Introduction to ROMS (Regional Ocean Modeling System)

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OUTLINE

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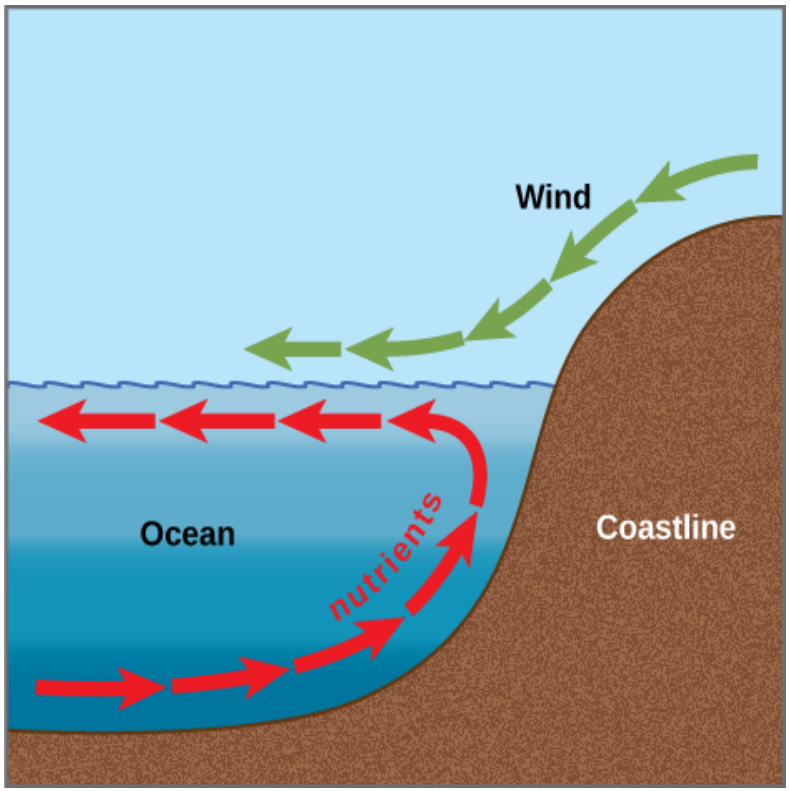
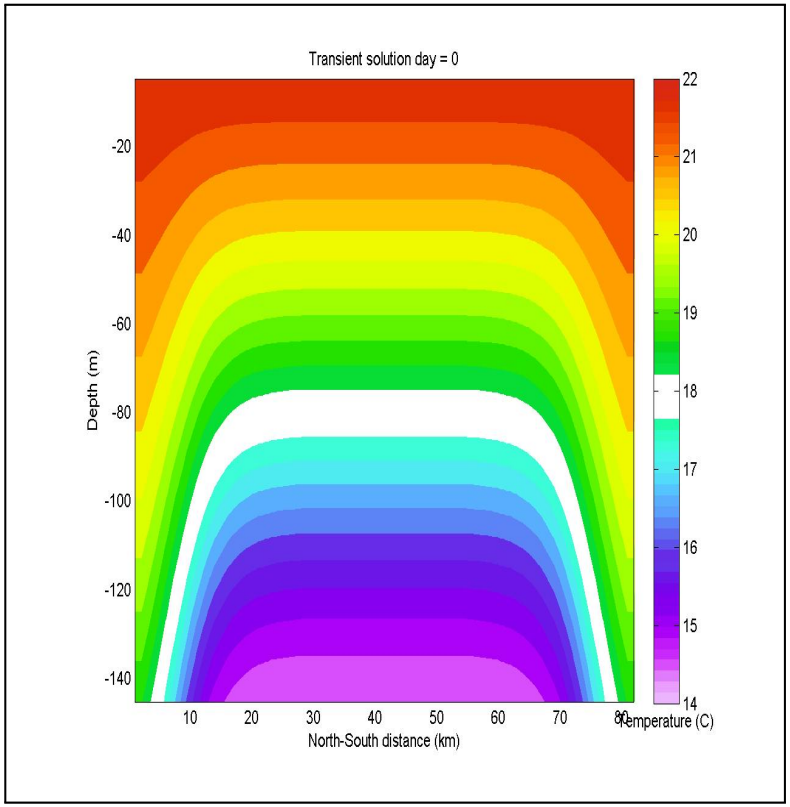
- How to learn about ROMS
- Registering, Downloading, Installing
- Compiling and Running simple test cases

Motivation





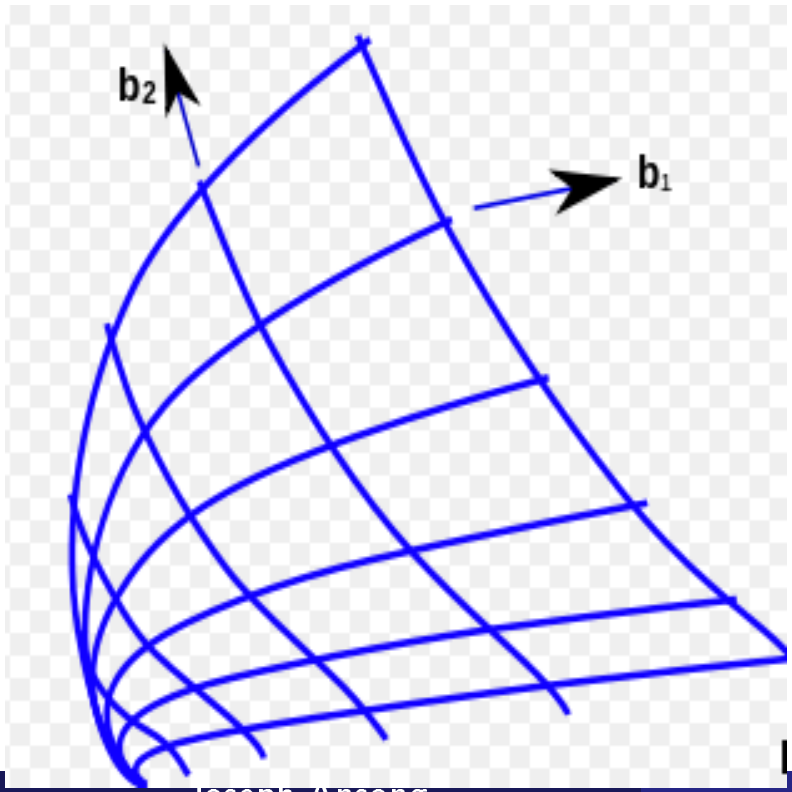
Play/Pause

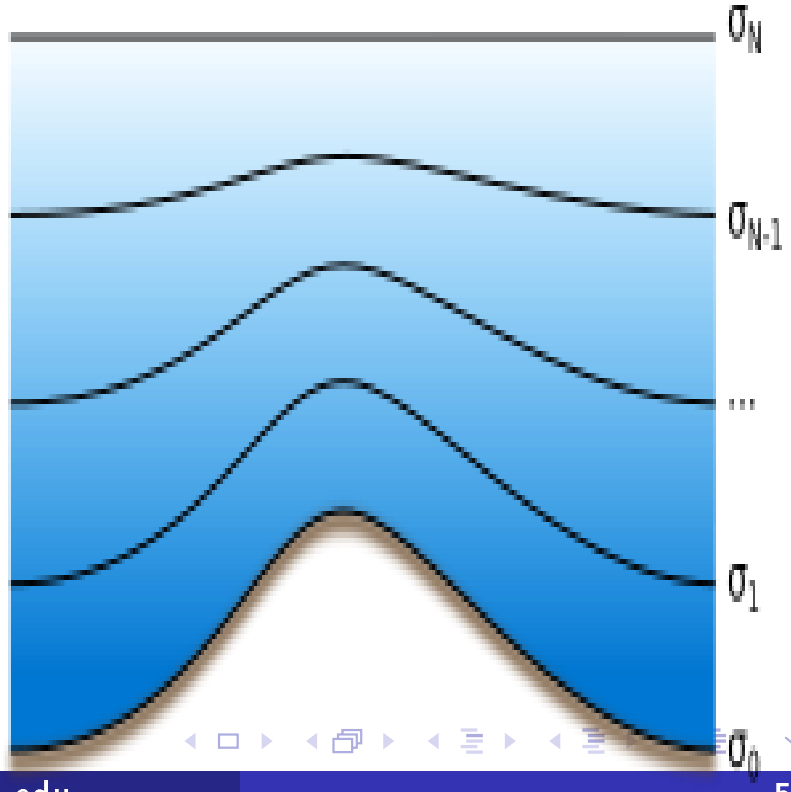
What is ROMS?

- The simple answer:
  –It is a numerical ocean model.
- But there is a lot more to ROMS than the simple answer:
  – active and continuous development of source code
  – Lead by Hernan G. Arango (Rutgers University) and Alexander F. Shchepetkin (UCLA)
  – 34 Listed Developers World Wide on ROMS website

What is ROMS?

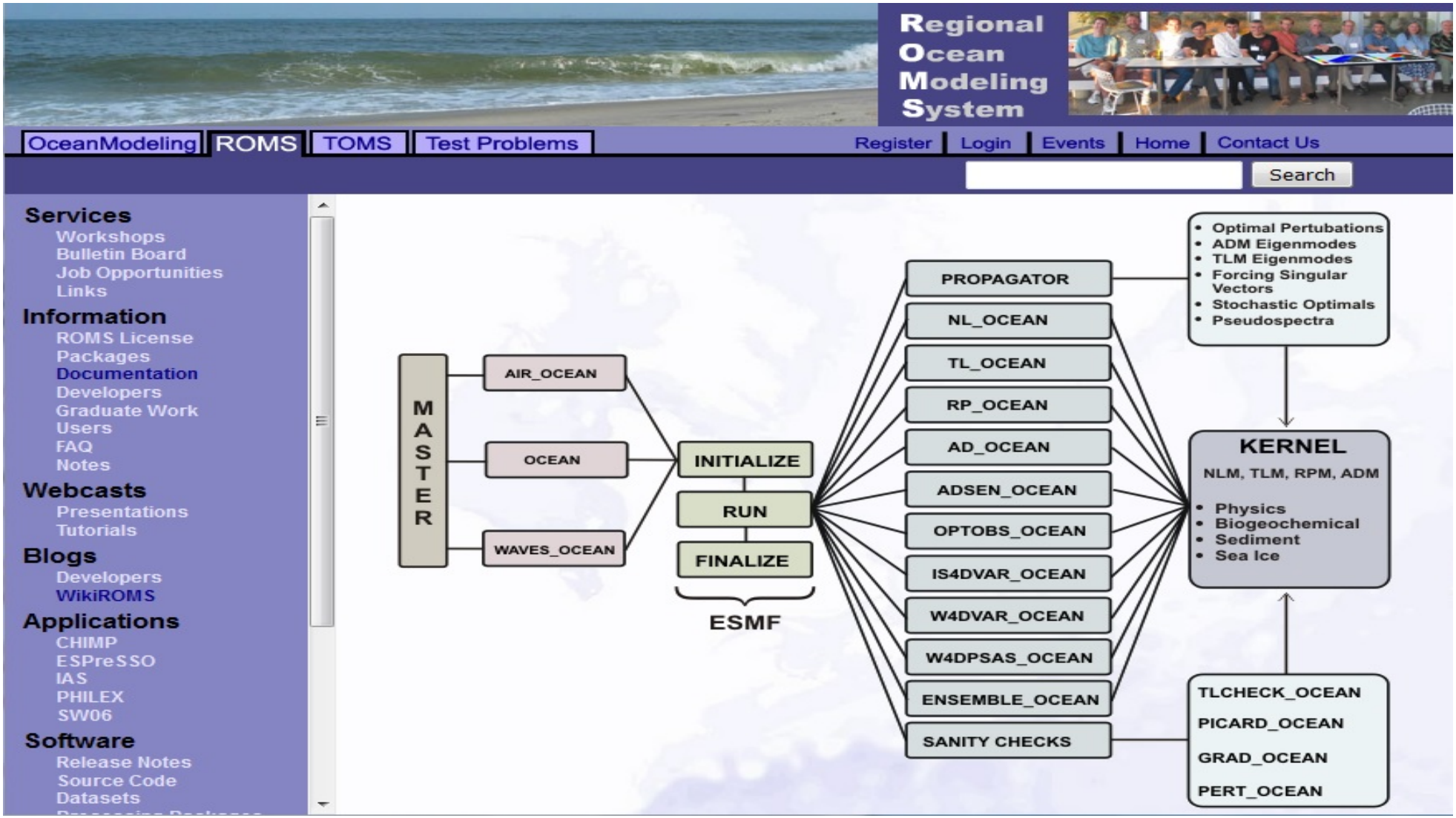
- Free surface, hydrostatic, primitive equation ocean model
- Horizontal coordinate system:
  –Orthogonal curvilinear coordinate
- Vertical coordinate:
  –Stretched, terrain-following S-coordinate





Where do I begin?

Go to the website:
http://www.myroms.org



Learning About ROMS

The ROMS website contains:

- Access to Source Code
- Documentation (WikiROMS)
- Frequently Asked Questions (FAQ)
- Access to Online Help (via the Bulletin Board)
- Pre-processing Packages
  –Grid generation, Input file creation, etc
- Tutorials
- Job Opportunities

Learning About ROMS

- Become a ROMS user:
  –Register, download, install, compile and run the source code yourself
- Become a Collaborator:
  –Collaborate with a ROMS user and use your combined expertise to investigate problems

Example

A biologist may understand ecosystems but may not wish to do the numerical modelling themselves but would rather interpret the results from a model simulation.

Becoming a ROMS User

Registration

- Registration: To register as a ROMS user, click on the registration link near the top of the website and follow the direction. Applications are reviewed on an individual basis and the approval process may take 2-3 days.
- Once registered you can login into the ROMS website, obtain access to the source code, MATLAB scripts, post to the forum, etc.

System Requirements

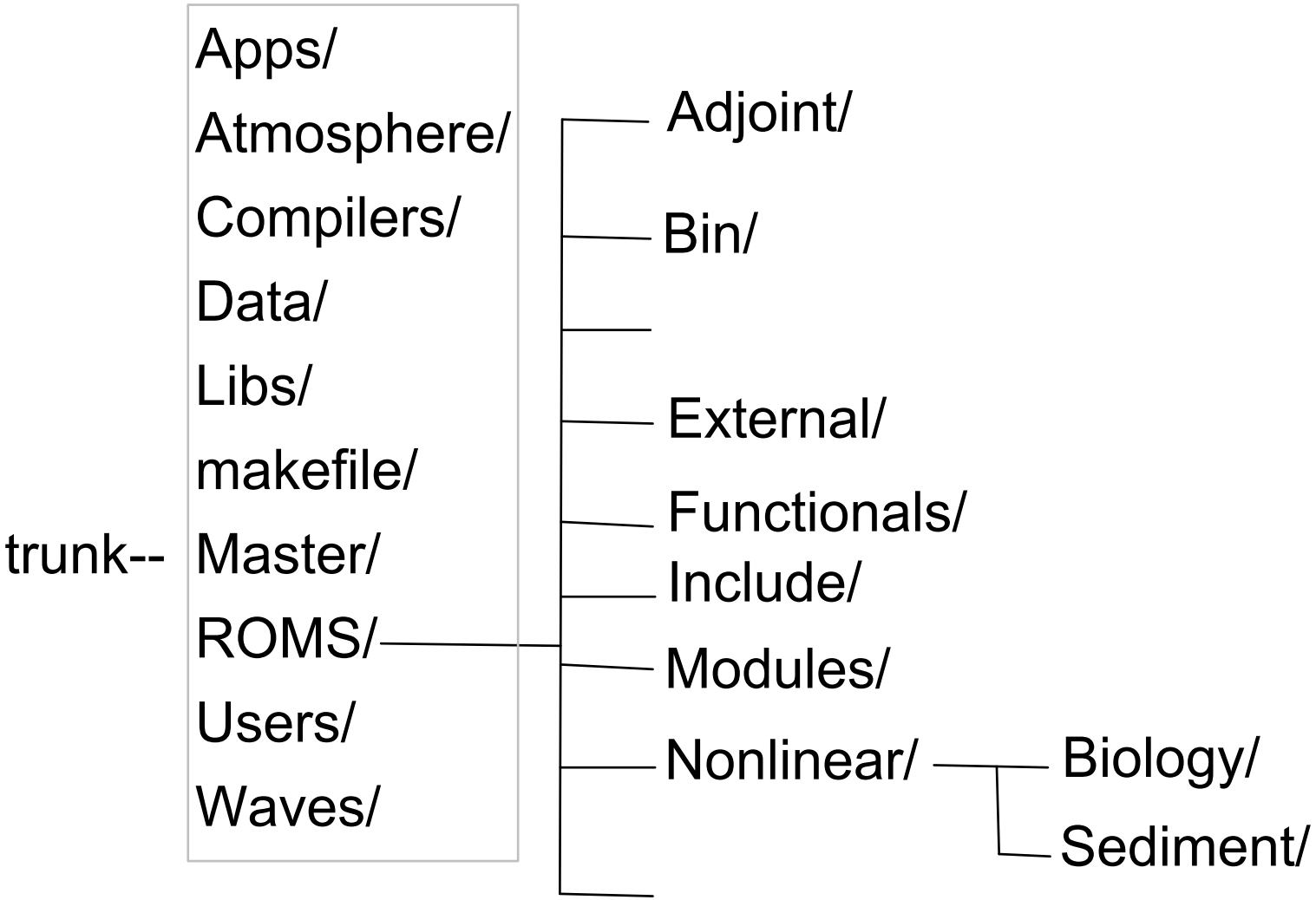
- Need a unix-like (Linux-like) environment.
- Using ROMS in a windows environment usually requires a linux emulator such as Cygwin (www.cygwin.com).
  –Go go https://www.myroms.org/wiki/ROMS-Cygwin
- NetCDF, FORTRAN 90/95, Perl, etc

Becoming a ROMS User

CONGRATULATIONS!

You have now successfully downloaded and installed ROMS

ROMS directory structure



Compiling the Source Code

Compiling

- ROMS has a single makefile
- Typically a user will need to modify a few definitions in the build script before compiling the source code.
  - User Defined Variables
  - Compiler-Specific Options
  - Local File Options

Compiling the Source Code

- The ROMS source code comes with a build script in the ROMS/Bin directory. Examples written with bash (build.bash).

- In your home directory (you can use some other directory to organize your ROMS projects if you wish) create a new folder named Projects and change into it.
  –> cd ∼
  –> mkdir Projects
  –> cd Projects

Customize the Build Script

- Create a folder named upwelling and change into it. ROMS is distributed with several Test Cases and the Upwelling example is the default which we will compile and run here.
  –> mkdir Upwelling
  –> cd Upwelling

- Copy the build.bash file distributed with ROMS to your Projects/Upwelling directory.
  –> cp /roms/trunk/ROMS/Bin/build.bash .

Customize the Build Script

- Next we need to configure a few options inside build.bash so that it finds the directories where the source code and your Projects are located.
- Open the build.bash script you just copied into your upwelling directory using your preferred text editor, e.g. vim, vi, etc. Use "WordPad" on Windows.
- Scroll down until you find `ROMS_APPLICATION`. You will notice it is set as follows:
  –> export `ROMS_APPLICATION`=UPWELLING

Customize the Build Script

- We do not need to change this. But this is the first thing you will alter when starting your own project. This tells ROMS the name of an include file that will contain all the directives to the C-PreProcessor to configure your application at compile time. ROMS' rule is change this string to lowercase and append a ".h", so this will search for a file called upwelling.h. It must be in the directory specified by `MY_PROJECT_DIR`:

- Scroll down until you find `MY_PROJECT_DIR` and set it as follows:
  -> export `MY_PROJECT_DIR`=$HOME/Projects/Upwelling
- This obviously assumes you put Projects/upwelling under your home directory.