Subject: Re: mapping/interpolation from one irregular grid to another (different) irregular grid.
Posted by Maarten[1] on Thu, 26 Jan 2012 09:30:36 GMT
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On Jan 24, 10:04 pm, Paul van Delst <paul.vande...@noaa.gov> wrote:
> I have a colleague who wants to map/interpolate data from one satellite sensor's footprint to another. The data is
> defined in terms of pixel vs scan line which means the lat/lon grid (which is how the sensor FOVs are matched) for each
> is quite irregular. He has performed loops over individual elements to do the interpolation, but as you would expect,
> this is very slow in IDL. We need to speed it up (a lot).

Which instruments are we talking about? I mapped MODIS on Aqua to OMI on Aura within the A-train. Although both grids are irregular, at least you know that they will pass over the same coordinate within a fixed time-difference. Both use TAI93 for time-stamping, once you know that, you can reduce the amount to data to a time-slice of about 10 seconds.

The key thing is to reduce the number of pixels as quickly as possible. For MODIS -> OMI I used the time difference, then searching in the 5x5 km pixels, and finally using that to search the 1x1 km pixels. That took the time down to about 45 minutes per orbit (from the brute force three weeks). That was good enough for me.

I used the pixels centers for MODIS, and constructed pixel boundaries for OMI. The IDLanROI class is useful, I created a subclass to deal with the dateline.

> My first thought would be to put both on a common regular grid, do the matchup/interpolation, and then somehow use
> histogram with the reverse_indices trick to get the matched data back to the irregular grid (as detailed in JD's
> histogram tutorial on idlcoyote.com).
>
> Does any of this make sense? I wanted to poll the IDL users out there that may have done this before recommending my
> colleague embark on a a potential fruitless endeavour.

Going to a regular grid first will introduce all kinds of interpolation artifacts. So, no it doesn't make sense to me. But it strongly depends on what you need to do, what instruments we're talking about (relative pixel sizes in particular). Is there any relation between the instruments?

Maarten