

Ben Foster <foster@ucar.edu>

Tue, Sep 22, 2015 at 9:57 AM

## **TIEGCM 2.0**

16 messages

Sean Elvidge <s.elvidge@bham.ac.uk>

To: Ben Foster <foster@ucar.edu>, "Stanley C. Solomon" <stans@ucar.edu>

Hi,

I have been using TIEGCM for a couple of years now, and I am just about to undertake a new project in which I hope to again use it. However I heard at a conference (AT-RASC, back in May) that TIEGCM v2.0 was "close" to being ready for release. I am particularly interested in the "double" resolution.

Do you have any idea how close "close" is? I am keen to use the new version from the beginning of the project rather than switching half way through.

Many thanks, Sean.

--

Dr. Sean Elvidge, PhD, MIMA

Research Fellow, Webmaster, Federation of Astronomical Societies (FAS).

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**Ben Foster** <foster@ucar.edu> To: Sean Elvidge <s.elvidge@bham.ac.uk>, Joe McInerney <joemci@ucar.edu> Cc: "Stanley C. Solomon" <stans@ucar.edu>

Sean,

Yes, we are somewhat delinquent in our releases. I would say that "close" means sometime this winter, maybe January. I appreciate that you want to use the new version, and agree that you should, so I can give you the current trunk revision of TIEGCM. It is considered stable, if not ready for a formal release. I could give you a tarball of the source, but better would be for you to have access to our svn repository - you could access it via a proxy URL, and that way you would have the option of updating when we make commits. Let me know if you want to do this, otherwise I will send you a tar file.

Tue, Sep 22, 2015 at 10:21 AM

--Ben [Quoted text hidden] --Ben Foster National Center for Atmospheric Research (NCAR) High Altitude Observatory (HAO) 303-497-1595

Sean Elvidge <s.elvidge@bham.ac.uk> To: Ben Foster <foster@ucar.edu>, Joe McInerney <joemci@ucar.edu> Cc: "Stanley C. Solomon" <stans@ucar.edu> Tue, Sep 22, 2015 at 10:39 AM

Hi Ben,

Thanks for your very quick response. Access to the svn repository would be excellent, definitely the best way of going about things.

Thanks, Sean.

On Tue, 22 Sep 2015 at 17:21 Ben Foster <foster@ucar.edu> wrote: Sean,

Yes, we are somewhat delinquent in our releases. I would say that "close" means sometime this winter, maybe January. I appreciate that you want to use the new version, and agree that you should, so I can give you the current trunk revision of TIEGCM. It is considered stable, if not ready for a formal release. I could give you a tarball of the source, but better would be for you to have access to our svn repository - you could access it via a proxy URL, and that way you would have the option of updating when we make commits. Let me know if you want to do this, otherwise I will send you a tar file.

--Ben

On Tue, Sep 22, 2015 at 9:57 AM, Sean Elvidge <<u>s.elvidge@bham.ac.uk</u>> wrote: [Quoted text hidden]

Ben Foster National Center for Atmospheric Research (NCAR) High Altitude Observatory (HAO) 303-497-1595

**Ben Foster** <foster@ucar.edu> To: Sean Elvidge <s.elvidge@bham.ac.uk>

Sean,

To build the tiegcm trunk, you will need to link the ESMF library (Earth System Modeling Framework), preferably compiled with Intel. See the Makefiles in the scripts directory. The ESMF is Tue, Sep 22, 2015 at 9:49 PM

free in public domain.

--Ben [Quoted text hidden]

**Sean Elvidge** <s.elvidge@bham.ac.uk> To: Ben Foster <foster@ucar.edu> Thu, Sep 24, 2015 at 8:35 AM

Ben,

I've been in touch with Gary and my account is now all set up. I've checked out the latest version today and am currently trying to build the trunk. I am just having a slight issue with the ESMF library, hopefully an easy question for you.

I've downloaded the latest version of ESMF, compiled it, and checked the build. Every test was passed. I've now included a line in my makefile for the location of esmf (a variable LIB\_ESMF in the makefile seemed to be the correct thing to do). When I then try and compile TIE-GCM the main compilation routine works but I get thrown an error after that along the lines of:

>>> esmf\_init: error return from ESMF\_FieldRegridStore for 3d geo2mag: rc= 513

MPI\_ABORT was invoked on rank 1 in communicator MPI\_COMM\_WORLD with errorcode 4.

(I've attached my tiegcm.out file in case that is helpful)

I guess I am supposed to link the ESMF library to TIEGCM somehow - but I'm not quite sure how to do that....

Thanks for any help you can provide, Sean.

On Wed, 23 Sep 2015 at 04:49 Ben Foster <foster@ucar.edu> wrote: Sean.

To build the tiegcm trunk, you will need to link the ESMF library (Earth System Modeling Framework), preferably compiled with Intel. See the Makefiles in the scripts directory. The ESMF is free in public domain.

--Ben [Quoted text hidden]

tiegcm.out 26K

Ben Foster <foster@ucar.edu> Thu, Sep 24, 2015 at 10:26 AM To: Sean Elvidge <s.elvidge@bham.ac.uk>, robert.oehmke@noaa.gov, Joe McInerney <joemci@ucar.edu>

## Sean,

This is a runtime error, so the model had compiled and linked ESMF successfully before execution. All 4 mpi tasks had successfully called the MPI initialization, and the decomposition was set up. The error occurred in a call to ESMF in which MPI operations are required. So I suspect that ESMF was built with some mismatch with the model compilation, possibly with respect to the MPI implementation.

I guess my first question is did both the ESMF build and the TIEGCM build use the same compiler, preferably Intel? I have not yet been successful compiling and linking with a compiler other than Intel (although others have). As you can see in Make.intel\_hao64, I am linking ESMF\_5\_2\_0rp1\_beta\_snapshot\_21, which I built with Intel a few years ago (I should update it). I am attaching the esmf.mk file that specified certain options for my build of this version. You should compare my esmf.mk and yours. I am not suggesting that you need to build this old ESMF snapshot to make it work, you should be able to use the latest version. Note that esmf.mk is included in the Makefile (include \$(LIB\_ESMF)/esmf.mk)

Also, make sure you are building 64-bit ESMF, and that you are compiling the model with default 8-byte reals (-r8 option, I think). I am copying Bob Oehmke here, an ESMF developer who was extremely helpful when we started using ESMF for regridding between geographic and geomagnetic grids. Maybe Bob can help us. Thanks for your patience - the fact that you successfully built ESMF and TIEGCM is a great first step. Also, please send output of "uname -a" on your machine - I think you are using a laptop, probably a Mac? (Also, you should not use job script or any scripts from an old version of TIEGCM - always use the files that came with the version you checked out)

--Ben [Quoted text hidden]



Robert Oehmke <robert.oehmke@noaa.gov> To: Ben Foster <foster@ucar.edu> Cc: Sean Elvidge <s.elvidge@bham.ac.uk>, Joe McInerney <joemci@ucar.edu> Thu, Sep 24, 2015 at 11:47 AM

Hi Ben,

Long time no talk. I hope that things are going well with you. :-)

Is there an error message in the Log files? Which version of ESMF is he using?

Thanks,

- Bob

[Quoted text hidden]

[Quoted text hidden] <esmf.mk> Ben Foster <foster@ucar.edu>Thu, Sep 24, 2015 at 1:10 PMTo: Robert Oehmke <robert.oehmke@noaa.gov>Cc: Sean Elvidge <s.elvidge@bham.ac.uk>, Joe McInerney <joemci@ucar.edu>

Sean,

The Log files Bob is asking about are the PET\* files that should appear in your execution directory (there will be one for each mpi task).

--Ben [Quoted text hidden]

Sean Elvidge <s.elvidge@bham.ac.uk> To: Ben Foster <foster@ucar.edu>, Robert Oehmke <robert.oehmke@noaa.gov> Cc: Joe McInerney <joemci@ucar.edu> Thu, Sep 24, 2015 at 2:20 PM

Hi Both,

Ben's original message provided me with the clue to fix the problem.

I compile TIE-GCM on Ubuntu using gfortran and openmpi. However when I compiled ESMF I didn't change any of the defaults, so it wasn't using the right compiler. Using the environment variable 'ESMF\_COMM=openmpi' and checking that the mpif90 compiler was used (which it was by default) and we have lift off!

I am using ESMF 6.3.0. Everything seems to be working great.

Thanks for your help, Sean.

On Thu, 24 Sep 2015 at 20:11 Ben Foster <<u>foster@ucar.edu</u>> wrote: Sean,

The Log files Bob is asking about are the PET\* files that should appear in your execution directory (there will be one for each mpi task).

--Ben

On Thu, Sep 24, 2015 at 11:47 AM, Robert Oehmke <<u>robert.oehmke@noaa.gov</u>> wrote: [Quoted text hidden]

Ben Foster <foster@ucar.edu>

Thu, Sep 24, 2015 at 2:29 PM

To: Sean Elvidge <s.elvidge@bham.ac.uk> Cc: Robert Oehmke <robert.oehmke@noaa.gov>, Joe McInerney <joemci@ucar.edu>

Way to go Sean, great that you fixed the problem! This inspires me to update to ESMF 6.3.0 myself here at hao (and also to support gfortran) This info will be useful to include in documentation of building TIEGCM v2.0. Thanks,

--Ben [Quoted text hidden]

Robert Oehmke <robert.oehmke@noaa.gov> To: Sean Elvidge <s.elvidge@bham.ac.uk>

Cc: Ben Foster <foster@ucar.edu>, Joe McInerney <joemci@ucar.edu>

Thu, Sep 24, 2015 at 2:35 PM

Great!

By the way, while I'm talking to you both, I just wanted to let you know that we've implemented 3D spherical bilinear. This is 3D bilinear where the cells follow the curve of the sphere. The calculation of the weights would likely be slower than what you have going on now because there's a lot more math involved, so I'm not suggesting that you switch that. However, if you ever have a case where the levels of the source and destination don't line up, or the grids are totally different shapes it would be useful. (e.g. mapping information back and forth between a field line grid and something more regular).

- Bob [Quoted text hidden]

Sean Elvidge <s.elvidge@bham.ac.uk>

To: Ben Foster <foster@ucar.edu>

Cc: Robert Oehmke <robert.oehmke@noaa.gov>, Joe McInerney <joemci@ucar.edu>

No problem at all. If you want my info on how I compiled it for gfortran just let me know, will happily pass it on (the isystem subroutine has to be removed from util.F and all references to it just replaced with the 'system' command, and suitable flags have to be passed to gfortran).

Now to try the double resolution mode....

Thanks for all your help as always, Sean.

On Thu, 24 Sep 2015 at 21:29 Ben Foster <<u>foster@ucar.edu</u>> wrote: Way to go Sean, great that you fixed the problem! This inspires me to update to ESMF 6.3.0 myself here at hao (and also to support gfortran) This info will be useful to include in documentation of building TIEGCM v2.0. Thanks,

--Ben [Quoted text hidden]

**Ben Foster** <foster@ucar.edu> To: Sean Elvidge <s.elvidge@bham.ac.uk>

Sean, yes, please send me the Make files you used for gfortran, and yes, I will remove the isystem sub from util.F. BTW, ESMF does not like to run this code with nproc=1, which some users have needed for debugging purposes. I am working w/ Bob on that problem.

Also, if you need startup histories for double-resolution, look in http://download.hao.ucar.edu/pub/tgcm/tiegcm1.95/ File names TGCM\*dres\*.nc.

--Ben [Quoted text hidden]

**Sean Elvidge** <s.elvidge@bham.ac.uk> To: Ben Foster <foster@ucar.edu>

Thu, Sep 24, 2015 at 2:50 PM

Thu, Sep 24, 2015 at 2:36 PM

Thu, Sep 24, 2015 at 2:57 PM

Please find attached my "Make.ubuntu" file. Once the isystem sub is removed from util.F the other files which include references to it (which just need to be changed to 'system' commands) are util.F, dispose.F and getfile.F.

Thanks, Sean.

C	On Thu, 24 Sep 2015 at 21:50 Ben Foster <foster@ucar.edu> wrote: Sean, yes, please send me the Make files you used for gfortran, and yes, I will remove the isystem sub from util.F. BTW, ESMF does not like to run this code with nproc=1, which some users have needed for debugging purposes. I am working w/ Bob on that problem.</foster@ucar.edu>
	Also, if you need startup histories for double-resolution, look in http://download.hao.ucar.edu/pub/tgcm/tiegcm1.95/ File names TGCM*dres*.nc.
	Ben [Quoted text hidden]

☐ Make.ubuntu 1K

**Ben Foster** <foster@ucar.edu> To: Robert Oehmke <robert.oehmke@noaa.gov> Thu, Sep 24, 2015 at 4:04 PM

Yes, long time no talk. BTW, now that Sean Elvidge's problem is resolved, I have been meaning to ask you about a problem: I get the same error that Sean got when I run the model with only a single processor (nproc=1).

0: >>> esmf\_init: error return from ESMF\_FieldRegridStore for 3d geo2mag: rc= 513

Surprisingly, it apparently did not produce a PET file (the 4 PET files from a previous successful run with nproc=4 are there and are empty). I would like to be able to occaisionally run the code with nproc=1 for debugging purposes. I'm attaching the stdout file w/ the error. Let me know if I can give you more information. No hurry on this - I no longer work on Fridays, so no need to reply before next week). Thanks,

--Ben

On Thu, Sep 24, 2015 at 11:47 AM, Robert Oehmke <robert.oehmke@noaa.gov> wrote:

[Quoted text hidden] [Quoted text hidden]

> tiegcm\_task0000.out 8K

Robert Oehmke <robert.oehmke@noaa.gov> To: Ben Foster <foster@ucar.edu> Cc: ESMF Support <esmf\_support@list.woc.noaa.gov> Fri, Sep 25, 2015 at 1:12 PM

Hi Ben,

I took a look at the output file. It doesn't have much information. It's strange that the Pet files are empty. When you abort do you call ESMF\_Finalize()? It flushes the log messages to file.

If that doesn't work, let me know and I'll think of another way to debug.

Thanks!

- Bob

[Quoted text hidden]

[Quoted text hidden] <tiegcm\_task0000.out>