

Dr. Nathaniel A. Frissell Ph.D.

From: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Sent: Wednesday, November 9, 2022 8:02 PM
To: Dr. Nathaniel A. Frissell Ph.D.
Subject: Re: LWS Hemisphere Weekly Telecon
Attachments: MERRA2_U_SuperDARN_NH_2010010100-2022073118.nc; timeseries_u10_u1_2010-2022.png

Hi Nathaniel,

Please see attached netCDF file that contains timeseries of zonal winds at 10hPa and 1hPa at the 10 SuperDARN radar sites that you sent to me. The 1-d arrays contain winds every 6 hours from 1 January 2010 through 31 July 2022, based on the MERRA-2 reanalysis. For each radar site, I averaged grid points within 3 degrees longitude and latitude of the central lon/lat coordinates that you sent in the CSV file. Also attached is a quick look screenshot of the data included in this file. Wind timeseries at 10hPa (30 km) is on the top and at 1hPa (50km) is on the bottom. The different colors are the different radars. You can see generally strong westerlies (positive values) in the winter at both levels, with intermittent negative spikes during SSWs. Let me know if you find any problems with this data. I can't wait to see it plotted over/alongside the TID results! 😊

Best,
Lynn

From: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Sent: Tuesday, November 8, 2022 11:00 AM
To: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Subject: RE: LWS Hemisphere Weekly Telecon

Great, thanks!

From: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Sent: Tuesday, November 8, 2022 12:30 PM
To: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Subject: Re: LWS Hemisphere Weekly Telecon

Great, thanks. I think I'll average the winds within 3 degrees longitude and latitude of the locations you sent to me. You're right that the winds likely don't vary much in this region but I feel it will be more robust than winds a singular grid point.

—○—
V. Lynn Harvey

Research Scientist
Laboratory for Atmospheric and Space Physics
3665 Discovery Drive
Boulder, CO 80303
tel: 720-232-7461
fax: 303-735-3737
email: lynn.harvey@lasp.colorado.edu

CU Boulder acknowledges that it is located on the traditional territories and ancestral homelands of the Cheyenne, Arapaho, Ute and many other Native American nations. Their forced removal from these territories has caused devastating and lasting impacts. While the University of Colorado Boulder can never undo or rectify the devastation wrought on Indigenous peoples, we commit to improving and enhancing engagement with Indigenous peoples and issues locally and globally.

From: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Sent: Tuesday, November 8, 2022 9:46 AM
To: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Subject: RE: LWS Hemisphere Weekly Telecon

They should be in the approximate center of the data region. If you look in the data table I sent, you can see that FHE and FHW both have different coordinates, even though the two ground stations are at the same location. Same for CVE/CVW. You can also see this by comparing it to the map below.

~Nathaniel

From: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Sent: Tuesday, November 8, 2022 11:43 AM
To: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Subject: Re: LWS Hemisphere Weekly Telecon

So are latitudes and longitudes that you sent located in the center of those pie regions? Or are they at the geographic location of the ground station?

Get [Outlook for Android](#)

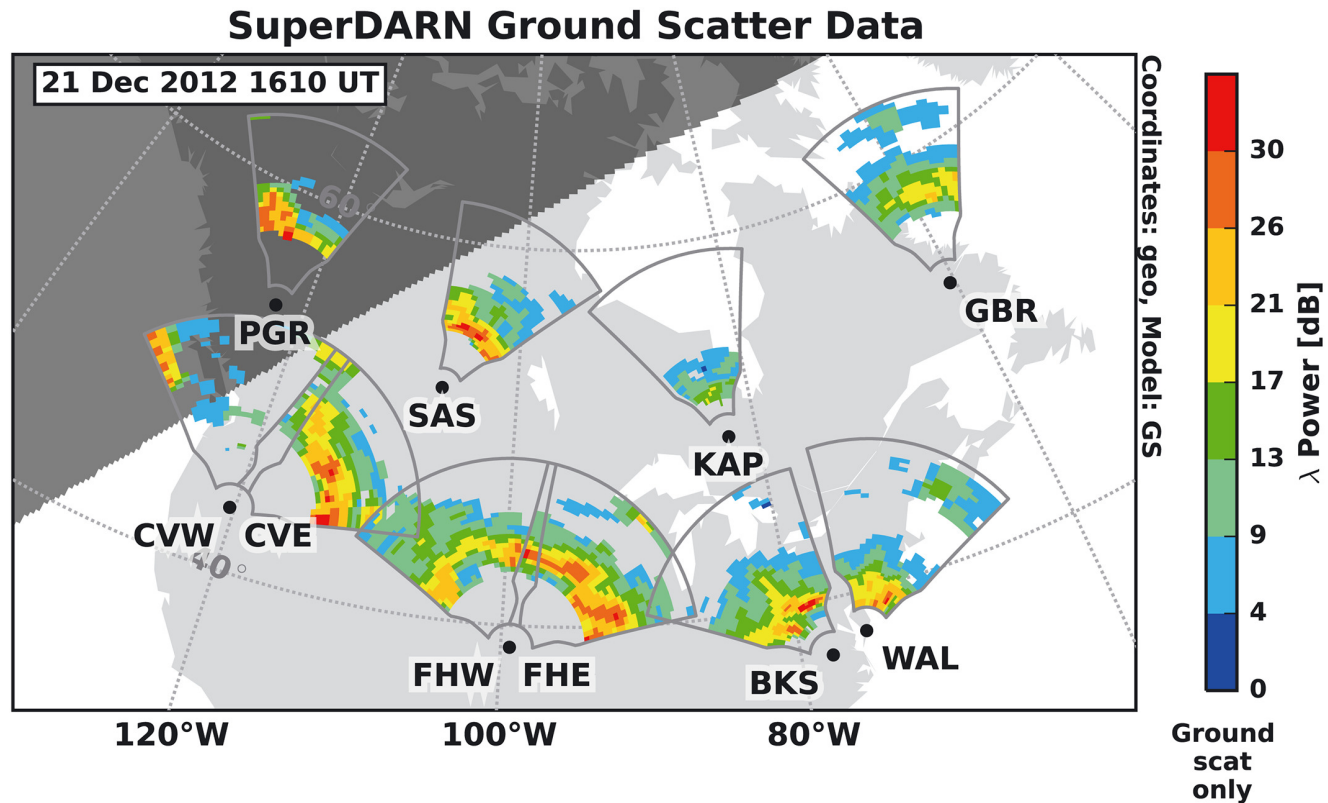
From: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Sent: Tuesday, November 8, 2022 9:40:38 AM
To: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Subject: RE: LWS Hemisphere Weekly Telecon

Hi, Lynn!

The location of the bands of colored data in figure below shows the approximate sampling area of each of the radars that I am using. It actually changes a little bit from sampling window to sampling window, as the amount and location of good data observed by a radar changes with time. The exact ranges used are determined automatically by my software on a case-by-case basis. We assume that the measurement is from the bottomside F region ionosphere at about 250 km to 350 km altitude.

I don't know how quickly the winds in MERRA2 change with lat/lon. I imagine that they are relatively constant/slowly changing within a radar sampling area, but you would know that much better than me. I think it is best if you can give me values that are most representative of what is happening within the region that each radar is making good observations.

~Nathaniel



From: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Sent: Tuesday, November 8, 2022 11:30 AM
To: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Subject: Re: LWS Hemisphere Weekly Telecon

Thanks Nathaniel! I got to thinking, do the radars sample a distance through the atmosphere? If so, maybe it would make more sense to average grid points within one degree latitude and longitude (or whatever appropriate distance) of each radar station instead of giving you time series at singular grid points. Thoughts?

Get [Outlook for Android](#)

From: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>
Sent: Monday, November 7, 2022 9:09:13 PM
To: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>
Subject: RE: LWS Hemisphere Weekly Telecon

Hi Lynn,

Here are the lat/lons for the radars I am working with. I'll keep working on the other action items.

Thanks!

Nathaniel

From: Lynn Harvey <Lynn.Harvey@lasp.colorado.edu>

Sent: Monday, November 7, 2022 7:06 PM

To: Mary Lou West <westm@mail.montclair.edu>; Katrina Bossert <kebosser@asu.edu>

Cc: Dr. Nathaniel A. Frissell Ph.D. <nathaniel.frissell@scranton.edu>; Richard Collins <rlcollins@alaska.edu>; Jackson.Jandreau@colorado.edu; kkumari2@asu.edu; sphillips@asu.edu; XINZHAO CHU <xinzhao.chu@colorado.edu>; Jintai Li <jlj23@alaska.edu>; Francis H. Tholley <francis.tholley@scranton.edu>; DIEGO SANCHEZ <ds999@njit.edu>

Subject: Re: LWS Hemisphere Weekly Telecon

Dear LWS Team,

See attached ppt from today's meeting for your records. Action items are on slide 3 and pasted below.

❖Nathaniel:

- ❖Send Lynn lon/lat locations of the SuperDARN radars
- ❖Get additional years (2010-2011, 2019-2020, 2020-2021, 2021-2022)
- ❖Superposed Epoch Analysis of MSTID activity during major SSWs
- ❖Case study will be: Dec 2018 – Jan 2019

❖Mary Lou

- ❖Superposed Epoch Analysis of LSTID activity during major SSWs

❖Katrina/Sophie

- ❖Plot of 3D AIRS gravity waves over N. America before, during, and after SSW of Jan 2019

❖Komal

- ❖Analysis of thermospheric winds during 2018-2019 winter?

❖Lynn:

- ❖Provide at 10 hPa (30 km) and 1 hPa (50 km):
- ❖6 hourly U and Wind Speed at the SuperDARN radar locations for all days (2010-2022)

-o-

V. Lynn Harvey

Research Scientist

Laboratory for Atmospheric and Space Physics

3665 Discovery Drive

Boulder, CO 80303

tel: 720-232-7461

fax: 303-735-3737

email: lynn.harvey@lasp.colorado.edu