Gulf of Guinea MITgcm/ECCO configuration

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- **Ubuntu Operating System**
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- **MITgcm**
- **Steps to configure MITgcm and Integrating the MITgcm**
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Introduction

This presentation gives an overview of what we studied as a group over the course of the week.

- Firstly, we give a short introduction to the installation of VirtualBox and a Linux Operating System.
- Also running some terminal commands on Linux and installing MITgcm Model.
- Finally the MITgcm model is employed to study the Gulf of Guinea with boundary conditions from Estimating the Circulation and Climate of the Ocean (**ECCO**).

VirtualBox

- VirtualBox is a software program that enables the user to switch between and run multiple operating systems simultaneously.
- It can be installed on all operating systems such as **Windows**, **Linux** and **Mac OS**.
- There are some key terminologies of Virtualbox namely: **Host Operating system**(Host OS) , **Guest Operating system**(Guest OS) and **Virtual machine**(VM)

VirtualBox

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Welcome to VirtualBox.org!

About

Screenshots

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Documentation

   End-user docs

   Technical docs

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VirtualBox is a powerful x86 and AMD64/Intel64 virtualization product for enterprise as well as home use. Not only is VirtualBox an extremely feature rich, high performance product for enterprise customers, it is also the only professional solution that is freely available as Open Source Software under the terms of the GNU General Public License (GPL) version 2. See "About VirtualBox" for an introduction.

Presently, VirtualBox runs on Windows, Linux, Macintosh, and Solaris hosts and supports a large number of guest operating systems including but not limited to Windows (NT 4.0, 2000, XP, Server 2003, Vista, Windows 7, Windows 8, Windows 10), DOS/Windows 3.x, Linux (2.4, 2.6, 3.x and 4.x), Solaris and OpenSolaris, OS/2, and OpenBSD.

VirtualBox is being actively developed with frequent releases and has an ever growing list of features, supported guest operating systems and platforms it runs on. VirtualBox is a community effort backed by a dedicated company: everyone is encouraged to contribute while Oracle ensures the product always meets professional quality criteria.

News Flash

New **July 17th, 2018**
VirtualBox 5.2.16 released!
Oracle today released a 5.2 maintenance release which improves stability and fixes regressions. See the Changelog for details.

New **May 9th, 2018**
VirtualBox 5.1.38 released!
Oracle today released a 5.1 maintenance release which improves stability and fixes regressions. See the Changelog for details.

New **October 18th, 2017**
VirtualBox 5.2 released!
Oracle today shipped a new minor release, VirtualBox 5.2. See the announcement for details.

More information...

Download VirtualBox 5.2

Hot picks:

- Pre-built virtual machines for developers at Oracle Tech Network
- **Hyperbox** Open-source Virtual Infrastructure Manager project site
- **phpVirtualBox** AJAX web interface project site

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<u>Ubuntu Operating Systems</u>

- Ubuntu is a free and open source linux operating system based on Debian (wikipedia).
- It is User-friendly
- It is free to download
- It is immune to viruses.
- It can be easily customized to suit the preference of the User.
- The terminal of the OS will play a vital role in developing the MITgcm model.
- Some terminal commands that are employed to install the MITgcm are given in the table below.

Some Terminal commands

Commands	Meaning
pwd	present working directory
cd	change directory
cd ..	return to parent directory
ls	list
cp	copy
rm	remove
ln -s	creates a soft link

NB: The terminal commands are case-sensitive.

```
patrick@patrick-700Z3C-700Z5C:~$ pwd
/home/patrick
patrick@patrick-700Z3C-700Z5C:~$ ls
Desktop     Downloads        Music              pendrive  Public     texput.log
Documents   examples.desktop octave-workspace   Pictures  Templates  Videos
patrick@patrick-700Z3C-700Z5C:~$ cd Documents/
patrick@patrick-700Z3C-700Z5C:~/Documents$ ls
GulfGuinea  Matlab  Research  testing
patrick@patrick-700Z3C-700Z5C:~/Documents$ cd Research/
patrick@patrick-700Z3C-700Z5C:~/Documents/Research$ ls
MITgcm-checkpoint67c
patrick@patrick-700Z3C-700Z5C:~/Documents/Research$ cd ..
patrick@patrick-700Z3C-700Z5C:~/Documents$ pwd
/home/patrick/Documents
patrick@patrick-700Z3C-700Z5C:~/Documents$
```

Massachusetts Institute of Technology general circulation model (MITgcm).

The **MITgcm** model is a numerical model designed to study and analyze the behaviours of ocean, climate and atmosphere. The following steps are involved in installing and running the MITgcm:

- Before running MITgcm, you need a **Linux or Unix - based operating system (OS)**.
- Linux OS has a compiler called **gfortran** for compiling codes.
- Download MITgcm from the link https://mitgcm.org.
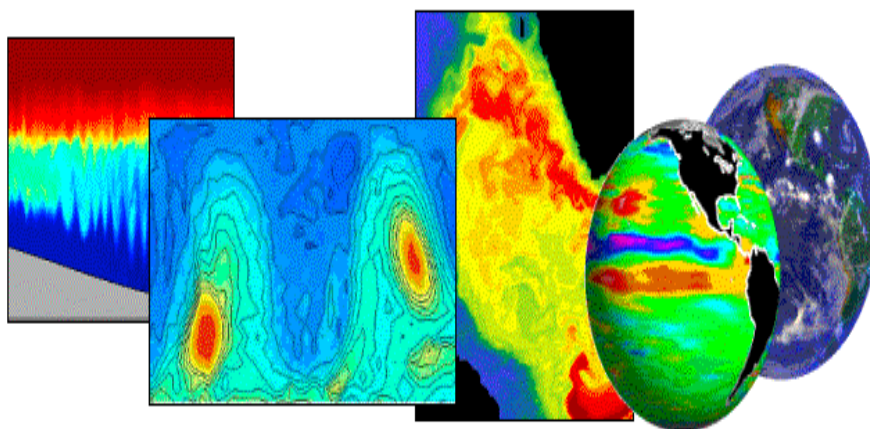
MITgcm
M.I.T General Circulation Model News and Information

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About MITgcm

The **MITgcm** (**MIT G**eneral **C**irculation **M**odel) is a numerical model designed for study of the atmosphere, ocean, and climate. Its non-hydrostatic formulation enables it to simulate fluid phenomena over a wide range of scales; its adjoint capability enables it to be applied to parameter and state estimation problems. By employing fluid isomorphisms, one hydrodynamical kernel can be used to simulate flow in both the atmosphere and ocean.

You are welcome to download and use MITgcm.

Papers charting the development of MITgcm can be found here.

Click on download button to proceed to next step
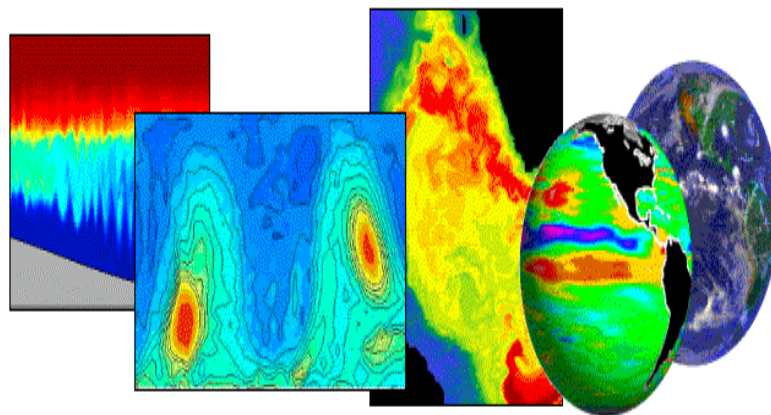
News Stories

MITgcm

The MITgcm code and documentation are under continuous development. For a while, MITgcm was developped and maintained under CVS but has been recently migrated to "git" on Feb 2018. Note that all the previous development history has been kept in the new MITgcm git repository while the former CVS repository is now frozen.

The MITgcm code and its companion documentation are now hosted at GitHub under a single repository.

- Access the MITgcm repository

- Detailed instructions on how to download the code:
  download a clone of the repository:

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

  or just get a one-time archive of MITgcm code:
  - the most recent checkpoint "tar" or "zip" file
    from GitHub or from here.
  - the latest "tar" or "zip" archive
    or the daily "tar" file.

Note: Some outlying pieces (e.g., contrib area) are still alive under CVS and can be viewed through the CVS code browser.

Steps involved in configuring and Integrating the MITgcm model

There are three main steps:

- Building the Model (After this process, an executable called **mitgmuv** is developed.)
- The next process involves running the model.(This computes for all the parameters values.)
- Finally, to analyze and visualize the solutions of the model equations, you need to use a software package like **Python**, **MATLAB**, or **Octave**.

Barotropic double gyre
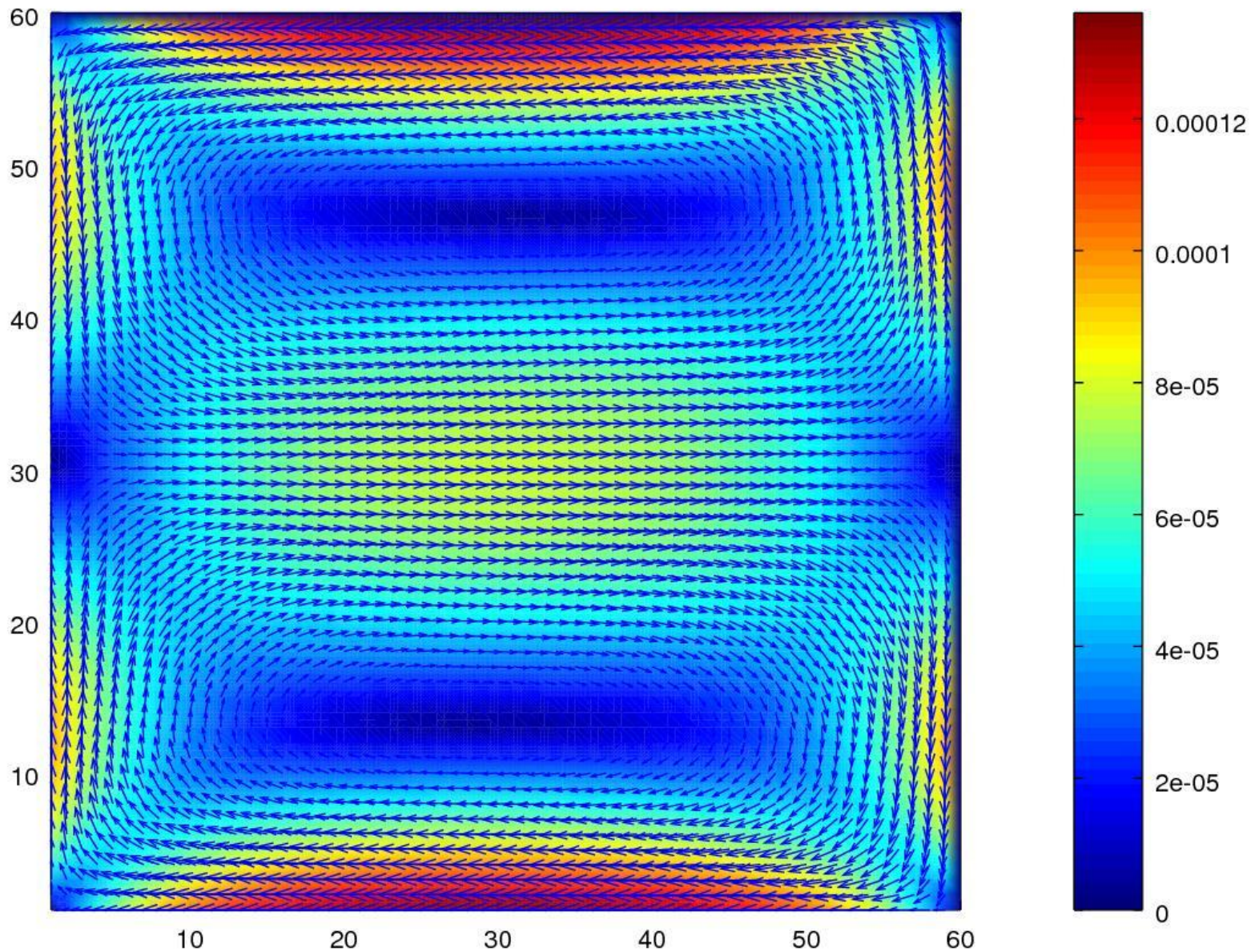
Sea surface temperature and currents on 02-Jan-1992