Subject: Interpolation
Posted by siumtesfai on Sun, 22 Feb 2015 20:46:48 GMT
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Hi,

I have around 62 radiosonde station monthly data over North America region along with station latitude-longitude information.

I have monthly gridded data from ERA-Interim and CMIP5 climate models
at 2.5 X 2.5 degree spatial resolution from 1979 - 2012

I need to interpolate all monthly data to station latitude longitude.

Any help or suggestion will be appreciated.

Thanks

Subject: Re: Interpolation
Posted by David Fanning on Sun, 22 Feb 2015 21:09:58 GMT
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siumtesfai@gmail.com writes:

> I have around 62 radiosonde station monthly data over North America region along with station latitude-longitude information.
>
> I have monthly gridded data from ERA-Interim and CMIP5 climate models
> at 2.5 X 2.5 degree spatial resolution from 1979 - 2012
>
> I need to interpolate all monthly data to station latitude longitude.
>
>
> Any help or suggestion will be appreciated.

http://www.idlcoyote.com/math_tips/interpgrid.html

Cheers,

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

Subject: Re: Interpolation
Posted by siumtesfai on Sun, 22 Feb 2015 21:44:49 GMT
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On Sunday, February 22, 2015 at 4:10:00 PM UTC-5, David Fanning wrote:
> siumtesfai@gmail.com writes:
>
>> I have around 62 radiosonde station monthly data over North America region along with station latitude-longitude information.
>>
>> I have monthly gridded data from ERA-Interim and CMIP5 climate models
>> at 2.5 X 2.5 degree spatial resolution from 1979 - 2012
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>> I need to interpolate all monthly data to station latitude longitude.
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>> Any help or suggestion will be appreciated.
>
> http://www.idlcoyote.com/math_tips/interpgrid.html
>
> Cheers,
>
> David
> --
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
> Sepore ma de ni thue. ("Perhaps thou speakest truth.")

Hi

The location of my stations are random.

do you think it is best to use closest.pro to extract the closest nearby grid boxs from the models

Subject: Re: Interpolation
Posted by David Fanning on Sun, 22 Feb 2015 22:00:55 GMT
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siumtesfai@gmail.com writes:

> The location of my stations are random.

Yes, these are the locations for which you are seeking fractional indices, right? Otherwise, your grid is regular in latitude and longitude.

Cheers,

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

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Subject: Re: Interpolation
Posted by siumtesfai on Sun, 22 Feb 2015 23:01:26 GMT
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On Sunday, February 22, 2015 at 5:00:57 PM UTC-5, David Fanning wrote:
> siumtesfai@gmail.com writes:
>
>> The location of my stations are random.
>
> Yes, these are the locations for which you are seeking fractional
> indices, right? Otherwise, your grid is regular in latitude and
> longitude.
>
> Cheers,
>
> David
> --
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
> Sepore ma de ni thue. ("Perhaps thou speakest truth.")

As you have suggested, I did the interpolation for station data

Do you think I have issue with Value_locate for latitude because my latitude ranges from -90 to 90 degree ?

```
 ;+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ +++++++
; Original model data at 192 X 96 degree spatial resolution
;  Data = Array[lon,lat,pressure, time]
;  data=Array[192, 96, 17, 1872]


; Extract one pressure level (e.g 850hPa) and interpolate to 2.5 X 2.5 degree spatial resolution
```

```
;  Interpolated one pressure level data (WS)

 WS=fltarr(144,73,n_elements(time))


;  Now Interpolate again to a station data

        slon  = findgen(144)*2.5
        slat  = findgen(73)*2.5-90

;  Station location example, at longitude 190 and latitude 37

; Find longitude fractional index.

  slonval = 190
  slonstep = slon[1] - slon[0]
   closeIndex = Value_Locate(slon, slonval)
   slonFracIndex = closeIndex + ((slonval - slon[closeIndex]) / slonstep)

    ; Find latitude fractional index.

     slatval = 37
      slatstep = slat[1] - slat[0]
      closeIndex = Value_Locate(slat, slatval)
      slatFracIndex = closeIndex + ((slatval - slat[closeIndex]) / slatstep)

   interpValue=fltarr(ntime)+1E20

      FOR i =0,n_elements(time)-1 do begin

        griddedArray=reform(WS(*,*,i))

        interpValue(i) = Interpolate(griddedArray, slonFracIndex, slatFracIndex)

        ENDFOR

        end

 ;++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++ ++++++++++
```

---

Subject: Re: Interpolation
Posted by David Fanning on Sun, 22 Feb 2015 23:18:38 GMT
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siumtesfai@gmail.com writes:

> As you have suggested, I did the interpolation for station data
>
> Do you think I have issue with Value_locate for latitude because my latitude ranges from -90 to 90 degree ?

As with so many things dealing with map projections, it depends. :-)

I have on occasion duplicated the first column and added it as the last column in my longitude and data arrays in situations like these. This allows my longitude vector to go from 0 to 360, which matches my latitude vector. That's probably what I would do in this case. That also sometimes helps with a small gap in your plot when doing filled contours, etc.

See the Array Concatenation Tutorial for how to add a column to an array in the IDL Way:

http://www.idlcoyote.com/tips/array_concatenation.html

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
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