CABLE code stocktake – 20 Feb 2019 Agenda

1. Overview of CABLE code repository versions (NCI and Met Office)
2. Compile list of current or near-future CABLE applications and CABLE branch/revision number being used. Is the trunk still relevant or has one of the shared branches become a pseudo-trunk?
3. Compile list of known issues with trunk or shared branches. Categorise (I/O, UM interface, science code; known/unknown solution; short/long term fix etc).
4. Short-term priorities – what do we want to fix now and how will we do it?
5. Medium-term – are there branches/developments that need to be consolidated/merged? Are there parts of the code that need significant work?
6. Longer-term – are there challenges in achieving the 'JAC' goals (CABLE in the UM/JULES trunk) and meeting the needs of local (offline) applications? Are we going to retire CABLE I/O in favour of using JULES I/O?
7. Code management. Who can make changes to which branches and after what testing/approvals?
8. Next steps

Repositories with CABLE code

Repository	Location	Notes	Applications
CABLE	NCI	Trunk, tags, shared branches, personal branches	Main repos for offline users. New users pointed to trunk/tag.
accessdev	NCI	UM v6 to v8	ACCESS-ESM1.5
MOSRS UM	UK (NCI mirror)	UM v10+	ACCESS-CM2, JaC
MOSRS JULES	UK (NCI mirror)		ACCESS-CM2, JaC
LIS	USA	Version consistent with CABLE trunk?	Offline with LIS datasets Online with WRF
CCAM	CSIRO		Online climate runs – regional focus, down-scaling

CABLE repository branches

Name	Size	Rev	Age	Last Change
branches		5606	17 hours	mgk576: Cleaned up counter
tags		3703	2 years	jxs599: reverse crazy GUI malfuction
trunk		4555	1 year	jxs599: *Trunk Update* **Type:** Correction **Ticket:** ~~#145~~ === ...

Tags
https://trac.nci.org.au/trac/cable/wiki/CableHistory

CABLE-2.0	304	6 years	jxs599: tagged @287. fully tested and verified pre-tag & release.
CABLE-2.0.1	627	6 years	jxs599: significant change is implementation of MPI. a few bug fix
CABLE-2.1.2	826	6 years	jxs599: **WARNING** this revision of tg is broken. ammendmen
CABLE-2.2.3	3703	2 years	jxs599: reverse crazy GUI malfuction
CABLE-2.3.4	2961	4 years	jxs599: TAG - CABLE trunk@r2920. First
libraries	2889	4 years	jxs599: add libcable_r288 - this code has all the changes required

ESM1, ACCESS1.4

Open Source

Share branches

ASC_testing	5481	4 months	vxh599: deducted
bios3	4471	1 year	cmt599: Allow rec
bios3_optJV_cropharv	5169	8 months	vxh599: mpi bug f
CABLE-2.0.1-Tagged-plus-Medlyn-Stom-Param	3151	3 years	jtk561: added dire
CABLE-2.0.1-Tagged-plus-Medlyn-Stom-Param-g1map	2215	5 years	mgk576: Fixed bu
CABLE-AUX	5578	5 days	jxs599: manoueve
CMIP6-MOSRS	5407	5 months	mgk576: fix bad c
CMIP6-MOSRS_CNP	5446	5 months	mgk576: removed
FCM-make	1299	5 years	kxl561: FCM-make
JULES	2519	4 years	jxs599: fix logic to
NESP2pt9	5595	21 hours	vxh599: lower GE
NESP2pt9_BLAZE	5599	20 hours	vxh599: --
NESP2pt9_TRENDYv7	5354	6 months	vxh599: paramete
NESP2pt9_TRENDYv7_Cumberland	5219	7 months	vxh599: branch fo
preTrunkTesting	2758	4 years	bep599: Changed
scripts	2466	4 years	jtk561: add compi
SharedDevelopments	5152	8 months	vxh599: longer file
Tickets2015	3598	3 years	vxh599: multiple c
Tickets2016	3947	2 years	jxs599: branch for
tools	2753	4 years	jxs599: copy from

14 more code versions
(mostly old)

Unified Model

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Last Change | Revision Log | Repository URL

source: main / branches / dev / Share

View revision: View diff against:

Name	Size	Rev	Age	Author	Last Change
../					
vn10.6_C3_bom_dev		62648	3 months	belindaroux	Changed n0 to 200e7 to give more realistic visibil
vn10.6_CABLE		62504	3 months	jhansrbinovsky	revert position of declaration
vn10.6_stashMaster_EAgraupel		57191	7 months	nicksavage	no packing for 30.224

JULES

Joint UK Land Environment Simulator

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source: main / branches / dev / Share

View revision: View diff against:

Name	Size	Rev	Age	Author	Last Change
../					
vn5.3_init_cable		13565	2 months	dannyeisenberg	copied vn5.3 Jac initialisation branch to the /Share dir
vn10.6_CABLE		13089	4 months	jhansrbinovsky	partial resolution of https://trac.nci.org.au/trac/cable/t

User responses – applications and versions

- Marcus Thatcher
  - UCLEM urban model (previously aTEB) – Mat Lipson
  - Lake model (k-e turbulence closure)
  - River routing (interested in improvements in runoff and Annette's CABLE-WRF work)
  - Changing PFTs (Palm oil plantation, land-cover experiments)
- Ian Harman
  - CMIP6 and associated AMIP runs to quantify impacts of changes since ACCESS1.3. Uses MOSRS [repos] branch
  - Water conservation, Tmax, numerics **root/branches/Users/inh599/CABLE-2.0_SSEB**
- Rachel Law/Tilo Ziehn
  - ACCESS-ESM1.5, CMIP6 submission with carbon cycle. Priority MIPS: ScenarioMIP, C4MIP, CDRMIP

User responses – applications and versions

- Ying-Ping Wang
  - Using r2979, /Users/yxw599/CABLE-2.0_mpi_bp2971 [4 years]
    - Eddy-covariance site simulations, subtropical forests China
    - Responses of biological N fixation to CO2, climate change and N deposition [global, offline?]
    - Impact of land carbon accumulation to increasing CO2, climate change, the importance of LAI feedback.
  - Using r4060, /Users/yxw599/CABLE-2.0_mpi [2 years]
    - Implementing a simple land use change and biological N fixation
  - Microbial model of soil C, N and P

User responses – applications and versions

- CSIRO Canberra group
  - Current active branches
    - https://trac.nci.org.au/svn/cable/branches/Share/NESP2pt9
    - https://trac.nci.org.au/svn/cable/branches/Share/NESP2pt9_BLAZE
  - (The ASC_testing branch refers to an activity that looked at the amplitude of the CO2 seasonal cycle)
  - Latest published description of our CABLE work is *Haverd et al. 2018, A new version of the CABLE land surface model (Subversion revision r4601) incorporating land use and land cover change, woody vegetation demography, and a novel optimisation-based approach to plant coordination of photosynthesis.*
  - Changes since:
    - The representation of co-ordination of photosynthesis has been updated
    - The photosynthesis routine has been adapted to account for mesophyll conductance (gm)
  - Current activities:
    - Juergen Knauer will be exercising the mesophyll conductance routine (including implementing his own meta-analysis of gm values) and testing it in combination with the coordination work.
    - Vanessa is working with Lars Nieradzik to implement Lars' BLAZE fire model.
    - Peter is working towards a hybrid land-use dataset incorporating LUH2 and a remotely-sensed forest index provided by Ray Martinez, linked to NCAS data.
    - Submission of TRENDY results, including V7 in August 2018. We expect to submit to V8, presumably in August 2019.
    - Juergen's crop modelling.
    - RECCAP2

User responses – applications and versions

- UNSW/Clex
  - CABLE focussed
    - water cycle responses during drought (spatial runs over Australia and globally)
    - PLUMBER2 (site runs)
    - Vegetation dynamics during drought (spatial and site runs with CASA-CNP)
    - using the groundwater code in ACCESS to look at droughts
    - Hydraulic schemes
    - Eucalypts
  - Generally
    - CABLE in ACCESS and WRF
    - Land surface impact on extremes

Issues

- No clear code development strategy.
  - Consistency of model versions across repositories (if needed)
  - Consistency of offline/online versions
  - CMIP6-MOSRS as default trunk, real trunk left behind, but no protocol for adding to CMIP6-MOSRS branch
  - Ticket processing stalled (even for trivial tickets)
  - Where should new users be directed
  - Code ‘pollution’ e.g. de-bugging code not being removed, #ifdef
  - Removal of obsolete code/switches
  - Clarity around information exchange between biophysical, biogeochemistry and land-use change – a consolidated coding strategy
  - Appropriate directory structure e.g. separate for land-use
  - Complexity of I/O. What is better as pre/post-process?

Issues

- CMIP6-MOSRS branch
  - doesn't run [offline?] (see #208).
  - I/O changed without user notification
  - Site run set-up differences with/without CASA-CNP
- Single site configuration
  - Not working [in which branch/configuration]
  - Simpler/more flexible solution available.
- CASA-CNP is broken
  - Science bugs
  - Coding bugs
  - I/O inflexible and more complicated than necessary

- ACCESS-CM2 (coupled or AMIP)
  - internally inconsistent representation of turbulent transfer – diurnal cycle impact.
  - Using JULES (not CABLE) roughnesses when determining orographic drag and aerosols
  - Need a proper lake scheme (rather than current water conservation fix) - re-investigate with the GW model activated.
  - SLI not activated/tested – (check numerical stability and consistency with REV_COR)
  - GW model not fully tested
  - water conservation over snow could be better, water conservation in dry climates – use Ian H's SSEB branch as a template or switch to SLI
  - snow on canopy – potential inconsistency in the use of JULES canmodel==4
  - use of JULES parameterisations for some diagnostics (10m winds, screen level TQ)
  - Penman-Monteith formulation for soil evaporation needs attention (incorrect over ice)
  - bare soil roughness and sparse canopies – z0 too small to keep the code stable (with standard configuration)
  - Output issues (cable_explicit or cable_implicit, what JULES does, separate STASH section)

Issues

- Namelist, parameter and input files
  - documentation
  - CABLE-AUX (perhaps better with each code branch)
  - Recommended configuration files (e.g. https://jules.jchmr.org/content/research-community-configurations)
- Restart
  - Offline: Redundant variables in restart file. Clean up
  - ACCESS: restart reproducibility #198
  - ACCESS: completeness of restart (%pudsto, %fes_cor)
- Spinup
- Coding standards – and general clean up of code (double precision, internal consistency, clarity around true state variables etc.)

Issues

- Need soil moisture/temperature nudging for LS3MIP
- Consistent method for working with ‘running means’ e.g. for optimisation
- Soil moisture initialisation in permanent ice
- Negative transfer velocity (if still a problem)
- Snow energy and water budget closure for CABLE in CCAM
- Combining repositories – code license issues (UKMO, CABLE, CCAM-GNU)

Suggestions

- Regular release cycle (~6 months)
- Regular updates to community – science improvements and bug fixes
- Testing of CMIP6-MOSRS branch at suite of flux sites
- Formal bench-marking system
- List of switches/configurations that code must be tested for before goes into trunk
- Implement scientific code review
- Proper commenting of code