
Subject: reading multiple HDF files

Posted by [julia.walterspiel](#) on Tue, 15 Jul 2008 11:41:04 GMT

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Hi!

I'm a newbie to IDL (I used to program in MATLAB but the place i work at only has IDL licences) and i need to get some things here done asap.

I've been struggling with reading HDF files from MODIS for quiet some time now and I def need some good input!

Here's the thing:

I downloaded a bunch (hundrets) of MODIS data (e.g. MOD_06, Cloud product, daily data, years 2000-2008) in HDF format from which I need to extract the SDS "Cloud_Fraction" and plot it as a time series for a specific geographical region (Switzerland). I managed to read the files with the program hdf_read by David fanning and I have a vague idea what to do in order to read in multiple hdf files (I guess this is done with a FOR loop).

HOWEVER: I simply cannot imagine how it is possible to link single SDS' (e.g. "Cloud_Fraction") from multiple hdf files, and I don't even wanna think about displaying them as a time series or on a map of a geographic region.

Can anybody give me some good hints? anything would be greatly appreciated!!!

many many thanks

Julia

Subject: Re: reading multiple HDF files

Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 09:41:34 GMT

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I'm making good progress here thanks to you - until I got the error message

HDF_SD_START: Unable to start the HDF-SD interface.

I searched the internet for answers, found a couple (restart IDL, .reset_session, i even restarted the computer) but it didnt help.

I had this problem a couple days ago, but could solve it with restart/reset session. I wonder what's it this time...

Any brilliant ideas? (I have to say I'm working on a laptop.. so might it be memory problems?)

Subject: Re: reading multiple HDF files

Posted by [jameskuyper](#) on Wed, 16 Jul 2008 11:12:57 GMT

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julia.walterspiel@gmail.com wrote:

> I'm making good progress here thanks to you - until I got the error
> message
> HDF_SD_START: Unable to start the HDF-SD interface.
>
> I searched the internet for answers, found a couple (restart
> IDL, .reset_session, i even restarted the computer) but it didnt
> help.
> I had this problem a couple days ago, but could solve it with restart/
> reset session. I wonder what's it this time...
>
> Any brilliant ideas? (I have to say I'm working on a laptop.. so might
> it be memory problems?)

When I've run into this error, it's always been due to one of the following stupid mistakes:

1. The specified file doesn't exist (typo in filename?).
 2. I don't have the permissions required to read the file.
 3. The file isn't actually an HDF file.
-

Subject: Re: reading multiple HDF files

Posted by [David Fanning](#) on Wed, 16 Jul 2008 12:28:41 GMT

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julia.walterspiel@gmail.com writes:

> FORGET EVERYTHING FROM ABOVE. I'm just a tired idiot:) if you look
> through the code you'll know why. SORRY GUYS, MY BAD
> (i wish one could delete entries here..)

Oh, you'll get used to this! This is what sears the IDL knowledge into you. ;-)

Cheers,

--

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: reading multiple HDF files

Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 12:49:47 GMT

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aye dave, this scrap was supposed to be deleted before anybody could see it :))
thinking then acting, Juls, not the other way around , -)

Subject: Re: reading multiple HDF files

Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 13:27:27 GMT

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well, it works, it doesnt, then it does, then it doesnt..
???????

here's the small code, if one of you could look at it quickly? I'm pretty sure, the error will strike you immediatley. However, it doesn't strike ME.

PRO read_multiple_hdf

```
hdf_file_path=FILE_SEARCH('I:\zue\doc\ks\Temp_Satellite_Data \Temp_MODIS
\MOD_08_jointAerosolWaterVaporCloudProduct\*.hdf')
```

```
;*****
;***** Begin the for loop to read all selected hdf files ***
```

```
for i=0,n_elements(hdf_file_path)-1 do begin
```

```
  hdfid = HDF_SD_START(hdf_file_path(i))
  varnames = HDF_SD_VARDIR (hdfid)
```

```
  index = hdf_sd_nametoindex(hdfid,
'Cloud_Fraction_Mean_Mean') ;varnames[Cloud_Fraction_Mean_Mean])
  if (index eq -1) then message, string(varnames, format='("Specified
Variable not found: ", a)')
```

```
  varid = hdf_sd_select(hdfid, index)
```

```
  HDF_SD_GETDATA, varid, data ; - The Cloud Fraction data will be
stored in the variable "data"
```

```
  hdf_sd_endaccess, varid
```

```
; ***** get the filename only, without path
```

```
filename_short = file_basename(hdf_file_path[i])
```

```
; to be continued....
```

```
endfor
```

```
END
```

Subject: Re: reading multiple HDF files

Posted by [David Fanning](#) on Wed, 16 Jul 2008 13:37:18 GMT

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julia.walterspiel@gmail.com writes:

```
> well, it works, it doesnt, then it does, then it doesnt..
> ???????
>
> here's the small code, if one of you could look at it quickly? I'm
> pretty sure, the error will strike you immediatley. However, it
> doesn't strike ME.
```

This is completely off the wall. I don't know anything about this, but I've thought all morning long that this was about losing access to logical unit numbers. Maybe you could try putting an HDF_SD_END in the code at the end of your loop. At least it would make me feel better about it. :-)

Cheers,

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: reading multiple HDF files

Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 14:45:12 GMT

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you can all relax :)

closing and restarting IDL, I noticed that the error occurred at loop number 32. Checking the file at this location didn't bring up anything strange, so I tried to make the loop start at i=32, got the error immediately, closed and reopened IDL, did the same thing again and tadaaa got the error at loop number 64 this time (and yes, also at

loop no. 96)

checking again, turns out that IDL is able to only loop through the program 32times before it gives the error.

And then you have to close IDL completely before doing the next "cycle". I guess this is an IDL limitation when it comes to large files (HDF files ARE large...)

is there a way to continuously reset the memory? (some IDL batch job)

if not, I guess this leaves me with saving the data in 32-loop-increments (which is not such a pain considering that it's only 100 files - at least this time)?

Cheers

juls

Subject: Re: reading multiple HDF files

Posted by [David Fanning](#) on Wed, 16 Jul 2008 14:46:43 GMT

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julia.walterspiel@gmail.com writes:

- > you can all relax :)
- > closing and restarting IDL, I noticed that the error occurred at loop
- > number 32. Checking the file at this location didn't bring up anything
- > strange, so I tried to make the loop start at i=32, got the error
- > immediately, closed and reopened IDL, did the same thing again and
- > tadaaa got the error at loop number 64 this time (and yes, also at
- > loop no. 96)
- > checking again, turns out that IDL is able to only loop through the
- > program 32times before it gives the error.
- > And then you have to close IDL completely before doing the next
- > "cycle". I guess this is an IDL limitation when it comes to large
- > files (HDF files ARE large...)
- >
- > is there a way to continuously reset the memory? (some IDL batch job)
- > if not, I guess this leaves me with saving the data in 32-loop-
- > increments (which is not such a pain considering that it's only 100
- > files - at least this time)?

Did you try closing the file, as in my last suggestion?
This is pretty much what I expected without that close.

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Subject: Re: reading multiple HDF files
Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 15:06:06 GMT
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> Did you try closing the file, as in my last suggestion?
> This is pretty much what I expected without that close.
>

yes I did.
I put the HDF_SD_END inside the loop and outside.
Placing it outside gave me the 32-loops.
Placing it inside gave me nothing but
IDL> read_multiple_hdf
Loaded DLM: HDF.
Compiled module: HDF_SD_VARDIR.

i'm sorry, this is my very first time I'm dealing with IDL, maybe I'm overlooking something completely obvious and simple?

Subject: Re: reading multiple HDF files
Posted by [Juggernaut](#) on Wed, 16 Jul 2008 15:18:58 GMT
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On Jul 16, 11:06 am, [julia.waltersp...@gmail.com](#) wrote:
>> Did you try closing the file, as in my last suggestion?
>> This is pretty much what I expected without that close.
>
> yes I did.
> I put the HDF_SD_END inside the loop and outside.
> Placing it outside gave me the 32-loops.
> Placing it inside gave me nothing but
> IDL> read_multiple_hdf
> Loaded DLM: HDF.
> Compiled module: HDF_SD_VARDIR.
>
> i'm sorry, this is my very first time I'm dealing with IDL, maybe I'm overlooking something completely obvious and simple?

You should include an hdf_sd_end after your hdf_sd_endaccess....see what that does for you.

Subject: Re: reading multiple HDF files
Posted by [Juggernaut](#) on Wed, 16 Jul 2008 15:21:01 GMT
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On Jul 16, 11:18 am, Juggernaut <juggernaut...@gmail.com> wrote:

> On Jul 16, 11:06 am, julia.waltersp...@gmail.com wrote:

>

>>> Did you try closing the file, as in my last suggestion?

>>> This is pretty much what I expected without that close.

>

>> yes I did.

>> I put the HDF_SD_END inside the loop and outside.

>> Placing it outside gave me the 32-loops.

>> Placing it inside gave me nothing but

>> IDL> read_multiple_hdf

>> Loaded DLM: HDF.

>> Compiled module: HDF_SD_VARDIR.

>

>> i'm sorry, this is my very first time I'm dealing with IDL, maybe I'm

>> overlooking something completely obvious and simple?

>

> You should include an hdf_sd_end after your hdf_sd_endaccess....see

> what that does for you.

Just realized I've repeated what David said....one day I'll learn to read.

Subject: Re: reading multiple HDF files
Posted by [David Fanning](#) on Wed, 16 Jul 2008 15:21:02 GMT
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julia.walterspiel@gmail.com writes:

>

>> Did you try closing the file, as in my last suggestion?

>> This is pretty much what I expected without that close.

>>

>

>

> yes I did.

> I put the HDF_SD_END inside the loop and outside.

> Placing it outside gave me the 32-loops.

> Placing it inside gave me nothing but

> IDL> read_multiple_hdf

> Loaded DLM: HDF.

> Compiled module: HDF_SD_VARDIR.

>

> i'm sorry, this is my very first time I'm dealing with IDL, maybe I'm
> overlooking something completely obvious and simple?

Here is the code I used to test this. I can run as many as
I like with the HDF_SD_END in the code, but only 32 without
it. :-)

```
#####  
PRO read_multiple_hdf  
  
hdf_file_path='G:\data\96108_08.hdf'  
  
*****  
,  
***** Begin the for loop to read all selected hdf files ***  
  
for I=0,100 do begin  
  
    hdfid = HDF_SD_START(hdf_file_path)  
    varnames = HDF_SD_VARLIST (hdfid)  
  
    index = hdf_sd_nametoindex(hdfid,'ScanRate')  
    if (index eq -1) then message, string(varnames)  
  
    varid = hdf_sd_select(hdfid, index)  
  
    HDF_SD_GETDATA, varid, data  
    hdf_sd_endaccess, varid  
    HDF_SD_END, hdfid  
  
    Print, I  
endfor  
END  
#####  
--  
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: reading multiple HDF files
Posted by [David Fanning](#) on Wed, 16 Jul 2008 15:27:13 GMT
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David Fanning writes:

> Here is the code I used to test this. I can run as many as
> I like with the HDF_SD_END in the code, but only 32 without

> it. :-)

Here is my theory. Suppose you open a file with a command like this:

```
OPENR, lun, filename, /Get_LUN
```

If you close the file like this:

```
CLOSE, lun
```

You have closed the file, but you have not released the logical unit number to be used over again. Since there are only 32 of these "managed" logical unit numbers, if you were opening files in a loop, you would run out after 32 iterations. You need to also free the logical unit number to be used over again:

```
FREE_LUN, lun
```

(Fortunately, in this case FREE_LUN also closes the file, so you don't need to use both of these commands. But I see a LOT of people using CLOSE when they should be using FREE_LUN.)

That is what is happening here, I think.

```
HDF_SD_ENDACCESS is equivalent to CLOSE
HDF_SD_END is equivalent to FREE_LUN
```

So, when you are working with HDF files, you **must** use both.

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

Subject: Re: reading multiple HDF files

Posted by [julia.walterspiel](#) on Wed, 16 Jul 2008 15:54:58 GMT

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yeah it was a different problem, a beginner problem.. sorry for wasting your time folks! it works now:

```
#####
PRO read_multiple_hdf

hdf_file_path=FILE_SEARCH('I:\zue\doc\ks\Temp_Satellite_Data \Temp_MODIS
\MOD_08_jointAerosolWaterVaporCloudProduct\*.hdf')

homer = intarr(6,2,99)

;*****
;***** Begin the for loop to read all selected hdf files ***

for i=0,5 do begin
;for i=0,n_elements(hdf_file_path)-1 do begin

hdfid = HDF_SD_START(hdf_file_path(i), /READ)
varnames = HDF_SD_VARDIR (hdfid)

index = hdf_sd_nametoindex(hdfid,
'Cloud_Fraction_Mean_Mean') ;varnames[Cloud_Fraction_Mean_Mean])
if (index eq -1) then message, string(varnames, format='("Specified
Variable not found: ", a)')

varid = hdf_sd_select(hdfid, index)

HDF_SD_GETDATA, varid, data ;- The Cloud Fraction data will be
stored in the variable "data"

HDF_SD_ENDACCESS, varid
HDF_SD_END, hdfid

print, i
print, data

homer[:,*,i]= data[:,*]

endfor
END
#####
```

Subject: Re: reading multiple HDF files
Posted by [Jeremy Bailin](#) on Wed, 16 Jul 2008 17:38:40 GMT
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> (Fortunately, in this case FREE_LUN also closes the file, so you
> don't need to use both of these commands. But I see a LOT of

> people using CLOSE when they should be using FREE_LUN.)

Does FREE_LUN really also close the file? I never knew that! All these years of redundantly closing and freeing, what time wasted! ;-)

-Jeremy.

Subject: Re: reading multiple HDF files

Posted by [David Fanning](#) on Wed, 16 Jul 2008 17:51:24 GMT

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Jeremy Bailin writes:

> Does FREE_LUN really also close the file? I never knew that! All these
> years of redundantly closing and freeing, what time wasted! ;-)

Yes, it really does. :-)

Cheers,

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: reading multiple HDF files

Posted by [Paul Van Delst\[1\]](#) on Thu, 17 Jul 2008 13:45:46 GMT

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David Fanning wrote:

> julia.walterspiel@gmail.com writes:

>

>> FORGET EVERYTHING FROM ABOVE. I'm just a tired idiot:) if you look

>> through the code you'll know why. SORRY GUYS, MY BAD

>> (i wish one could delete entries here..)

>

> Oh, you'll get used to this! This is what sears the IDL

> knowledge into you. ;-)

Or in some spookily serendipitous cases, "seers" it into you; e.g. if I burn incense at the full moon and rotate clockwise twice in my office chair, the code works. Otherwise, it doesn't. Note that this behaviour applies to all languages (computer and spoken :o)

ehem.

cheers,

paulv

Subject: Re: reading multiple HDF files

Posted by [MarioIncandenza](#) on Thu, 17 Jul 2008 15:40:47 GMT

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I. I see several people have recommended Liam Gumley's HDF routines, but not the best one of all: SDS_READ (http://www.ssec.wisc.edu/~gumley/sds_read.html). I have found this to work with every MODIS product I've tried and several other kinds of data, and it does everything for you. It has a GUI for easy file exploration, but works great in scripts too. It's called like so:

```
IDL> sds_read,<HDF_FILE>,<DUMMY>,/INFO ; see a list of available SDS
(GUI) and get metadata printed out;
IDL> sds_read,<HDF_FILE>,<DATA>,/READ_ALL,SDS=<SDS_NAME>; pull in an
SDS from the HDF file (no GUI);
```

II. Now, as for your application ending with:

```
homer[*,*,i]= data[*,*]
```

Your initial post suggested you were reading MODIS Level 2 data, which have different geolocation for each granule. Thus, while you can theoretically stack the data as you did there, you're missing a lot of information you'll need to actually interpret the data. Maybe I'm misunderstanding what you're trying to do, or maybe you're using MODIS L3 data, where the reprojected data will actually stack properly.

III. For diagnosing memory limitation issues, you'll want MEMTEST. I can no longer remember if this is a built-in or not, but if it's not built-in, you'll want it in your library. It gives a concise rundown of memory available and fragmentation.

Good luck!

--Edward H.

Subject: Re: reading multiple HDF files

Posted by [MarioIncandenza](#) on Fri, 18 Jul 2008 18:43:45 GMT

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On Jul 16, 8:54 am, julia.waltersp...@gmail.com wrote:

```
> hdfid = HDF_SD_START(hdf_file_path(i), /READ)
> varnames = HDF_SD_VARDIR (hdfid)
> index = hdf_sd_nametoindex(hdfid,
> 'Cloud_Fraction_Mean_Mean') ;varnames[Cloud_Fraction_Mean_Mean])
> varid = hdf_sd_select(hdfid, index)
> HDF_SD_GETDATA, varid, data ; - The Cloud Fraction data will >
HDF_SD_ENDACCESS, varid
> HDF_SD_END, hdfid
```

I would recommend sds_read.pro (http://www.ssec.wisc.edu/~gumley/sds_read.html). Using SDS_READ, the above code could be reduced to:
IDL> sds_read,hdf_file_path[i],data,sds='Cloud_Fraction_Mean_Mean ',/
read_all

Also, I note this is a Level 2 product you are reading, so stacking the data, while probably possible, will maybe not give you what you want, since each scene is separately geo-referenced.

Subject: Re: reading multiple HDF files

Posted by [julia.walterspiel](#) on Thu, 24 Jul 2008 09:21:56 GMT

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```
>
> Also, I note this is a Level 2 product you are reading, so stacking
> the data, while probably possible, will maybe not give you what you
> want, since each scene is separately geo-referenced.
```

Hi Ed

for this project, I'm using MODIS L3 data (MOD_08 product), so I won't have a problem with separate geo-reference. However, I'm intending to do similar work on MOD14, MOD15 and MOD35, so I will keep your info in mind!

thanks!

juls
