
Subject: Can't exit DEFINE mode in netCDF File
Posted by [David Fanning](#) on Tue, 06 Oct 2009 20:42:03 GMT
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Folks,

I am writing my first netCDF file in IDL and I am practically copying the code out of Ken Bowman's book. I open a file:

```
fID = NCDF_CREATE(filename, /CLOBBER)
```

Then, I define several global attributes, two dimensions, and two variables. I also define a couple of attributes of the variables. All in that order.

Then, I attempt to get out of DEFINE mode and into DATA mode, so I can write the actual variables.

```
NCDF_CONTROL, fID, /ENDEF
```

But at this point I get the following error message:

```
% NCDF_CONTROL: Attempt to take the file out of  
define mode (ENDEF) failed. (NC_ERROR=-45)  
% Execution halted at: TIMESERIES::CREATE_CLIMATOLOGY 2589
```

Does anyone have ANY idea what this might be about?

Thanks,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [David Fanning](#) on Tue, 06 Oct 2009 21:45:55 GMT
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David Fanning writes:

```
>  
> Folks,  
>  
> I am writing my first netCDF file in IDL and I am practically
```

```

> copying the code out of Ken Bowman's book. I open a file:
>
>   fID = NCDF_CREATE(filename, /CLOBBER)
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> Then, I define several global attributes, two dimensions,
> and two variables. I also define a couple of attributes
> of the variables. All in that order.
>
> Then, I attempt to get out of DEFINE mode and into DATA
> mode, so I can write the actual variables.
>
>   NCDF_CONTROL, fID, /ENDEF
>
> But at this point I get the following error message:
>
>   % NCDF_CONTROL: Attempt to take the file out of
>   define mode (ENDEF) failed. (NC_ERROR=-45)
>   % Execution halted at: TIMESERIES::CREATE_CLIMATOLOGY 2589
>
> Does anyone have ANY idea what this might be about?

```

The code is pretty simple:

```

; Create a netCDF file for storing the climatology.
fID = NCDF_Create(filename, /CLOBBER)

; Define dimensions.
ysizeID = NCDF_DIMDEF(fID, 'cols', xsize)
ysizeID = NCDF_DIMDEF(fID, 'rows', ysize)
timeID = NCDF_DIMDEF(fID, 'time', 2)

; Define variables.
vid = NCDF_VARDEF(fID, 'time', [timeID], /LONG)
vid = NCDF_VARDEF(fID, 'climatology', [ysizeID, ysizeID], /DOUBLE)

; Define variable attributes.
NCDF_ATTPUT, fID, 'time', 'units', 'Days since 1601-01-01 00:00:00'
NCDF_ATTPUT, fID, 'time', 'long_name', 'Start and end time. '
NCDF_ATTPUT, fID, 'climatology', '_FillValue', fillValue
NCDF_ATTPUT, fID, 'climatology', 'long_name', 'longish name'

; Exit DEFINE mode and into DATA mode.
NCDF_Control, fID, /ENDEF

; Write the variables.
NCDF_VarPut, fID, 'time', [time[0], time[timepts-1]]
NCDF_VarPut, fID, 'climatology', climatology

```

```
; Close the file.  
NCDF_Close, fID
```

At one time I had global attributes in there, but I took them out and the code worked! So I added them back one by one. Then, it didn't work again, so I took them all back out. Now it *still* doesn't work! Something really, really weird going on here, I think. :-(

Cheers,

David

--
David Fanning, Ph.D.
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Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Paul Van Delst\[1\]](#) on Tue, 06 Oct 2009 22:03:33 GMT
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David Fanning wrote:

> David Fanning writes:

>

>> Folks,

>>

>> I am writing my first netCDF file in IDL and I am practically
>> copying the code out of Ken Bowman's book. I open a file:

>>

>> fID = NCDF_CREATE(filename, /CLOBBER)

>>

>> Then, I define several global attributes, two dimensions,
>> and two variables. I also define a couple of attributes
>> of the variables. All in that order.

>>

>> Then, I attempt to get out of DEFINE mode and into DATA
>> mode, so I can write the actual variables.

>>

>> NCDF_CONTROL, fID, /ENDEF

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>> But at this point I get the following error message:

>>

>> % NCDF_CONTROL: Attempt to take the file out of
>> define mode (ENDEF) failed. (NC_ERROR=-45)

>> % Execution halted at: TIMESERIES::CREATE_CLIMATOLOGY 2589

```

>>
>> Does anyone have ANY idea what this might be about?
>
> The code is pretty simple:
>
> ; Create a netCDF file for storing the climatology.
> fID = NCDF_Create(filename, /CLOBBER)
>
> ; Define dimensions.
> xsizeID = NCDF_DIMDEF(fID, 'cols', xsize)
> ysizeID = NCDF_DIMDEF(fID, 'rows', ysize)
> timeID = NCDF_DIMDEF(fID, 'time', 2)
>
> ; Define variables.
> vid = NCDF_VARDEF(fID, 'time', [timeID], /LONG)
> vid = NCDF_VARDEF(fID, 'climatology', [xsizeID, ysizeID], /DOUBLE)
>
> ; Define variable attributes.
> NCDF_ATTPUT, fID, 'time', 'units', 'Days since 1601-01-01 00:00:00'
> NCDF_ATTPUT, fID, 'time', 'long_name', 'Start and end time. '
> NCDF_ATTPUT, fID, 'climatology', '_FillValue', fillValue
> NCDF_ATTPUT, fID, 'climatology', 'long_name', 'longish name'
>
> ; Exit DEFINE mode and into DATA mode.
> NCDF_Control, fID, /ENDEF
>
> ; Write the variables.
> NCDF_VarPut, fID, 'time', [time[0], time[timepts-1]]
> NCDF_VarPut, fID, 'climatology', climatology
>
> ; Close the file.
> NCDF_Close, fID
>
> At one time I had global attributes in there, but I took them out
> and the code worked! So I added them back one by one. Then, it
> didn't work again, so I took them all back out. Now it *still*
> doesn't work! Something really, really weird going on here, I think. :(

```

I think it's related to the `_FillValue` global attribute. I can't remember the details, but I posted here about exactly the same thing a few months ago. Searching the web....

Paul van Delst wrote:

```

> Hello,
>
> I've encountered a strange problem with some netCDF output using IDL.
>
> I define a character string array variable in my output netCDF file like so:
> VarId = NCDF_VARDEF( fid, 'Absorber_Units_Name', [32,n_Absorbers_DimId], /CHAR)

```

> where the "32" is the maximum string length.
>
> Now if I try to set a fill value attribute for that variable, like so
> NCDF_ATTPUT, fid, VarId, '_FillValue', ''
> or
> NCDF_ATTPUT, fid, VarId, '_FillValue', 0B
>
> when I run the code I get the following error when I take the file out of define mode:
>
> % NCDF_CONTROL: Attempt to take the file out of define mode (ENDEF) failed.
(NC_ERROR=-45)
>
> If I simply comment out the call to NCDF_ATTPUT for these character variables, there's no
> problem.
>
> I do this sort of thing (i.e. _FillValue of " " for character string variables) all the
> time using the Fortran90 API to netCDF so I assume an empty space is a valid fill value.
>
> Has anyone else encountered this behaviour in IDL? I.e. is this a known bug in the IDL
> netCDF interface, or do I need to do something special with character fill values?
>
> Thanks for any info.
>
> cheers,
>
> paulv

Fiç½LDY Lajos came up with a solution,

> I have found the solution: _FillValue needs to be the same type as the
> variable. '' is an IDL string, which is converted to something, probably
> BYTE. So let's add an explicite /CHAR to ncdf_attput:
>
> ncid=ncdf_create('test.nc', /clobber)
> dim32=ncdf_dimdef(ncid, 'dim1', 32)
> n_absorbers_dimid=ncdf_dimdef(ncid, 'dim2', 9)
> varid = ncdf_vardef(ncid, 'absorber_units_name', [dim32,n_absorbers_dimid], /char)
> ncdf_attput, ncid, varid, '_FillValue', '', /CHAR
> ncdf_control, ncid, /endef
> ncdf_close, ncid
>
> It works now! :-)
>
> regards,
> lajos

Does that help?

cheers,

paulv

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [David Fanning](#) on Tue, 06 Oct 2009 22:33:23 GMT
[View Forum Message](#) <> [Reply to Message](#)

Paul van Delst writes:

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> FÖLDY Lajos came up with a solution,
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>
>> I have found the solution: _FillValue needs to be the same type as the
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>>
>> ncid=ncdf_create('test.nc', /clobber)
>> dim32=ncdf_dimdef(ncid, 'dim1', 32)
>> n_absorbers_dimid=ncdf_dimdef(ncid, 'dim2', 9)
>> varid = ncdf_vardef( ncid, 'absorber_units_name', [dim32,n_absorbers_dimid], /char)
>> ncdf_attput, ncid, varid, '_FillValue', ' ', /CHAR
>> ncdf_control, ncid, /endef
>> ncdf_close, ncid
>>
>> It works now! :-)
>>
>> regards,
>> lajos
>
> Does that help?
```

Ah! Yes, I remember reading that and thinking it was too esoteric for an article on my web page. I should have known better. I won't make that mistake again!

Where is it written, though, that the _FillValue attribute has to be the same data type as the variable it is an attribute of? And why doesn't *that* cause an error, instead of this action at a distance thing?

I'm not sure this was worth three hours of effort, not counting the time it will take to write the damn article. :-(

Thanks for the help.

Cheers,

David

--

David Fanning, Ph.D.

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Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Paul Van Delst\[1\]](#) on Wed, 07 Oct 2009 14:30:42 GMT

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David Fanning wrote:

> Paul van Delst writes:

>

>> Fí½LDY Lajos came up with a solution,

>>

>>

>>> I have found the solution: _FillValue needs to be the same type as the
>>> variable. ' ' is an IDL string, which is converted to something, probably
>>> BYTE. So let's add an explicite /CHAR to ncdf_attput:

>>>

>>> ncid=ncdf_create('test.nc', /clobber)

>>> dim32=ncdf_dimdef(ncid, 'dim1', 32)

>>> n_absorbers_dimid=ncdf_dimdef(ncid, 'dim2', 9)

>>> varid = ncdf_vardef(ncid, 'absorber_units_name', [dim32,n_absorbers_dimid], /char)

>>> ncdf_attput, ncid, varid, '_FillValue', ' ', /CHAR

>>> ncdf_control, ncid, /endef

>>> ncdf_close, ncid

>>>

>>> It works now! :-)

>>>

>>> regards,

>>> lajos

>> Does that help?

>

> Ah! Yes, I remember reading that and thinking it was too

> esoteric for an article on my web page. I should have known

> better. I won't make that mistake again!

>

> Where is it written, though, that the _FillValue attribute has

> to be the same data type as the variable it is an attribute of?

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Foldy Lajos](#) on Wed, 07 Oct 2009 15:52:08 GMT
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On Wed, 7 Oct 2009, dcleon@gmail.com wrote:

>
>> Where is it written, though, that the _FillValue attribute has
>> to be the same data type as the variable it is an attribute of?
>> And why doesn't *that* cause an error, instead of this action at
>> a distance thing?
>
> I've run into this problem several times. I think with the ncdf_
> routines that if the type on any attribute or variable fails to match
> the declared type, that you're going to get an error when you close
> the file. Seems like the ncdf routines should give you the error when
> you define the attribute/variable not down the road when you go to
> close the file. Anyway, the bottom line is check types very carefully
> when writing NetCDF files.
>
> Cheers,
> dave
>

Some ncdf_ routines silently return -1 on error. Users have to check these
return values manually. But I am sure there is some logic behind it, it's
IDL ;-)

regards,
lajos

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [David Fanning](#) on Wed, 07 Oct 2009 16:24:30 GMT
[View Forum Message](#) <> [Reply to Message](#)

dcleon@gmail.com writes:

> I've run into this problem several times. I think with the ncdf_
> routines that if the type on any attribute or variable fails to match
> the declared type, that you're going to get an error when you close
> the file. Seems like the ncdf routines should give you the error when
> you define the attribute/variable not down the road when you go to
> close the file. Anyway, the bottom line is check types very carefully
> when writing NetCDF files.

It is not that the attribute data type has to match its
declared type, it is that the attribute type has to

match the data type of the variable it is being associated with. So there is another layer of obfuscation in there. And since this completely undocumented error can occur in another part of the code entirely from where the actual error shows up, it is basically impossible to debug. How the solution was discovered is beyond my understanding.

Cheers,

David

--

David Fanning, Ph.D.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Foldy Lajos](#) on Wed, 07 Oct 2009 17:52:31 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Wed, 7 Oct 2009, David Fanning wrote:

> it is basically impossible to debug. How the solution
> was discovered is beyond my understanding.

It's easy, I was using FL, not IDL :-) FL prints netCDF error messages verbatim:

% Error: NCDF_CONTROL: NetCDF: Not a valid data type or _FillValue type mismatch

regards,
lajos

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Kenneth P. Bowman](#) on Wed, 07 Oct 2009 18:22:38 GMT
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In article
<1a1cedb2-981d-4b52-af3e-1af44caf7830@x5g2000prf.googlegroups.com>,
"dcleon@gmail.com" <dcleon@gmail.com> wrote:

>> Where is it written, though, that the _FillValue attribute has
>> to be the same data type as the variable it is an attribute of?
>> And why doesn't *that* cause an error, instead of this action at

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> the declared type, that you're going to get an error when you close
> the file. Seems like the ncdf routines should give you the error when
> you define the attribute/variable not down the road when you go to
> close the file. Anyway, the bottom line is check types very carefully
> when writing NetCDF files.
>
> Cheers,
> dave

Well, you learn something new every day (if you're lucky). Or perhaps unlearn something wrong that you thought you knew.

I always interpreted the NCDF_CONTROL man page to imply that fill values could not be changed, when in fact it (correctly) states that the *default* fill values cannot be changed.

Use of the _FillValue attribute is rather well hidden on pages 91 and 133 of the netCDF C-interface documentation

<http://www.unidata.ucar.edu/software/netcdf/docs/netcdf-c.pdf>

I thought this usage was restricted to the netCDF utilities (such as ncgen) and not a property of the API.

Section 6.30 of the docs does say that errors can result when attempting to convert a fill value from one type to another.

IDL seems to be reporting this in a particularly opaque manner. (That's a polite euphemism for damned incomprehensible IDL error message.)

Ken Bowman

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [David Fanning](#) on Fri, 09 Oct 2009 19:00:10 GMT
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Paul van Delst writes:

> All good questions. Although I find myself in the strange position of *providing*
> David-Fanning-type wisdom (to said namesake no less!) rather than being on the receiving end:
>
> It is like it is because that's the way it is.

No wonder my hate mail runs about 10:1 verses the complements.(1) :-(

> BTW, was it the fillvalue attribute in particular, or some other one?

Your example was a

> little bit different from mine in that my fillvalue was a character (where I believe yours
> was a numeric quantity).

My variable and fill value where numerical values.

What happened was that I was reading a variable and its
fill value out of a file, computing some averages (climatologies),
then writing the climatologies back into another netCDF file.

I just tried to assign the climatologies the same fill value

I had read out of the file. But, of course, the original

data were long integers, and the climatologies were floats.

I never looked at (or even knew) the fill value.

> Ultimate thanks go to Mr. Lajos (or Mr. Földy?

> Don't know the correct order)

Yes, of course. I may have to investigate that FL language. ;-)

Cheers,

David

(1) Mostly from the Chinese though, thankfully. They are still
pissed about the Dahli Lama reference on my book page.

--

David Fanning, Ph.D.

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Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: Can't exit DEFINE mode in netCDF File
Posted by [Foldy Lajos](#) on Fri, 09 Oct 2009 19:27:05 GMT

[View Forum Message](#) <> [Reply to Message](#)

On Wed, 7 Oct 2009, Paul van Delst wrote:

>

> Ultimate thanks go to Mr. Lajos (or Mr. Földy? Don't know the correct order)

>

Hungarian names are in reverse order. Wait, no! English names are in
reverse order :-)

So, FÖLDY is the family name, Lajos is the given name. (I write the family name in uppercase in emails, but this time it did not help :-) The o with umlaut is pronounced like the German ö in the word 'schön' (a little bit shorter).

regards,
Lajos

ps: the English middle name is the last in Hungarian, which is logical:
the second given name comes after the first.
