

O3ProV8 Implementation with ADL

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Alter existing code as little as possible

- Add on to existing V6 IMOPO-INPAK code.
- 4 xml files lengthened
- 5 existing Fortran files altered(as little as possible)
- 45 New Fortran 90 Files
- 2 Cxx files altered: glueware file and c++ caller.
- Output file: 30 additional Fields in group /All_Data/OMPS-NP-IP_All

Allow for future improvements

- Information concentration
- Outlier removal
- Increased number of channels
- Off-Nadir Viewing geometry

New Output Fields

/All_Data/OMPS-NP-IP_All/Step1O3_v8
/All_Data/OMPS-NP-IP_All/Step2O3_v8
/All_Data/OMPS-NP-IP_All/aerind_v8
/All_Data/OMPS-NP-IP_All/algflag_v8
/All_Data/OMPS-NP-IP_All/averaging_kernel_v8
/All_Data/OMPS-NP-IP_All/bestozone_v8
/All_Data/OMPS-NP-IP_All/cloudfrac_v8
/All_Data/OMPS-NP-IP_All/cloudpress_v8
/All_Data/OMPS-NP-IP_All/dn360_v8
/All_Data/OMPS-NP-IP_All/dndr_v8
/All_Data/OMPS-NP-IP_All/efficiency_v8
/All_Data/OMPS-NP-IP_All/errflag_v8
/All_Data/OMPS-NP-IP_All/groundpres_v8
/All_Data/OMPS-NP-IP_All/mixing_ratio_press_v8
/All_Data/OMPS-NP-IP_All/mixing_ratio_v8
/All_Data/OMPS-NP-IP_All/niteration_v8
/All_Data/OMPS-NP-IP_All/ozcloud_v8
/All_Data/OMPS-NP-IP_All/profile_apriori_v8
/All_Data/OMPS-NP-IP_All/profile_code_v8
/All_Data/OMPS-NP-IP_All/profile_firstguess_v8
/All_Data/OMPS-NP-IP_All/profile_temperature_v8
/All_Data/OMPS-NP-IP_All/ref331_v8
/All_Data/OMPS-NP-IP_All/ref360_v8
/All_Data/OMPS-NP-IP_All/residual0_v8
/All_Data/OMPS-NP-IP_All/residual_v8
/All_Data/OMPS-NP-IP_All/resn_v8
/All_Data/OMPS-NP-IP_All/resqc_v8
/All_Data/OMPS-NP-IP_All/sens_v8
/All_Data/OMPS-NP-IP_All/toz_apprf_v8
/All_Data/OMPS-NP-IP_All/tozpro_v8

Output file size increases about 85%

Old size	201K
new:	377K

**ADL sizes including Geolocation and INPAK*

*Per day size of GONPO-IMOPO-INPAK V8:
410MB, 1100 HDF5 files.*

Code Improvements

Based on earlier work for OMI Version 8 ozone profile.

Code has machinery to use more than 13 wavelengths it currently uses.

Single scatter channels and multiple scatter channels handled separately.

Eliminated all SBUV Instrument specific code(N07, NOAA14)

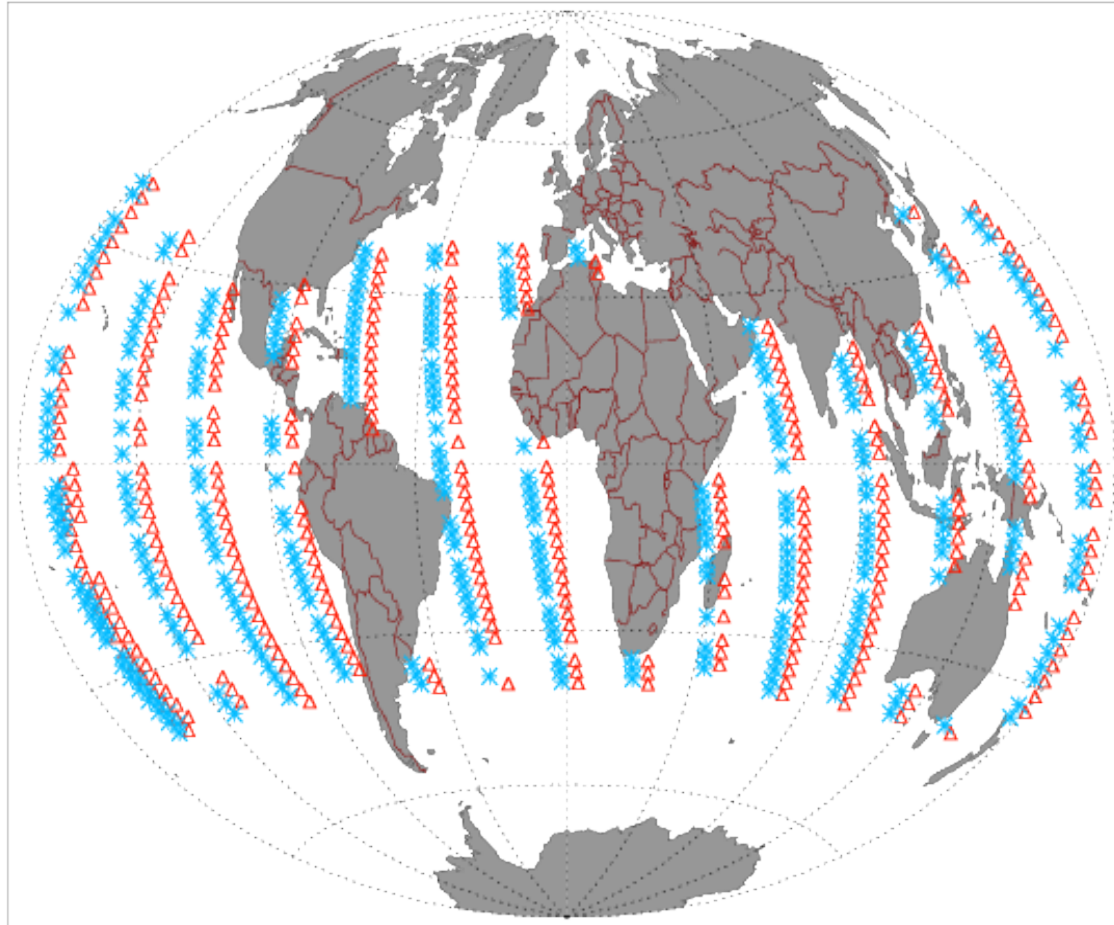
Edited code to use Fortran90 features where possible.

- Indenting
- intent statements
- strongly typed, `real some_var` becomes `real(KIND=SP) :: some_var`
- F90 Comment style
- continuation character
- Tested on multiple compilers: sunf95, intel, gfortran, Portland

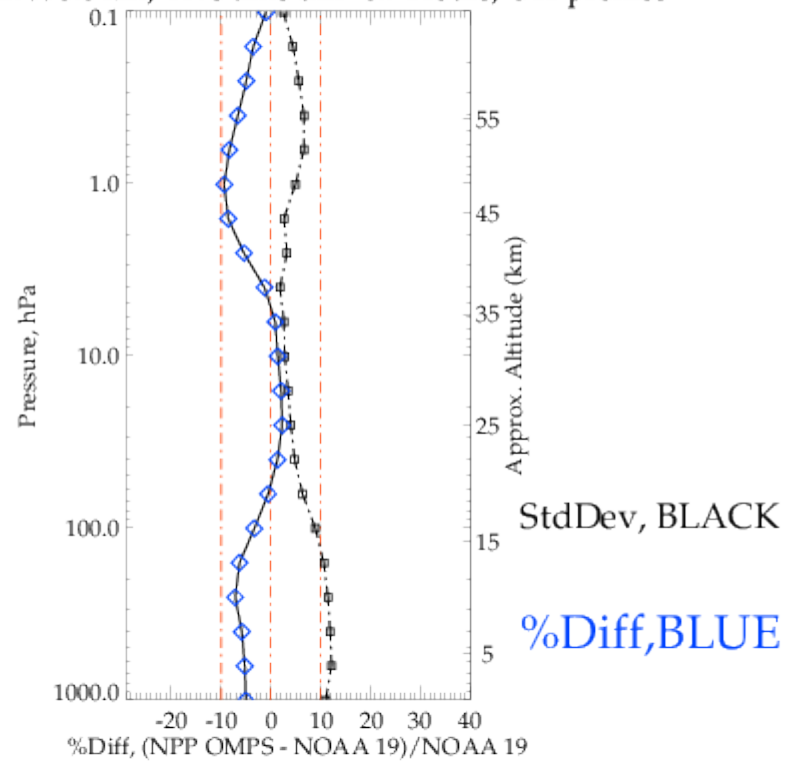
Most time consuming task was I/O. Input files were opened and read in numerous files. Input files were in different formats. All input needed to be consolidated and put in flat binary input. The existing OMPS-NP-LUT file has about 10 MB data appended to it.

Validation Results.

NPP OMPS and NOAA 19 for 1 Days, Beginning on 2013/10/22



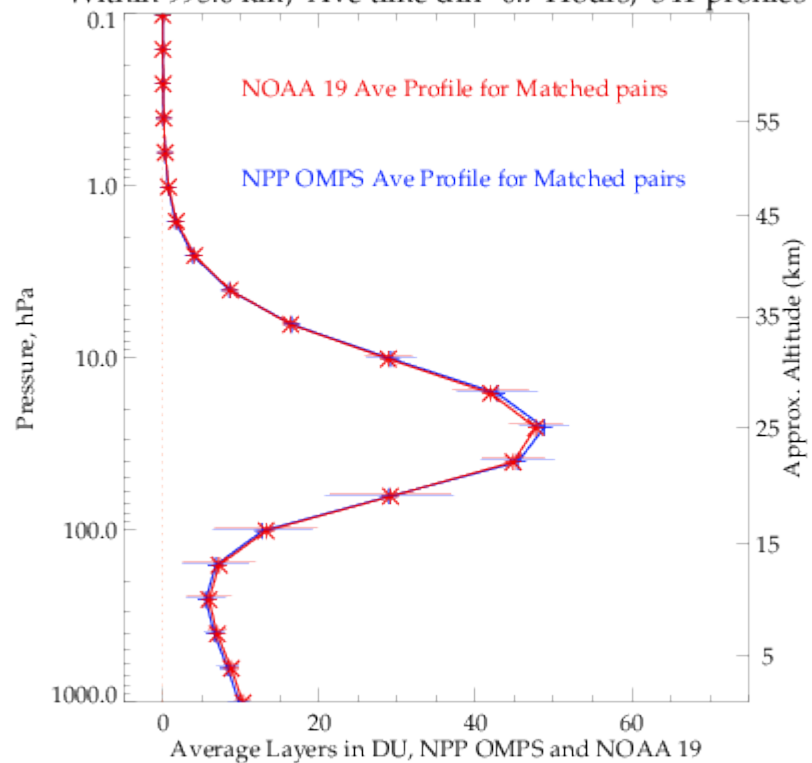
Within 995.0 km, Ave time diff -0.7 Hours, 341 profiles



Ave SZA for NPP OMPS = 33.85°

Ave SZA for NOAA 19 = 36.95°

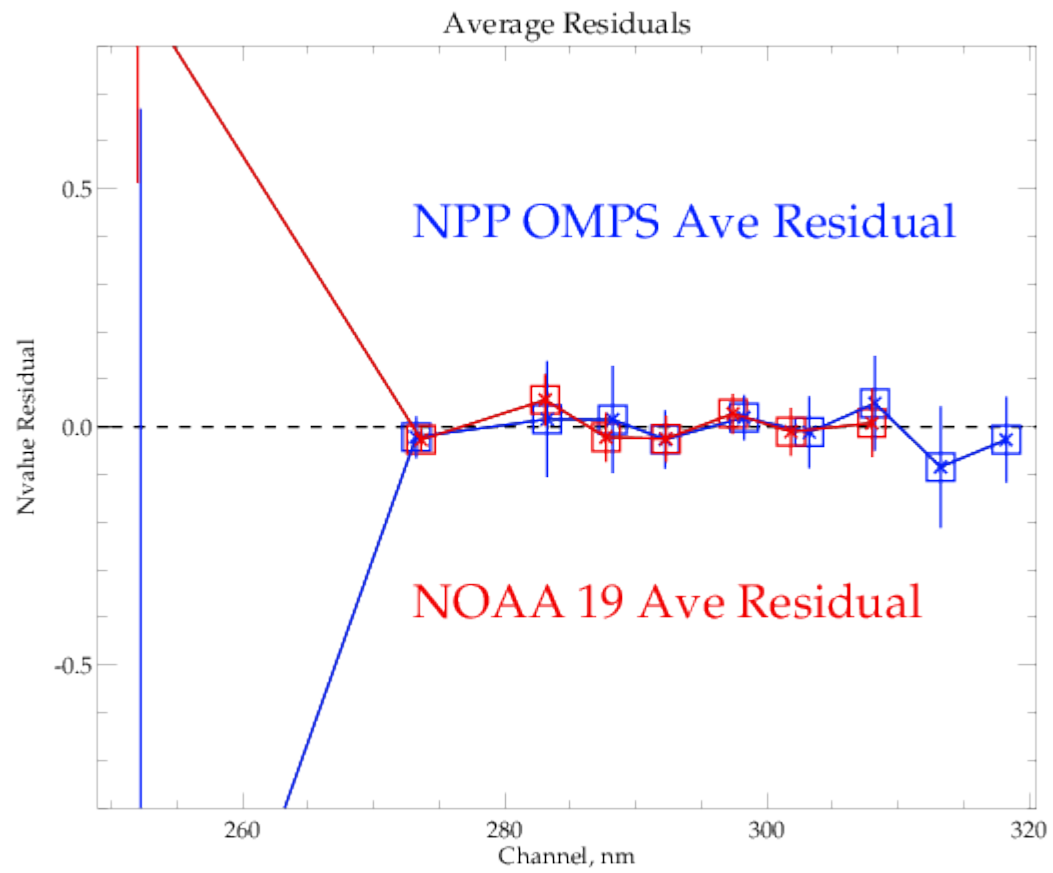
Within 995.0 km, Ave time diff -0.7 Hours, 341 profiles



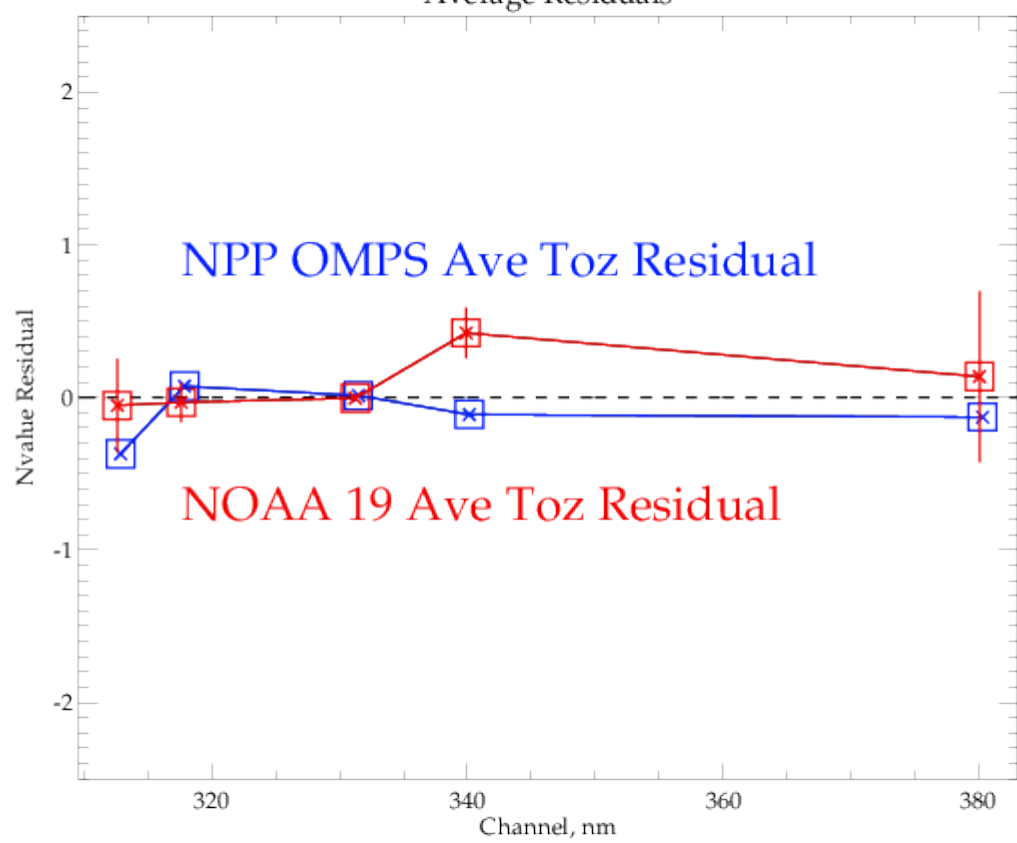
276.7 DU, Column sum for NPP OMPS

277.1 DU, Column sum for NOAA 19

-0.1 %Diff in Column sum: NPP OMPS - NOAA 19

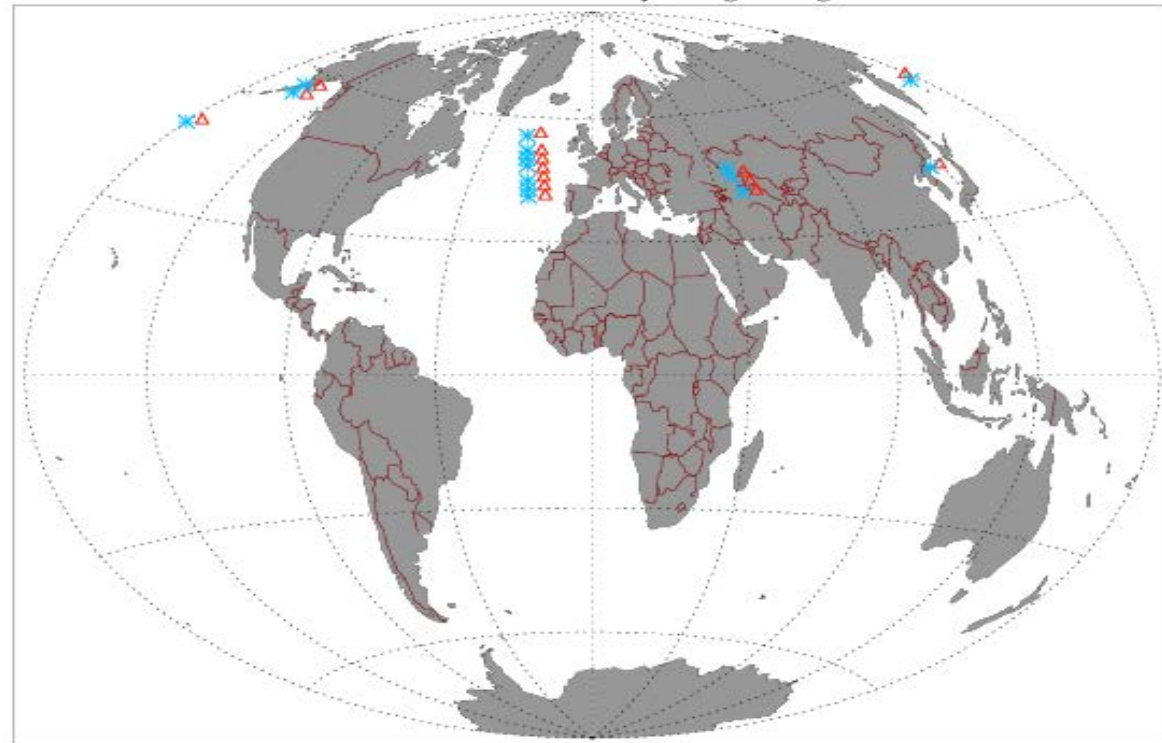


Average Residuals

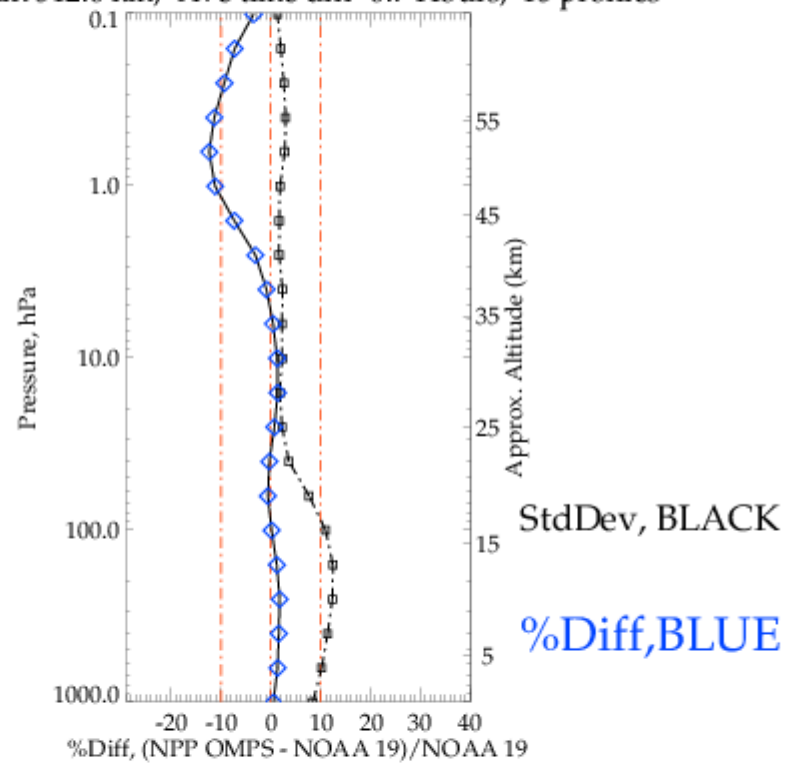


Mid Lat case

NPP OMPS and NOAA 19 for 1 Days, Beginning on 2013/10/22



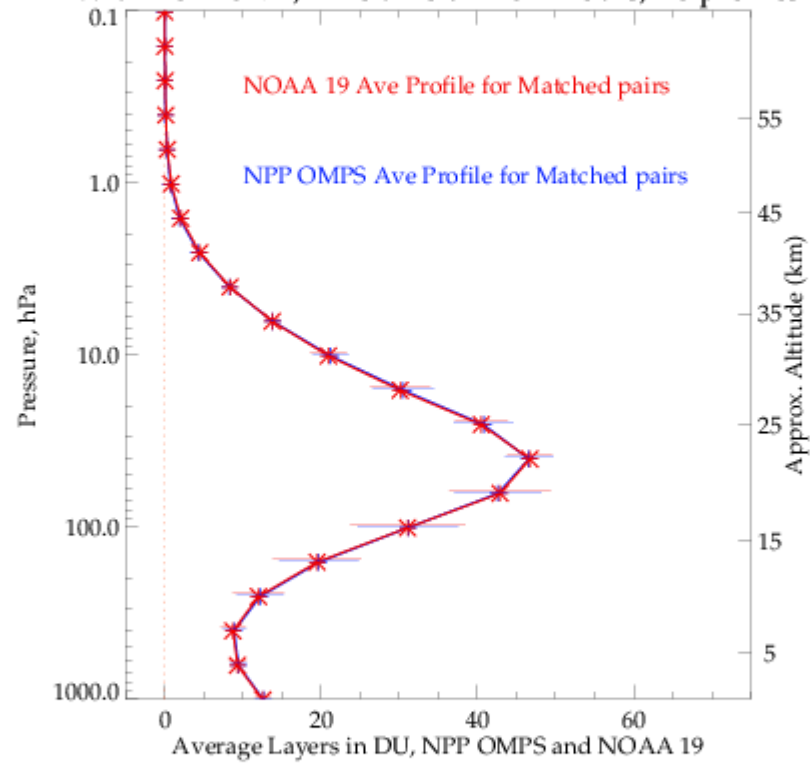
Within 512.0 km, Ave time diff -0.7 Hours, 15 profiles



Ave SZA for NPP OMPS = 61.15°

Ave SZA for NOAA 19 = 61.58°

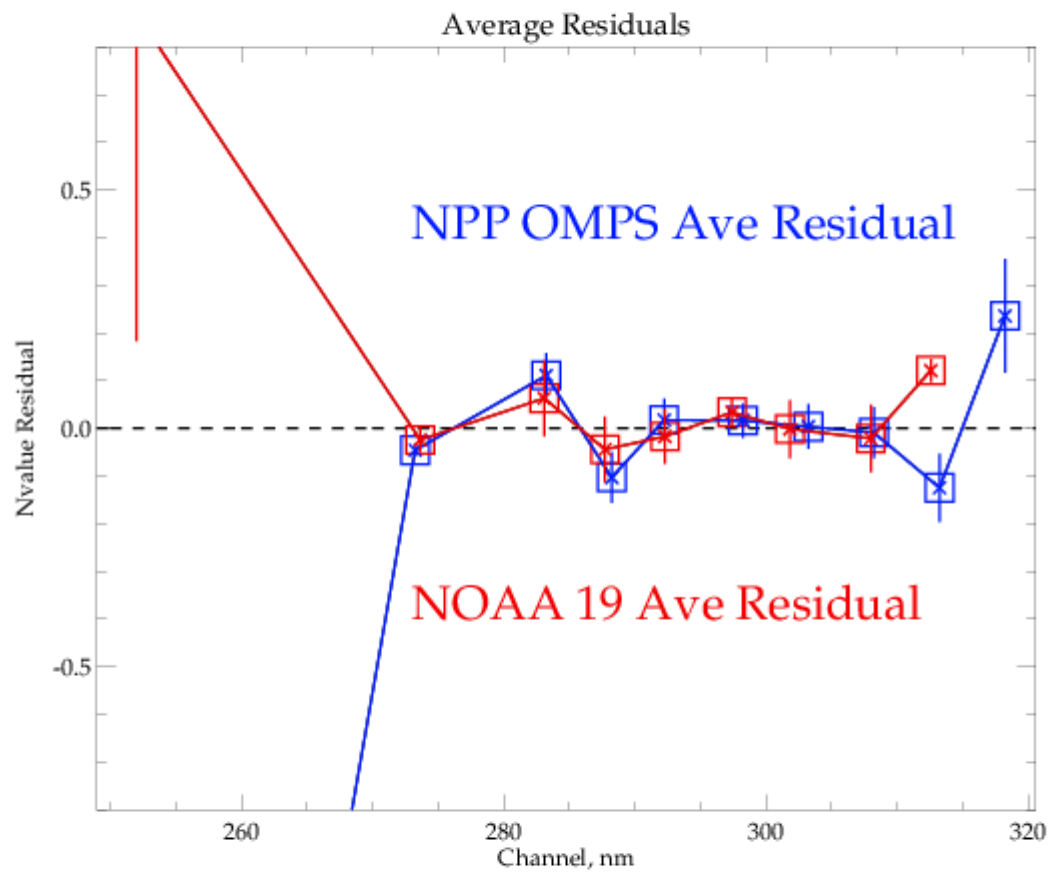
Within 512.0 km, Ave time diff -0.7 Hours, 15 profiles

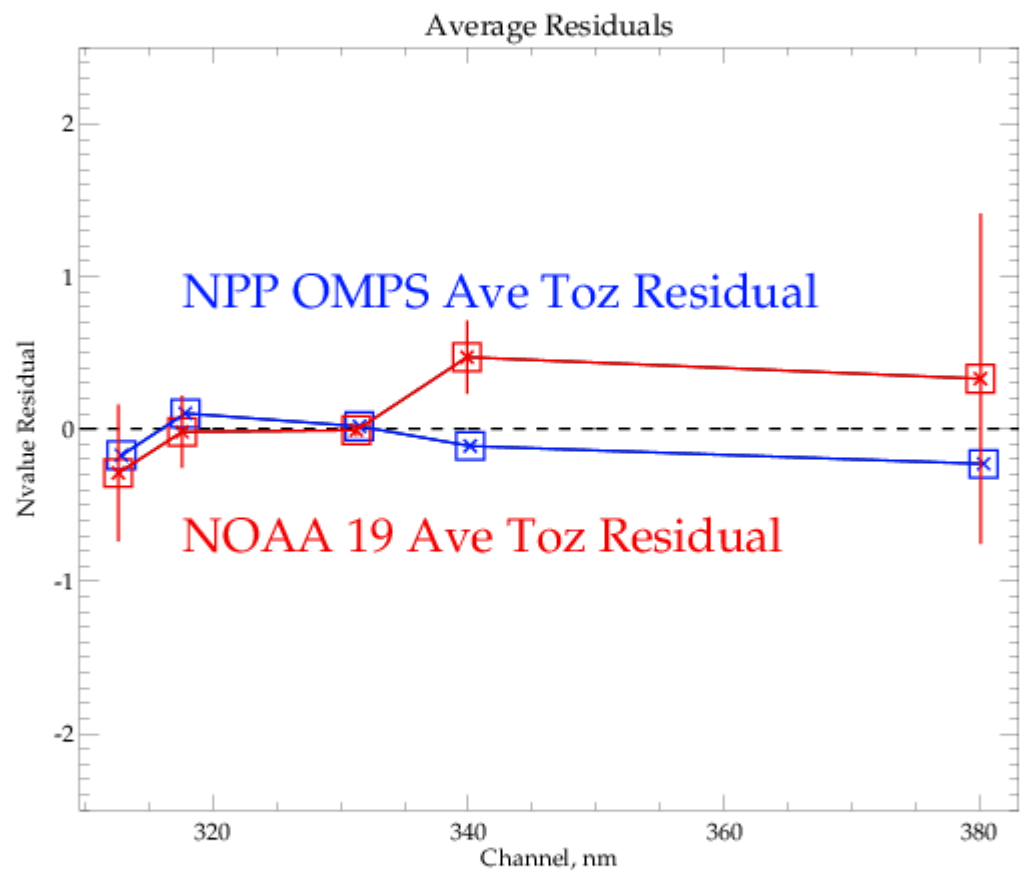


305.4 DU, Column sum for NPP OMPS

304.5 DU, Column sum for NOAA 19

0.3 %Diff in Column sum: NPP OMPS - NOAA 19





Future Work for V8Pro

Information Concentration

Outlier Detection

More Wavelengths

Off-nadir geometry

Glueware source code file must change for J1