

# instructions for 'Introduction to ocean data-model analysis' (MIT, IAP 2016)

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**date:** January 2016

**source:** [http://mitgcm.org/viewvc/MITgcm/MITgcm\\_contrib/gael/comm/course-idma2016/](http://mitgcm.org/viewvc/MITgcm/MITgcm_contrib/gael/comm/course-idma2016/)

## 0) downloading matlab toolboxes

0.1) create a directory called 'iap-idma' and two subdirectories called 'iap-idma/matlab' and 'iap-idma/release1'

0.2) open a web browser and download the following two files:

[ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/checkpoints/gcmfaces\\_20160114.tar.gz](ftp://mit.ecco-group.org/ecco_for_las/version_4/checkpoints/gcmfaces_20160114.tar.gz)

[ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/checkpoints/c65r\\_MITprof.tar.gz](ftp://mit.ecco-group.org/ecco_for_las/version_4/checkpoints/c65r_MITprof.tar.gz)

0.3) move these two files to the idma/ directory and uncompress them.

0.4) the iap-idma directory should now contain two new subdirectories named 'gcmfaces' and 'c65r\_MITprof'. Rename c65r\_MITprof as 'MITprof'. At this point the iap-idma directory should contain 'matlab/', 'release1/', 'MITprof/', and 'gcmfaces/'.

*Notes :*

- disk space requirement ~ 9M (plus session specific items that will be added later)
- 2011 or later matlab version is needed (for native netcdf implementation)
- for session 1 you only need MITprof but gcmfaces will come handy later so you might as well download both right away

## 1) instruction for session #1 activity

1.1) see 'downloading matlab toolboxes'

1.2) download `idma_float_plot.m`, `idma_box_subset.m`, and `idma_box_mean.m` from [http://mitgcm.org/viewvc/MITgcm/MITgcm\\_contrib/gael/comm/course-idma2016/matlab/](http://mitgcm.org/viewvc/MITgcm/MITgcm_contrib/gael/comm/course-idma2016/matlab/)

1.3) move these files to the `iap-idma/matlab/` directory

1.4) use your favorite ftp client (e.g. fetch in iOS, secureFX in MS-windows, or wget in LINUX) to download [ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/release1/MITprof\\_release1](ftp://mit.ecco-group.org/ecco_for_las/version_4/release1/MITprof_release1)

1.5) move the `MITprof_release1/` directory inside the `iap-idma/release1/` directory

1.6) start matlab, go to the `iap-idma` directory, and type:

```
addpath matlab/  
[p]=idma_float_plot('4900828');  
box_l=[-180 -140]; box_L=[-10 10]-30; box_D=[0 300];  
[prof_T,prof_Testim,prof_Tweight]=idma_box_subset(box_l,box_L,box_D);  
[boxmean,tim,dep]=idma_box_mean(prof_T,prof_Tweight);  
figureL; pcolor(tim,-dep,boxmean); colorbar;
```

*Notes :*

- disk space requirement ~ 6.4G

- `idma_float_plot.m` and `idma_box_subset.m` add the `MITprof/` directories to the matlab path

- `idma_box_subset` is the most time consuming of the three scripts and may take ~3 minutes

## 2) instruction for session #2 activity

2.1) see 'downloading matlab toolboxes'. *Note: make sure to use `gcmfaces_20160114.tar.gz` or a later version (e.g. the up to date version of `gcmfaces` from CVS).*

2.2) download the `m_map` plotting toolbox (use the 'zip archive' link) from <https://www.eoas.ubc.ca/~rich/map.html> and then unzip and move it inside `iap-idma/`

2.3) use your favorite ftp client (e.g. fetch in iOS, secureFX in MS-windows, or wget in LINUX) to download the `nctiles_grid/` directory (145M) at [ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/release1/nctiles\\_grid](ftp://mit.ecco-group.org/ecco_for_las/version_4/release1/nctiles_grid) and move it inside `iap-idma/`

2.4) use your favorite ftp client (e.g. fetch in iOS, secureFX in MS-windows, or wget in LINUX) to download the `nctiles_climatology/` directory (14G) at [ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/release1/nctiles\\_climatology](ftp://mit.ecco-group.org/ecco_for_las/version_4/release1/nctiles_climatology) and move it inside `iap-idma/release1/`

2.5) start matlab, go to the `iap-idma/` directory, and type:

```
p = genpath([pwd filesep 'gcmfaces/']); addpath(p);  
p = genpath([pwd filesep 'MITprof/']); addpath(p);  
p = genpath([pwd filesep 'm_map/']); addpath(p);
```

```

grid_load;%load ECCO v4 grid into mygrid
gcmfaces_global;%declare mygrid as global
disp(mygrid);%displays grid variables
diags=example_transports;%computes transports (takes ~ 2 minutes)
example_transports_disp(diags);%display results

```

Then proceed as explained in section 5 of [gcmfaces/gcmfaces.pdf](#) to use `diags_driver.m` and `diags_display.m` (takes ~ 5 minutes).

### 3) instruction for session #3 activity

3.1) see session #2 instructions (2.1 through 2.4 are needed here)

3.2) use your favorite ftp client (e.g. fetch in iOS, secureFX in MS-windows, or wget in LINUX) to download the `binary_inputs/` directory (230M) at [ftp://mit.ecco-group.org/ecco\\_for\\_las/version\\_4/release1/binary\\_inputs](ftp://mit.ecco-group.org/ecco_for_las/version_4/release1/binary_inputs) and move it inside `iap-idma/release1/`

3.3) download `idma_interp_2d.m`, `idma_area_mean.m`, and `idma_load_fields.m` from [http://mitgcm.org/viewvc/MITgcm/MITgcm\\_contrib/gael/comm/course-idma2016/matlab/](http://mitgcm.org/viewvc/MITgcm/MITgcm_contrib/gael/comm/course-idma2016/matlab/) and move them inside the `iap-idma/matlab/` directory

3.4) start matlab, go to the `iap-idma/` directory, and type:

```

addpath matlab;
p = genpath([pwd filesep 'gcmfaces/']); addpath(p);
p = genpath([pwd filesep 'MITprof/']); addpath(p);
p = genpath([pwd filesep 'm_map/']); addpath(p);
grid_load;%load ECCO v4 grid into mygrid
gcmfaces_global;%declare mygrid as global
idma_load_fields;%loads various types of variables to memory

```

Then type ``help idma_interp_2d.m'` and proceed with its example.

Then type ``help idma_area_mean.m'` and proceed with its example.

### 4) instruction for session #4 activity

*Note: the following activity requires a linux computer or a MAC where the following software is already installed: CVS (Concurrent Versions System), make or (preferably) GNU make, a FORTRAN compiler (e.g. gfortran), and a C compiler (e.g. gcc). Steps 4.4 to 4.6 below are computationally intensive and require a cluster with at least 24 cores and an installation of MPI.*

4.1) install MITgcm as explained @ [http://mitgcm.org/public/source\\_code.html](http://mitgcm.org/public/source_code.html) directly in your `iap-idma/` directory

4.2) at the command line, type

```

cd MITgcm/verification/
./testreport -t tutorial_global_oce_latlon

```

4.3) start matlab, go to the `iap-idma/` directory, and type:

```

addpath matlab;
p = genpath([pwd filesep 'gcmfaces/']); addpath(p);
p = genpath([pwd filesep 'MITprof/']); addpath(p);
p = genpath([pwd filesep 'm_map/']); addpath(p);
%
dirExp='MITgcm/verification/tutorial_global_oce_latlon/run/';
nFaces=1; frmt='straight';
grid_load(dirExp,nFaces,frmt);%load grid from this experiment
gcmfaces_global;
%
THETA=rdmds2gcmfaces([dirExp 'T.0000000010']);%load a temperature field
SST=mygrid.mskC(:,1).*THETA(:,1);%get first level and apply land mask
figure; qwckplot(SST);%basic plot of the model SST

```

Then proceed as explained @ [http://mitgcm.org/viewvc/\\*checkout\\*/MITgcm/MITgcm\\_contrib/gael/comm/course-idma2016/guidelines/iap-idma-exercises](http://mitgcm.org/viewvc/*checkout*/MITgcm/MITgcm_contrib/gael/comm/course-idma2016/guidelines/iap-idma-exercises) (under MITgcm exercises) to generate and display results from adjustment.cs-32x32x1, tutorial\_held\_suarez\_cs, and tutorial\_plume\_on\_slope

4.4) follow instructions provided @ [http://mitgcm.org/viewvc/\\*checkout\\*/MITgcm/MITgcm\\_contrib/gael/verification/eccov4.pdf](http://mitgcm.org/viewvc/*checkout*/MITgcm/MITgcm_contrib/gael/verification/eccov4.pdf) to install the ECCO v4 setups (section 1.3) and run the 20 year ECCO v4 solution (section 2.1).

4.5) start matlab and proceed as in #4.3 above but with 'dirExp' set to your run directory, 'nFaces' set to 5 and 'frmt' set to 'compact'.

4.6) proceed as explained in section 5 of gcmfaces/gcmfaces.pdf to use diags\_driver.m and diags\_driver\_tex.m to generate the standard analysis document.