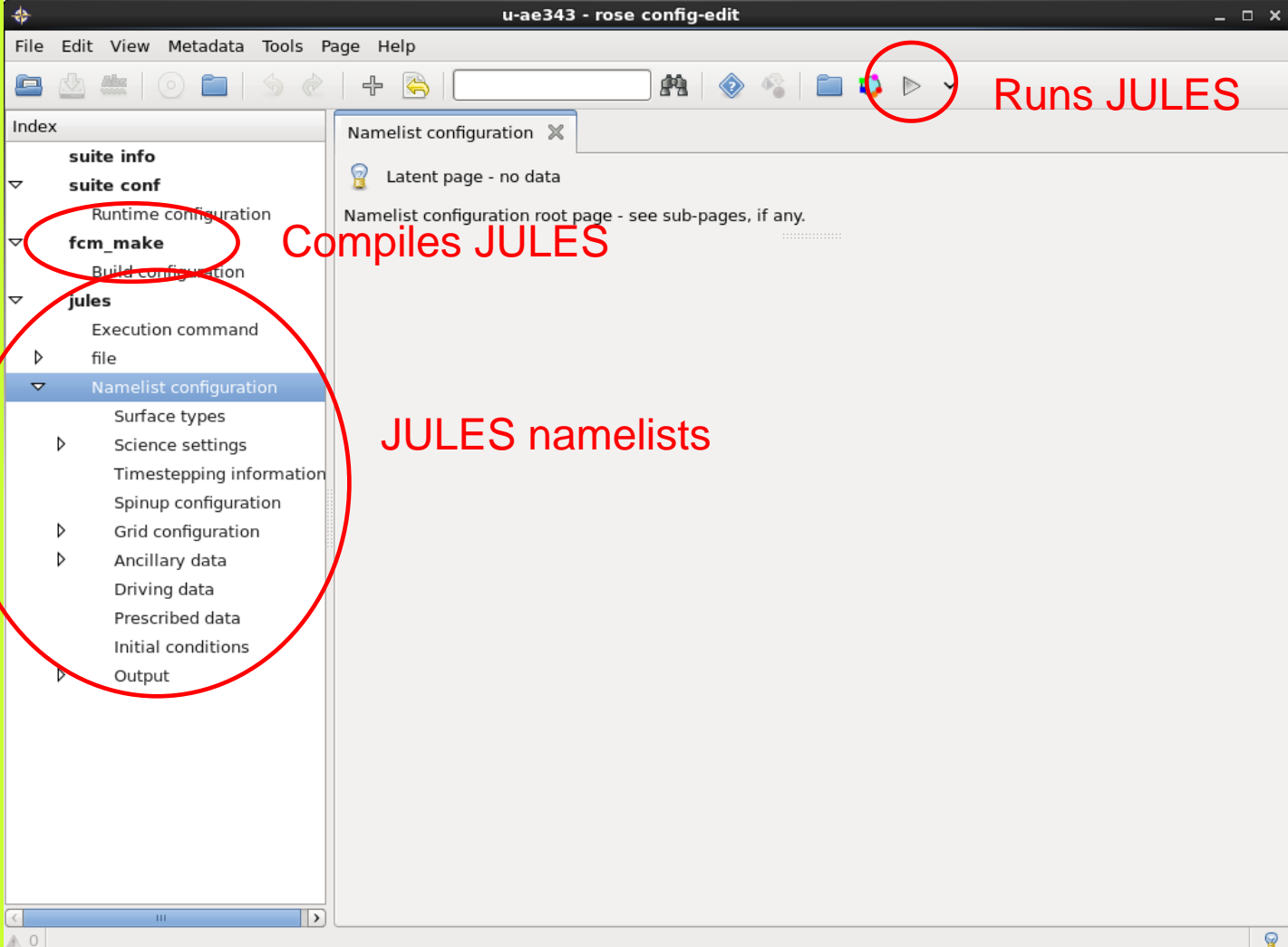
mi | 24 records found at 2016-06-22T08:20:18Z

title: JULES Loobos GL4 configuration

NB: Two directories created on your local drives:
(i) roses/
(ii) cylc-run/

Using an existing Rose suite

Suite contains 2 applications: - fcm-make and jules

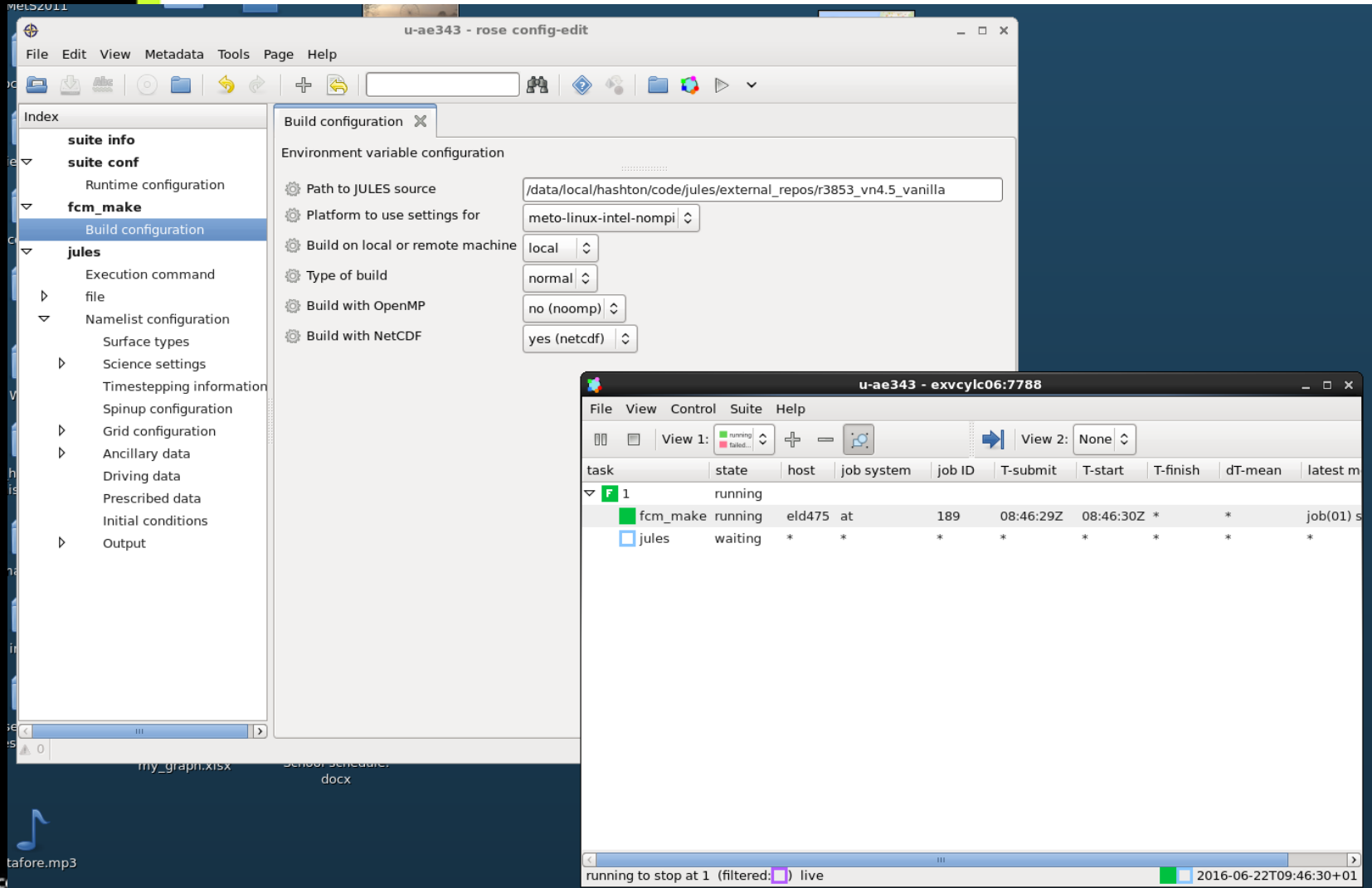


The screenshot shows the 'rose config-edit' application window. The left sidebar contains a tree view with the following structure:

- suite info
- suite conf
 - Runtime configuration
 - fcm_make**
 - jules
 - Execution command
 - file
 - Namelist configuration**
 - Surface types
 - Science settings
 - Timestepping information
 - Spinup configuration
 - Grid configuration
 - Ancillary data
 - Driving data
 - Prescribed data
 - Initial conditions
 - Output

Red annotations highlight the 'fcm_make' and 'jules' sections in the tree, and the 'Namelist configuration' section. A red circle highlights a play button icon in the toolbar, with the text 'Runs JULES' next to it. The text 'Compiles JULES' is placed near the 'fcm_make' section, and 'JULES namelists' is placed near the 'Namelist configuration' section.

Using an existing Rose suite



The image shows two windows from the Rose suite interface. The top window, titled 'u-ae343 - rose config-edit', displays the 'Build configuration' section. The bottom window, titled 'u-ae343 - exvcylc06:7788', shows a task execution table.

Build configuration window (u-ae343 - rose config-edit):

- Path to JULES source: /data/local/hashton/code/jules/external_repos/r3853_vn4.5_vanilla
- Platform to use settings for: meto-linux-intel-nompi
- Build on local or remote machine: local
- Type of build: normal
- Build with OpenMP: no (noomp)
- Build with NetCDF: yes (netcdf)

Task execution window (u-ae343 - exvcylc06:7788):

task	state	host	job system	job ID	T-submit	T-start	T-finish	dT-mean	latest m
F 1	running								
fcm_make	running	eld475	at	189	08:46:29Z	08:46:30Z	*	*	job(01) s
jules	waiting	*	*	*	*	*	*	*	*

At the bottom of the execution window, it shows 'running to stop at 1 (filtered: live)' and a timestamp '2016-06-22T09:46:30+01'.

Using an existing Rose suite

Screen output: Rose-bush, rose suite-log

```
Terminal
File Edit View Search Terminal Help
$ cd roses
$ ls
aonva-rose mi-af335 mi-am541 u-a-ae343
mi-ac136 mi-af486 mot-ab149 u-a-ae343
mi-af251 mi-ag587 mot-ab156 u-a-ae343
$ cd u-ae343/
$ rose suite-log
$
$
$
$
$
$
$
```

```
Terminal
File Edit View Search Terminal Help
$ tail -40 cylc-run/u-ae343/log/job/1/jules/01/job.out
[INFO] next_time: Timestep: 17517; Started at: 1997-12-31 21:00:00
[INFO] next_time: Timestep: 17518; Started at: 1997-12-31 21:30:00
[INFO] next_time: Timestep: 17519; Started at: 1997-12-31 22:00:00
[INFO] next_time: Timestep: 17520; Started at: 1997-12-31 22:30:00
[INFO] jules: Run completed successfully
[INFO] file_ncdf_open: Opening file ./output/jules.dump.19971231.82800.nc for writing
[INFO] write_dump: canopy
[INFO] write_dump: cs
[INFO] write_dump: gs
[INFO] write_dump: snow_tile
[INFO] write_dump: sthuf
[INFO] write_dump: t_soil
[INFO] write_dump: tstar_tile
[INFO] write_dump: sthzw
[INFO] write_dump: zw
[INFO] write_dump: rho_snow
[INFO] write_dump: snow_depth
[INFO] write_dump: snow_grnd
[INFO] write_dump: frac
[INFO] write_dump: b
[INFO] write_dump: sathh
[INFO] write_dump: satcon
[INFO] write_dump: sm_sat
[INFO] write_dump: sm_crit
[INFO] write_dump: sm_wilt
[INFO] write_dump: hcap
[INFO] write_dump: hcon
[INFO] write_dump: albsoil
[INFO] write_dump: fexp
[INFO] write_dump: ti_mean
[INFO] write_dump: ti_sig
[INFO] write_dump: frac_agr
[INFO] write_dump: co2_mmr
[INFO] write_dump: latitude
[INFO] write_dump: longitude
[INFO] file_ncdf_close: Closing file ./output/jules.dump.19971231.82800.nc
[INFO] file_ascii_close: Closing file ./Loobos_1997.dat
[INFO] file_ncdf_close: Closing file ./output/jules.all.nc
cylc (scheduler - 2016-06-22T08:50:32Z): succeeded at 2016-06-22T08:50:32Z
JOB SCRIPT EXITING (TASK SUCCEEDED)
$
$
```

Rose Bush @ els032 hashton u-ae343 cycles list jobs list

Display Options

Suite is stopped, last activity 2016-06-22T08:50:32Z

- jules
- fcm_make

Virtual Machine (VM)

Set up instructions available here:

<https://code.metoffice.gov.uk/trac/jules/wiki/JULESVirtualMachine>

- The FCM/Rose team at the Met Office have set up a VM with FCM, Rose and Cylc installed and configured.
- Easy way to get started if you are a new to JULES.
- Useful tool to use if you are trying to set up these systems and want to see how it should work!
- Please seek advice from Jules-Support if you plan to install Rose/Cylc yourself!

Support

Mailing list that users are signed up to after account request:

<https://www.lists.rdg.ac.uk/mailman/listinfo/jules-users>

Simply email: jules-users@lists.reading.ac.uk - used to ask general questions to the whole JULES community.

Mailbox for very specific questions (e.g. Rose, FCM, VM, code reviews etc):

jules-support@metoffice.gov.uk

Useful Links

- JULES User Documentation

<http://jules-lsm.github.io/>

- JULES Website:

<https://jules.jchmr.org/>

- Trac environment for JULES:

<https://code.metoffice.gov.uk/trac/jules/>

- Rose documentation:

<http://metomi.github.io/rose/doc/rose.html>

- Useful scientific computing resources:

<http://software-carpentry.org/>

References

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Questions and answers

