

MITgcm git info etc...

Overview

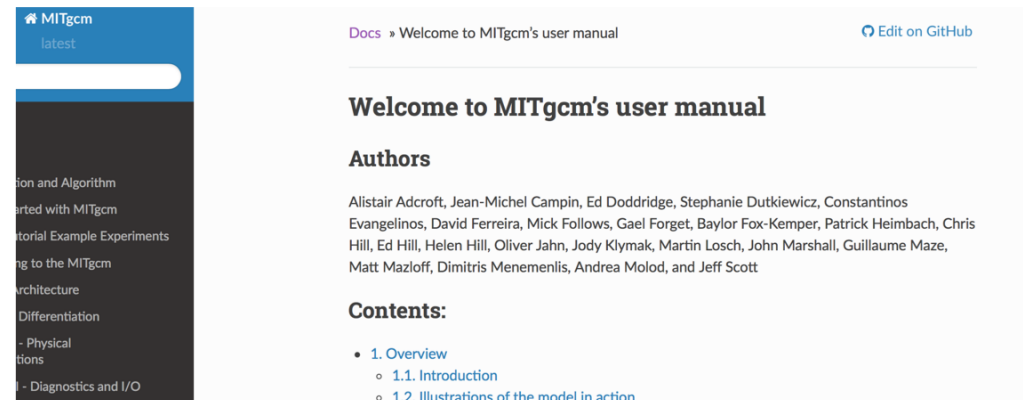
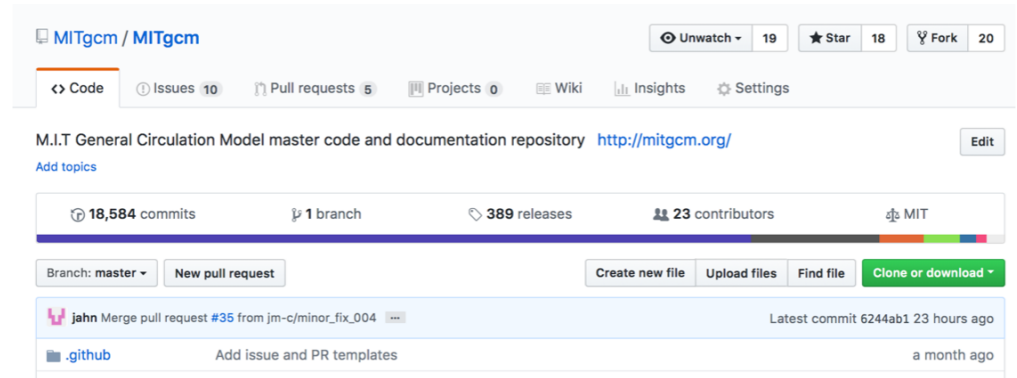
- Code distribution and development now hosted under git using GitHub as main repository

- <https://github.com/MITgcm/MITgcm>

- Documentation manual within the main repository using .rst format and published through readthedocs.

- <http://mitgcm.readthedocs.io>

<http://mitgcm.org> updated to point to new spaces (old links also there for reference).



Topics for today

- A little about about git setup
 - New ways to
 - Download (git clone)
 - Browse code (LXR)
 - Provide code/doc feedback, requests and contributions (issues, PR)
- Documentation update status, plans and feedback discussion
 - Current status
 - New sections
 - Areas for contribution
- <http://mitgcm.org> web skin upgrade previewing soon

http://mitgcm.readthedocs.io/en/latest/getting_started/getting_started.html#method-1

```
% git clone https://github.com/MITgcm/MITgcm.git
```

<http://lxr.mitgcm.org/lxr2/source>



MITgcm

MITgcm/

1 / MITgcm

! Issues 10

🔗 Pull requests 5

<https://github.com/MITgcm/MITgcm/issues>

<https://github.com/MITgcm/MITgcm/pulls>

Downloading from git

Step by step in

http://mitgcm.readthedocs.io/en/latest/getting_started/getting_started.html

3.2.1. Method 1

This section describes how to download git-aware copies of the repository. In a terminal window, cd to the directory where you want your code to reside. Type:

```
% git clone https://github.com/MITgcm/MITgcm.git
```

This will download the latest available code. If you now want to revert this code to a specific checkpoint release, first `cd` into the MITgcm directory you just downloaded, then type

```
git checkout checkpointXXX
```

 where `XXX` is the checkpoint version.

Alternatively, if you prefer to use ssh keys (say for example, you have a firewall which won't allow a https download), type:

```
% git clone git@github.com:MITgcm/MITgcm.git
```

You will need a GitHub account for this, and will have to generate a ssh key through your GitHub account user settings.

3.2.2. Method 2

This section describes how to do a one-time download of the MITgcm, NOT git-aware. In a terminal window, `cd` to the directory where you want your code to reside. To obtain the current code, type:

```
% wget https://github.com/MITgcm/MITgcm/archive/master.zip
```

For specific checkpoint release `XXX`, instead type:

```
% wget https://github.com/MITgcm/MITgcm/archive/checkpointXXX.zip
```

Searching code tree (LXR)

Direct access

<http://lxr.mitgcm.org>

Integrated into doc e.g.

In general, the horizontal momentum time-stepping can contain some terms that are treated implicitly in time, such as the vertical viscosity when using the backward time-stepping scheme (`implicitViscosity = .TRUE.`). The method used to solve those implicit terms is provided in [Section 2.6](#), and `momentum` equations (2.2) and (2.3) to give:



$$\begin{aligned} u^{n+1} - \Delta t \partial_z A_v \partial_z u^{n+1} + \Delta t g \partial_x \eta^{n+1} &= u^n + \Delta t G_u^{(n+1/2)} \\ v^{n+1} - \Delta t \partial_z A_v \partial_z v^{n+1} + \Delta t g \partial_y \eta^{n+1} &= v^n + \Delta t G_v^{(n+1/2)} \end{aligned}$$

<http://mitgcm.readthedocs.io/en/latest/algorithm/algorithm.html>

Definitions for `implicitViscosity`

Type	Member of	File	Line
local and common block variable		/model/inc/PARAMS.h	*437
global or module variable		/model/inc/PARAMS.h	*528
local and common block variable		/model/src/ini_parms.F	*213

3 declarations in 2 files.

References to `implicitViscosity`

File	Line
/model/inc/PARAMS.h	*437 *528
/model/src/config_check.F	*801 *811
/model/src/config_summary.F	*430
/model/src/dynamics.F	*578 *586 *588 *621
/model/src/ini_parms.F	*213
/model/src/set_defaults.F	*204
/model/src/set_parms.F	*66
/pkg/gg190/gg190_check.F	*94
/pkg/kl10/kl10_check.F	*62
/pkg/kpp/kpp_check.F	*141
/pkg/mom_common/mom_u_implicit_r.F	*84 *280
/pkg/mom_common/mom_v_implicit_r.F	*84 *280
/pkg/mom_fluxform/mom_fluxform.F	*239 *524 *553 *756 *785
/pkg/mom_vecinv/mom_vecinv.F	*444 *517
/pkg/my82/my82_check.F	*67
/pkg/pp81/pp81_check.F	*60

<http://lxr.mitgcm.org/lxr2/ident/MITgcm? i=implicitViscosity>

Feedback and contributions to code/doc.

Issues provide feedback, bug reports related to code or documentation

- Not for support questions
- Some discussion, but targeted/focused to an artefact that can ultimately be resolved and closed (i.e. not open ended debate).

Current issue list

MITgcm / MITgcm

Code Issues 10 Pull requests 5 Projects 0 Wiki Insights Settings

Label issues and pull requests for new contributors
Now, GitHub will help potential first-time contributors discover issues labeled with **help wanted** or **good first issue**

Filters Labels Milestones

10 Open 5 Closed Author Labels Projects Mil

- Pull request and issue templates** #49 opened 17 hours ago by edoddridge
- Revamping "Highlighted Papers" section** **manual** #48 opened 17 hours ago by edoddridge
- New suite of 2.8 degree tutorials** **enhancement** **manual** #45 opened 2 days ago by christophernhill
- Add a little on coding guidelines to manual** **manual** #44 opened 2 days ago by christophernhill
- Package LAYERS documentation and some code clean up notes** **enhancement** **manual** #43 opened 2 days ago by christophernhill

<https://github.com/MITgcm/MITgcm/issues>

Pull requests (PRs) allow anybody to submit new or modified code. Submissions will be reviewed etc... and, if useful and adequate quality, accepted. PRs can be used for code, test cases, documentation etc...

Current pull requests

MITgcm / MITgcm

Code Issues 10 Pull requests 5 Projects 0 Wiki Insights Settings

Label issues and pull requests for new contributors
Now, GitHub will help potential first-time contributors discover issues labeled with **help wanted** or **good first issue**

Filters Labels Milestones

5 Open 29 Closed Author Labels Projects Mil

- WIP: Add a list of related projects** **manual** **work in progress** #47 opened 17 hours ago by edoddridge
- Docs: fix typo and sign errors**

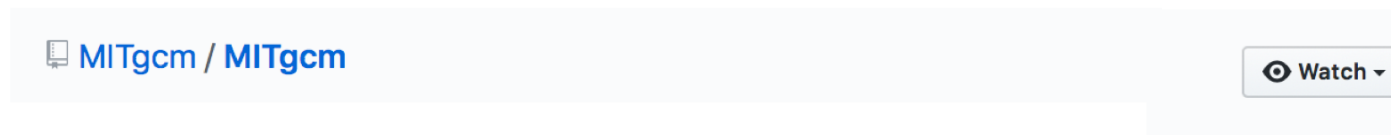
<https://github.com/MITgcm/MITgcm/pulls>

More detailed instructions.

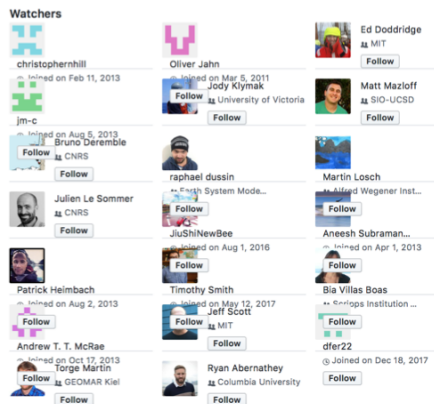
<http://mitgcm.readthedocs.io/en/latest/contributing/contributing.html#contributing-to-the-mitgcm>

Tracking and watching

- Good way to keep track of new items

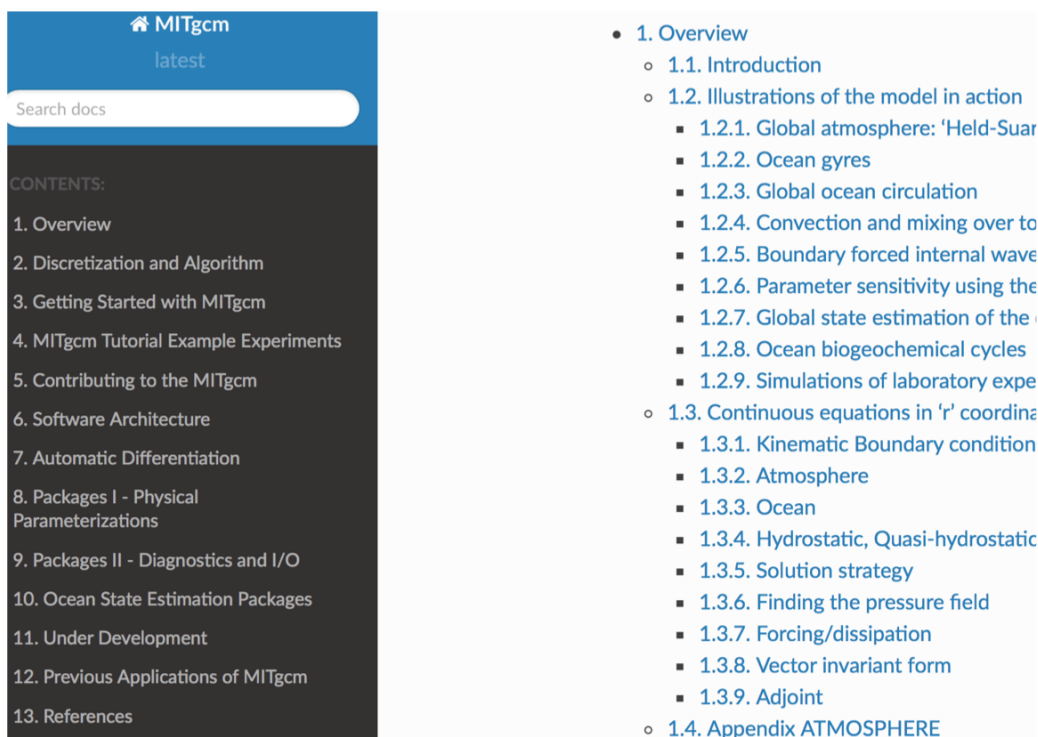


- Currently have only 20 watchers, feel free to join!



Documentation

<http://mitgcm.readthedocs.io/en/latest/>



The screenshot shows the MITgcm documentation website. The top navigation bar is blue with the MITgcm logo and the word "latest". Below the navigation bar is a search bar labeled "Search docs". The main content area is dark grey and contains a "CONTENTS:" section with a list of 13 items. To the right of the contents is a detailed table of contents for the "1. Overview" section, listing sub-sections 1.1 through 1.4 with their respective sub-sections.

- 1. Overview
 - 1.1. Introduction
 - 1.2. Illustrations of the model in action
 - 1.2.1. Global atmosphere: 'Held-Suar
 - 1.2.2. Ocean gyres
 - 1.2.3. Global ocean circulation
 - 1.2.4. Convection and mixing over to
 - 1.2.5. Boundary forced internal wave
 - 1.2.6. Parameter sensitivity using the
 - 1.2.7. Global state estimation of the
 - 1.2.8. Ocean biogeochemical cycles
 - 1.2.9. Simulations of laboratory expe
 - 1.3. Continuous equations in 'r' coordin
 - 1.3.1. Kinematic Boundary condition
 - 1.3.2. Atmosphere
 - 1.3.3. Ocean
 - 1.3.4. Hydrostatic, Quasi-hydrostatic
 - 1.3.5. Solution strategy
 - 1.3.6. Finding the pressure field
 - 1.3.7. Forcing/dissipation
 - 1.3.8. Vector invariant form
 - 1.3.9. Adjoint
 - 1.4. Appendix ATMOSPHERE

Nearly all of existing documentation has been converted from Latex to .rst and migrated from CVS to git.

One remaining major piece TBD

- *Packages II: Diagnostics and I/O*

Previous and current/future manual "versions" being integrated into Dspace (and Zenodo?) to provide better citable docs.

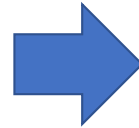
Planning to "overhaul" tutorials, getting started info. So only two tutorials currently migrated.

Latex to .rst mixes automatic (pandoc) and manual ().

The horizontal momentum and continuity equations for the ocean ([\ref{eq:ocean-mom}](#) and [\ref{eq:ocean-cont}](#)), or for the atmosphere ([\ref{eq:atmos-mom}](#) and [\ref{eq:atmos-cont}](#)), can be summarized by:

```
\begin{eqnarray}
\partial_t u + g \partial_x \eta & = & G_u \\
\partial_t v + g \partial_y \eta & = & G_v \\
\partial_x u + \partial_y v + \partial_z w & = & 0
\end{eqnarray}
```

where we are adopting the oceanic notation for brevity. All terms in the momentum equations, except for surface pressure gradient, are encapsulated in the G vector. The continuity equation, integrated over the fluid depth, H , and with the rigid-lid flow boundary conditions applied, becomes:



```
.. _press_meth_rigid:
```

```
Pressure method with rigid-lid
```

```
=====
```

The horizontal momentum and continuity equations for the ocean ([:eq:`eq-ocean-mom`](#) and [:eq:`eq-ocean-cont`](#)), or for the atmosphere ([:eq:`atmos-mom`](#) and [:eq:`atmos-cont`](#)), can be summarized by:

```
.. math::
```

```
\begin{aligned}
\partial_t u + g \partial_x \eta & = & G_u \\
\partial_t v + g \partial_y \eta & = & G_v \\
\partial_x u + \partial_y v + \partial_z w & = & 0
\end{aligned}
```

where we are adopting the oceanic notation for brevity. All terms in the momentum equations, except for surface pressure gradient, are encapsulated in the G vector. The continuity equation, integrated over the fluid depth, H , and with the rigid-lid normal flow boundary conditions applied, becomes:

Tutorial/getting started overhaul

Once latex to .rst conversion is fully complete one focus will be on overhaul of getting started/tutorial sections including examining

- basic getting started
- using more features
- research relevant starting points
- regression/verification suite

Starting with new realistic lat-lon setup suite at 2.8 degree resolution.

Current scope

- Basic physical setup (z-coord)
- Basic physical setup (p-coord)
- Carbon cycle model
- Simple adjoint sensitivity

See/comment at <https://github.com/MITgcm/MITgcm/issues/45>

Related projects section

- Replacing “previous applications”.
- A first cut is at <https://github.com/MITgcm/MITgcm/pull/47/files>
- Send PRs with things to add (once initial examples are merged).
- Any near-term comments can be added to <https://github.com/MITgcm/MITgcm/pull/47>

```
5 +Projects Related to MITgcm
6 +=====
7 +
8 +Estimating the Circulation and Climate of the Ocean (ECCO)
9 +-----
10 +
11 +ECCO is an oceanic reanalysis product that makes use of MITgcm's adjoint capabilities to assimilate observations into a
12 +dynamically self-consistent state estimate.
13 +
14 +website: https://ecco.jpl.nasa.gov/
15 +
16 +Octopus - Lagrangian Particle Tracker
17 +-----
18 +
19 +Octopus is an offline Lagrangian particle tracker that uses saved velocity fields from MITgcm simulations.
20 +
21 +website: https://github.com/jinbow/Octopus
22 +
23 +
24 +Southern Ocean State Estimation (SOSE)
25 +-----
26 +
27 +SOSE uses the same techniques as ECCO to produce an eddy-permitting state estimate of the Southern Ocean.
28 +
29 +website: http://sose.ucsd.edu/
30 +
31 +
32 +xmitgcm
33 +-----
34 +
35 +xmitgcm is a Python module that loads MITgcm MDS output files as `xarray <http://xarray.pydata.org/en/stable/>` arrays
36 +with the associated grid information. These can be easily exported as NetCDF files.
37 +
38 +website: http://xmitgcm.readthedocs.io/en/latest/
```

Documentation (and code) contributions/feedback.

- Looking for feedback on documentation and plans (e.g. <https://github.com/MITgcm/MITgcm/issues/45>).
- Comments/feedback on all/any areas very welcome (not just getting started/tutorials)
- Other example experiment contributions always welcome (can we make this easier?).
- Package documentation is always welcome. Ryan is working on pkg/layers for example.
- Planning to incorporate more code and documentation for self-organizing ecosystem work (GUD).

New web "skin" preview coming soon

Updating web site to integrate with new doc, code.

New "skin" to freshen up.

Monthly stories and publication summaries ongoing etc....

