Subject: Find Closest Coincident Measurements In Time And Space Between Two Data Sets
Posted by r083r7 on Mon, 13 Oct 2008 12:14:01 GMT
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I was hoping that somebody could help and apply some magic to this problem.

I have two sets of satellite measurement data and for dataset A want to find the value in dataset B that are closest to it in time and space.

If that's easy enough to speed it it'd also be useful to find ALL values in databaset B that were within a certain spatial and temporal distance of each point in dataset A (for example, 5deg lat/lon and 2 hours).

As both datasets are quite large I have a feeling that this problem is quite similar to the one found here http://www.dfanning.com/code_tips/slowloops.html but I don't think I understand it quite well enough to solve and eliminate the FOR loops.

My (working but slow) code is below.

Any help would be great.

Cheers

```
;datasetA structure contains lat, long, time and values
;datasetB has lat, long, time and value arrays

count=0L
final_lat=fltarr(100000)
final_lon=fltarr(100000)
final_datasetA=fltarr(100000)
final_datasetB=fltarr(100000)
final_time=strarr(100000)
final_date=strarr(100000)

;value in hms of datasetB meas. either side of datasetA meas. time
where time is still considered coincident

time_margin=010000

;value in degrees of datasetB meas. either side of datasetA meas.
location where location is still considered coincident
```

```
space_margin=2.  ;degrees lat/long

print, ‘Starting to loop through dataset A to find coincident dataset
B points'
FOR i=0L, n_elements(datasetA.lats)-1  DO BEGIN

;find measurement in datasetB that is within time and space margin of
datasetA
coin=where(datasetB_hms GE datasetA.time[i]-time_margin AND
datasetB_hms LE datasetA.time[i]+time_margin AND $
        datasetB_lat GE datasetA.lats[i]-space_margin AND
datasetB_lat LE datasetA.lats[i]+space_margin AND $
        datasetB_lon GE datasetA.lons[i]-space_margin AND
datasetB_lon LE datasetA.lons[i]+space_margin)

;account for no coincident matches between datasets
if coin[0] NE -1 THEN BEGIN
final_lat[count]=datasetA.lats[i]
final_lon[count]=datasetA.lons[i]
final_datasetA[count]=datasetA.value[i]

;store mean of datasetB values that are coincident to datasetA
measurments
final_datasetB[count]=mean(datasetB_values[coin])
final_time[count]=datasetA.time[i]
final_date[count]=datasetA.date
count=count+1L
END
ENDFOR
print, 'Finished looping through datasetA data to find coincident
datasetB data'
```

Subject: Re: Find Closest Coincident Measurements In Time And Space Between Two Data Sets

Posted by Jeremy Bailin on Thu, 16 Oct 2008 01:32:25 GMT

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On Oct 13, 8:14 am, "|Rob|" <r08...@gmail.com> wrote:
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> to find the value in dataset B that are closest to it in time and
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> final_datasetA=fltarr(100000)
> final_datasetB=fltarr(100000)
> final_time=strarr(100000)
> final_date=strarr(100000)
>
> ;value in hms of datasetB meas. either side of datasetA meas. time
> where time is still considered coincident
>
> time_margin=010000
>
> ;value in degrees of datasetB meas. either side of datasetA meas.
> location where location is still considered coincident
>
> space_margin=2. ;degrees lat/long
>
> print, 'Starting to loop through dataset A to find coincident dataset
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> FOR i=0L, n_elements(datasetA.lats)-1 DO BEGIN
>
> ;find measurement in datasetB that is within time and space margin of
> datasetA
> coin=where(datasetB_hms GE datasetA.time[i]-time_margin AND
> datasetB_hms LE datasetA.time[i]+time_margin AND $
>   datasetB_lat GE datasetA.lats[i]-space_margin AND
> datasetB_lat LE datasetA.lats[i]+space_margin AND $
>   datasetB_lon GE datasetA.lons[i]-space_margin AND
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> if coin[0] NE -1 THEN BEGIN
> final_lat[count]=datasetA.lats[i]
> final_lon[count]=datasetA.lons[i]
> final_datasetA[count]=datasetA.value[i]
>
> ;store mean of datasetB values that are coincident to datasetA
> measurments
> final_datasetB[count]=mean(datasetB_values[coin])
> final_time[count]=datasetA.time[i]
> final_date[count]=datasetA.date
> count=count+1L
> END
> ENDFOR
> print, 'Finished looping through datasetA data to find coincident
> datasetB data'

While not the full solution, you might find WITHINSPHRAD useful:
http://astroconst.org/jbiu/jbiu-doc/astro/withinsphrad.html
within JBIU:
http://web.astroconst.org/jbiu

-Jeremy.
