Deviations for XCO$_2$ using PCT parameter 0.02<>0.005

[percentage]

Bialystok (Poland)
Bremen (Germany)
Caltech (USA)
Dryden (USA)
East Trout Lake (Canada)
Eureka (Canada)
Garmisch (Germany)
Lamont (USA)
Lauder LL (New Zealand)
Lauder LR (New Zealand)
Ny Alesund (Spitzbergen)
Orleans (France)
Paris (France)
Park Falls (USA)
Reunion Island (France)
Rikubetsu 2017 (Japan)
Rikubetsu 2018 (Japan)
Sodankyla (Finland)
Tsukuba 2017 (Japan)
Tsukuba 2018 (Japan)
Xianghe (China)
Zugspitze (Germany)

Δ XCO$_2$ [ppm]   -2.5   -2   -1.5   -1   -0.5   0   0.5   1   1.5   2

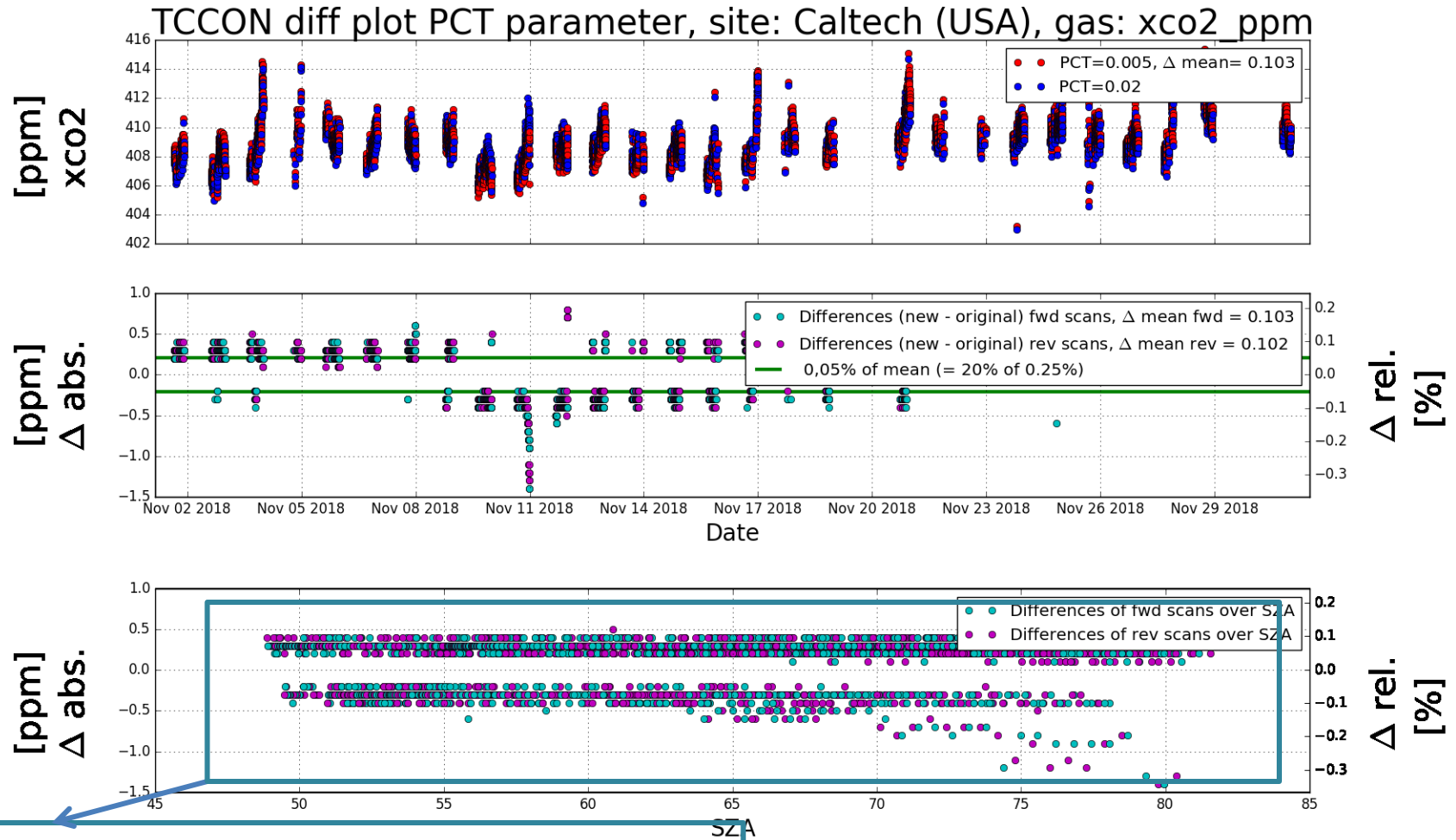# Bialystok PCT 0.02 <-> 0.005

TCCON diff plot PCT parameter, site: Bialystok (Poland), gas: xco2_ppm
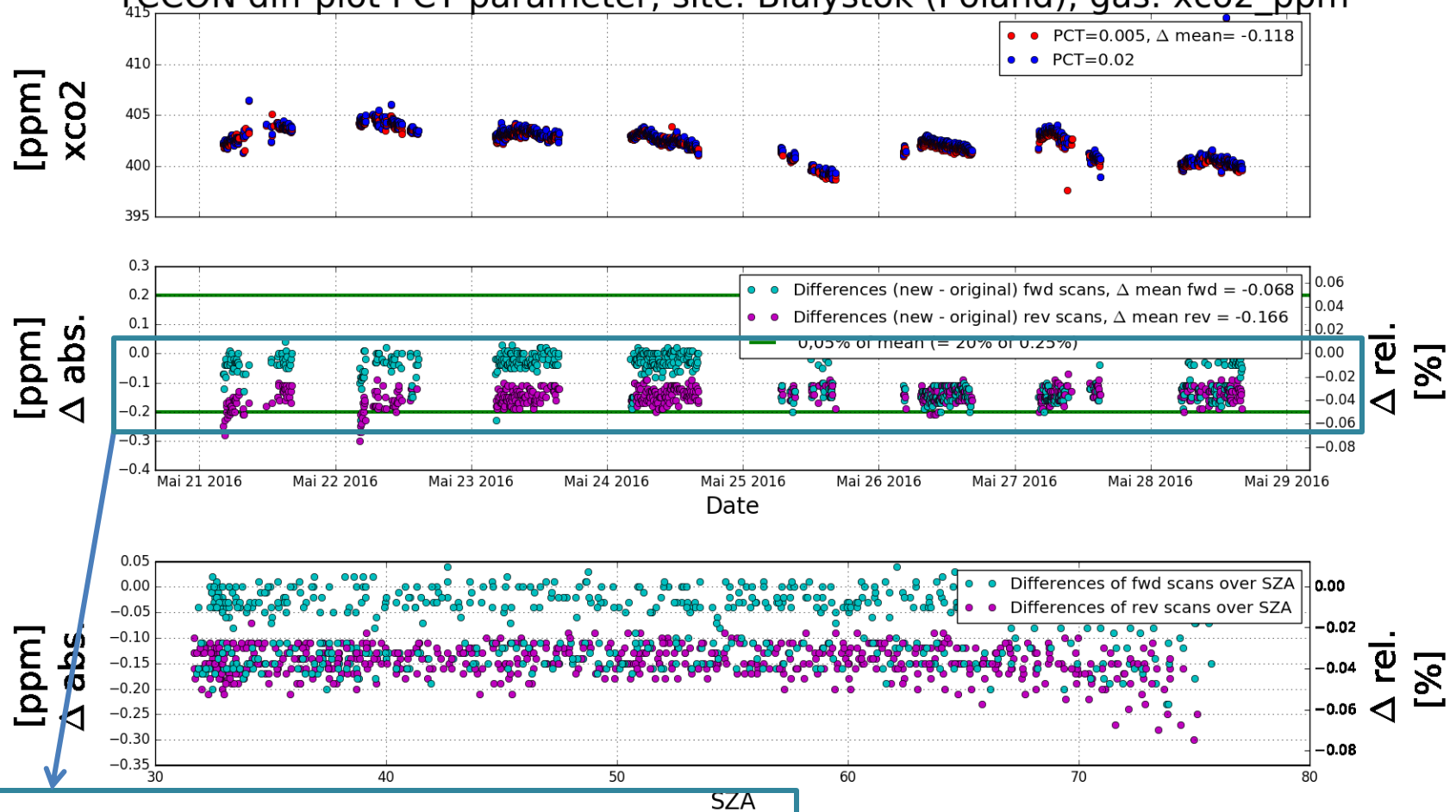
offset ~0.1 ppm and fwd-rev-split

# Caltech PCT 0.02 <-> 0.005

TCCON diff plot PCT parameter, site: Caltech (USA), gas: xco2_ppm

Legend (top panel):
- PCT=0.005, Δ mean= 0.103
- PCT=0.02

Legend (middle panel):
- Differences (new - original) fwd scans, Δ mean fwd = 0.103
- Differences (new - original) rev scans, Δ mean rev = 0.102
- 0,05% of mean (= 20% of 0.25%)

Legend (bottom panel):
- Differences of fwd scans over SZA
- Differences of rev scans over SZA

split, but not assigned to fwd-rev

Paris PCT 0.02 <-> 0.005

TCCON diff plot PCT parameter, site: Paris (France), gas: xco2_ppm
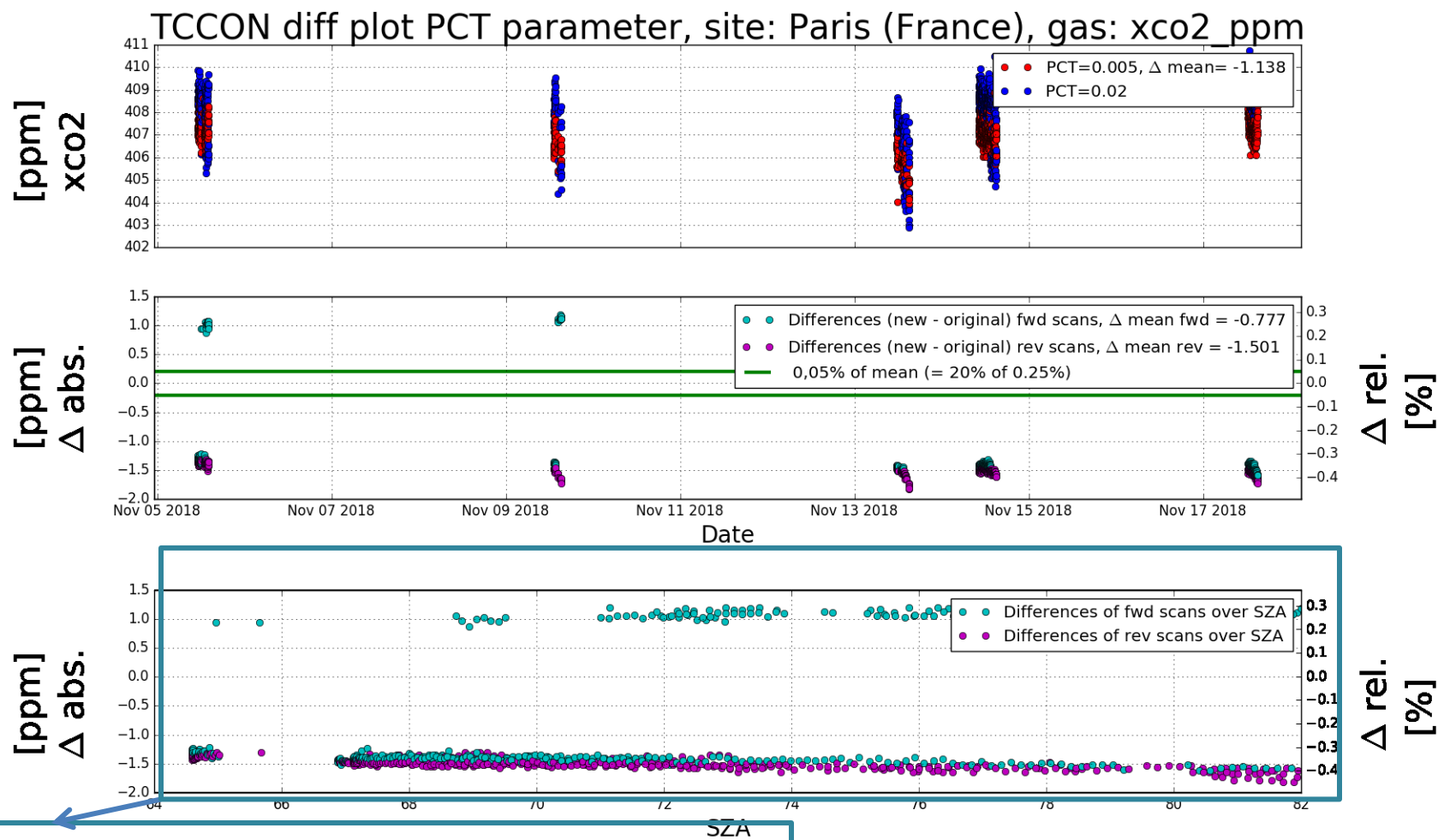
offset ~1.1 ppm and fwd-rev-split

Eureka PCT 0.02 <-> 0.005

TCCON diff plot PCT parameter, site: Eureka (Canada), gas: xco2_ppm
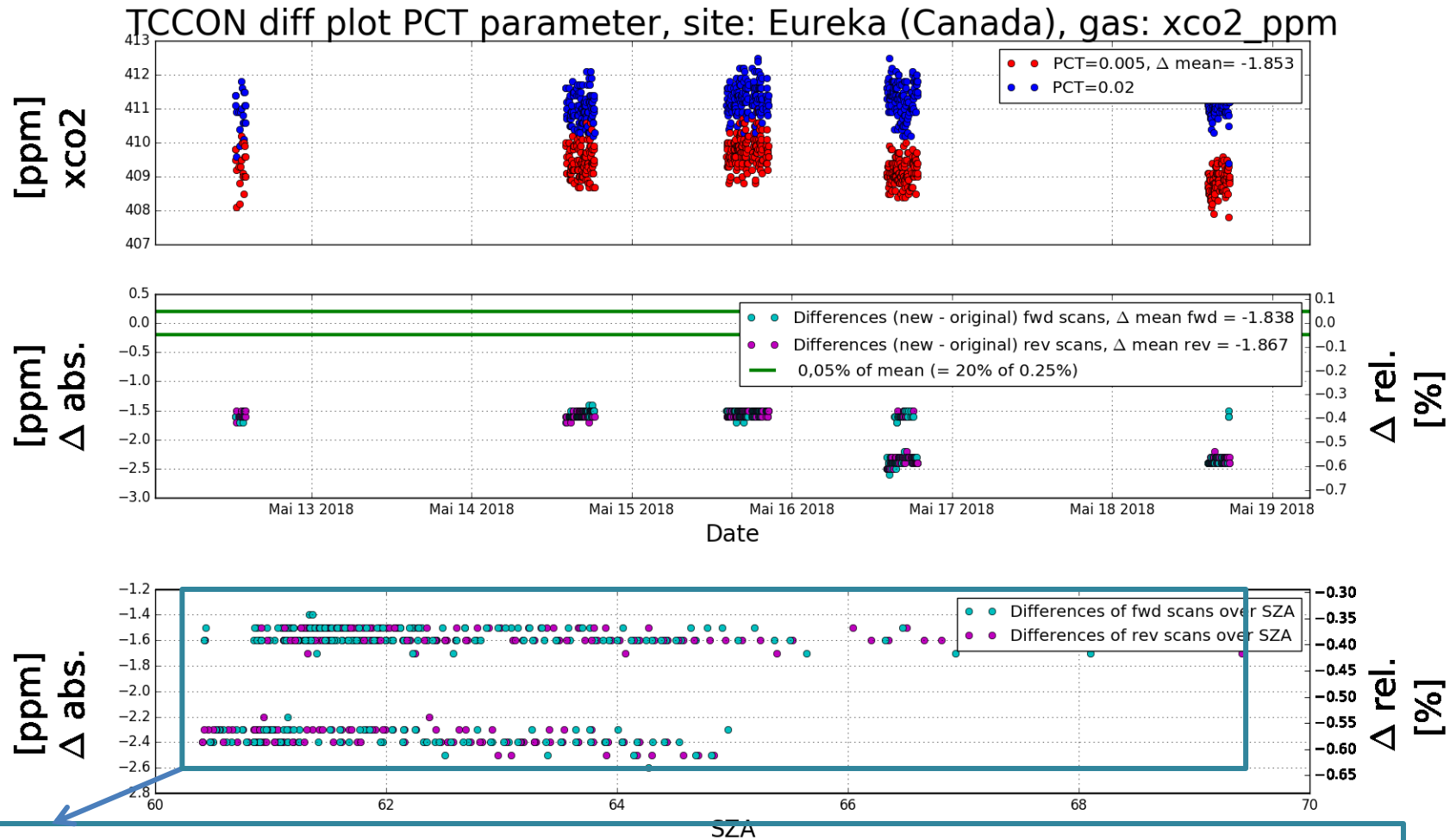
offset 1.8ppm, split not assigned to fwd-rev, SZA dependance

Park Falls PCT 0.005 <-> 0.001

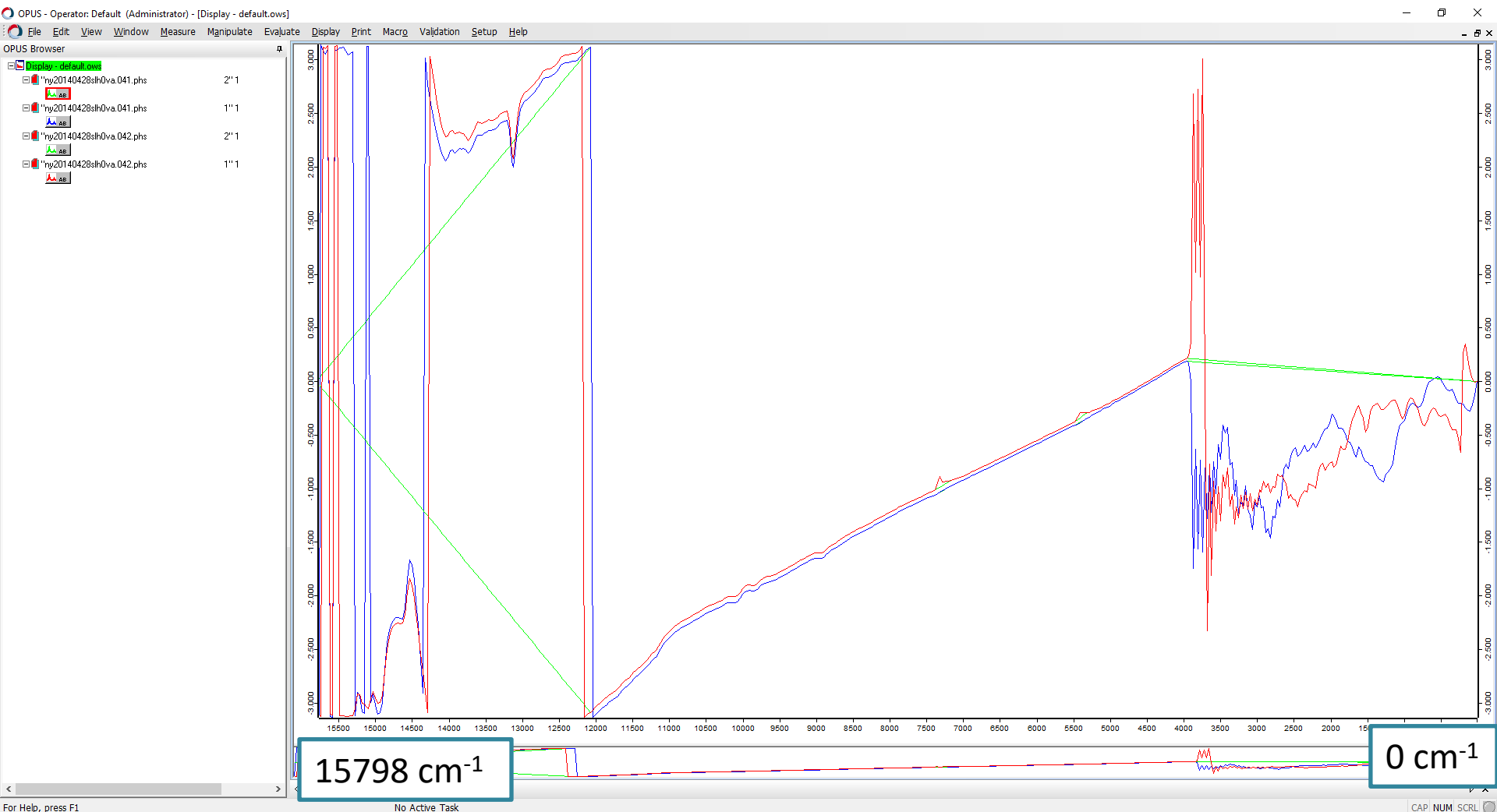TCCON diff plot PCT parameter, site: Park Falls (USA), gas: xco2_ppm
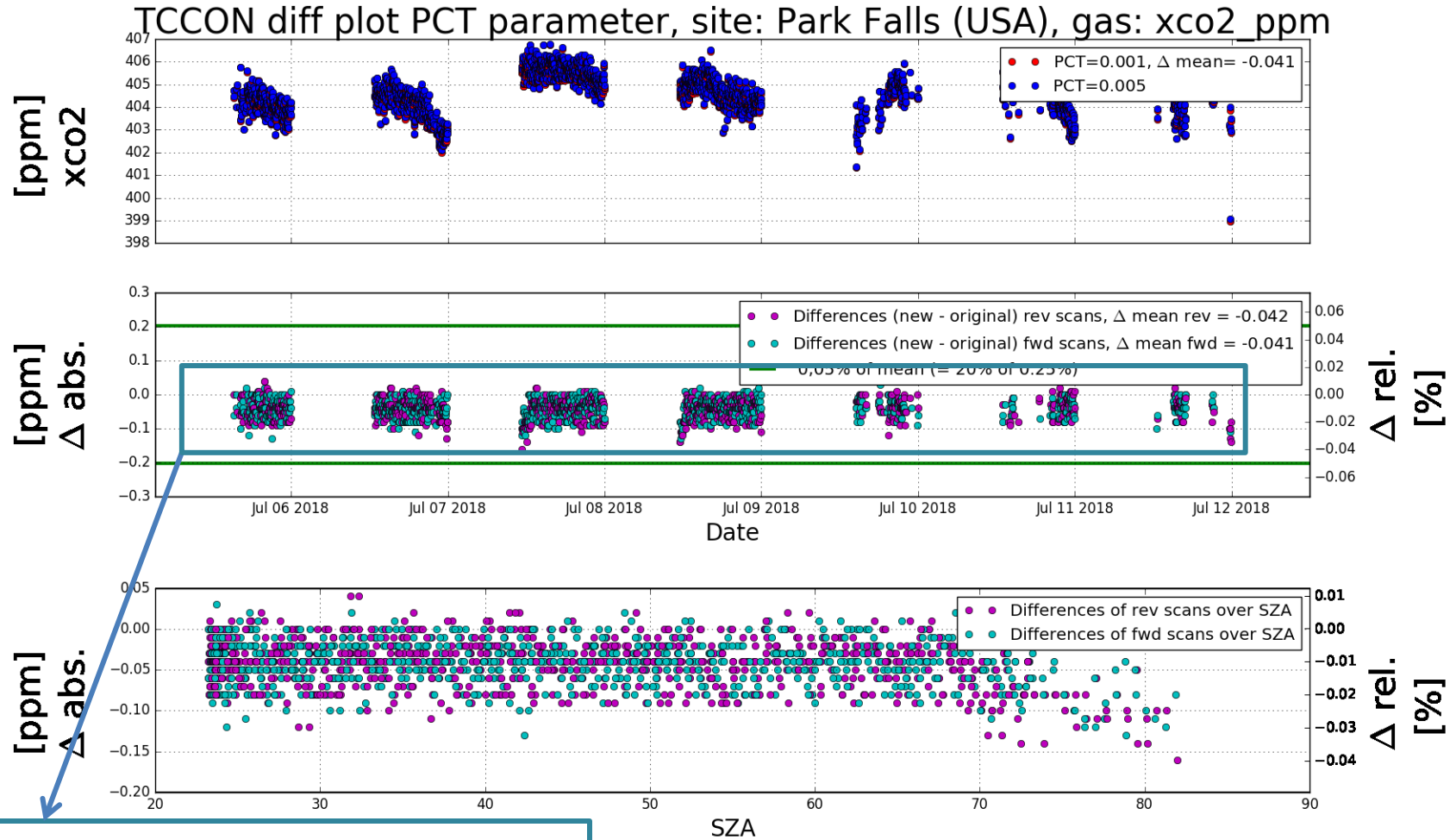
even PCT=0.005 is not enough

Eureka PCT 0.005 <-> 0.001
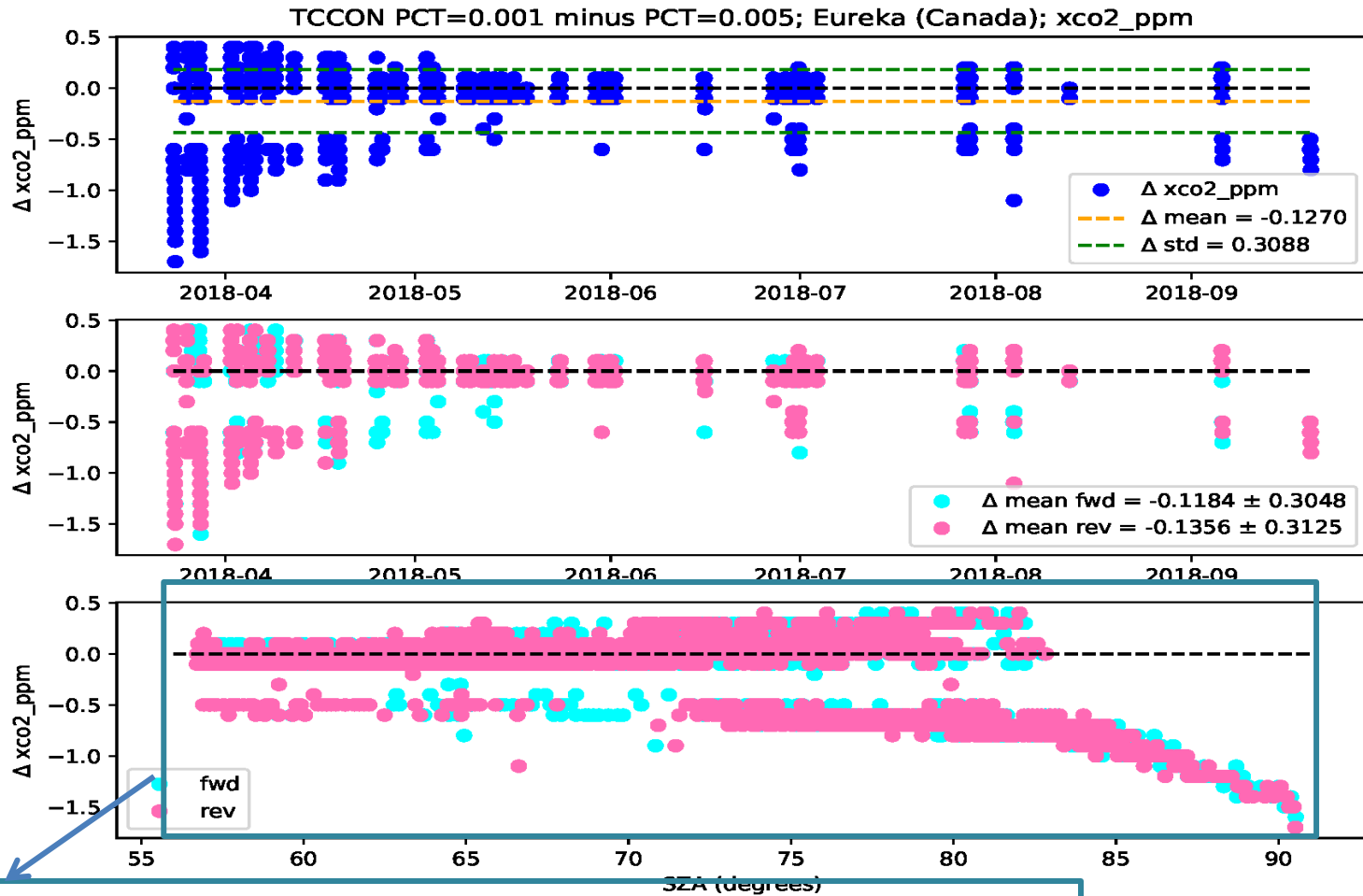
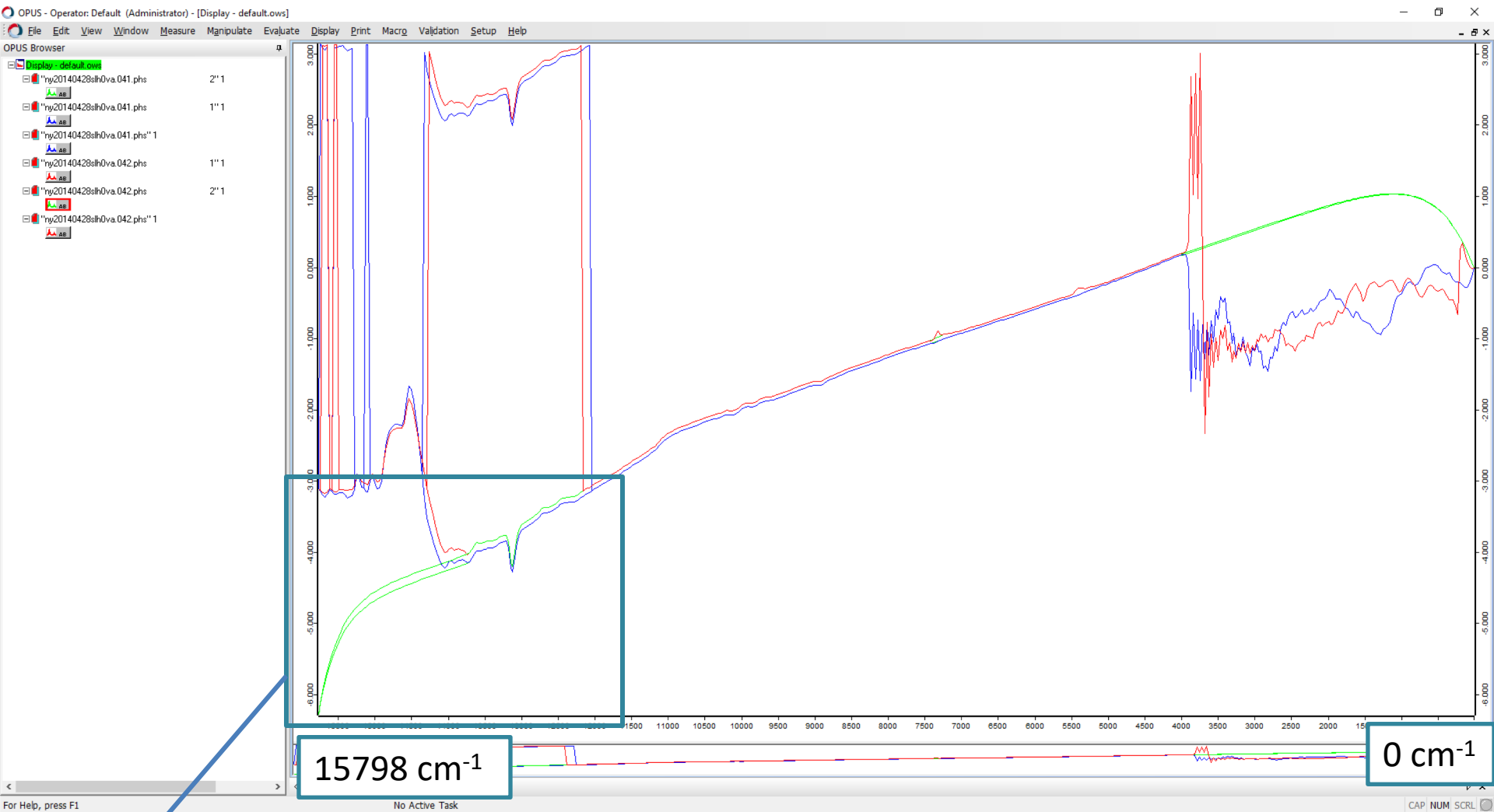even PCT=0.005 is not enough

Ny Alesund Phase Interpolation (PCT=0.02)

15798 cm^{-1}

0 cm^{-1}

Interpolation from + / - pi -> discontinuity / fwd-rev split

Ny Alesund Phase Interpolation (PCT=0.02)

15798 cm^{-1}

0 cm^{-1}
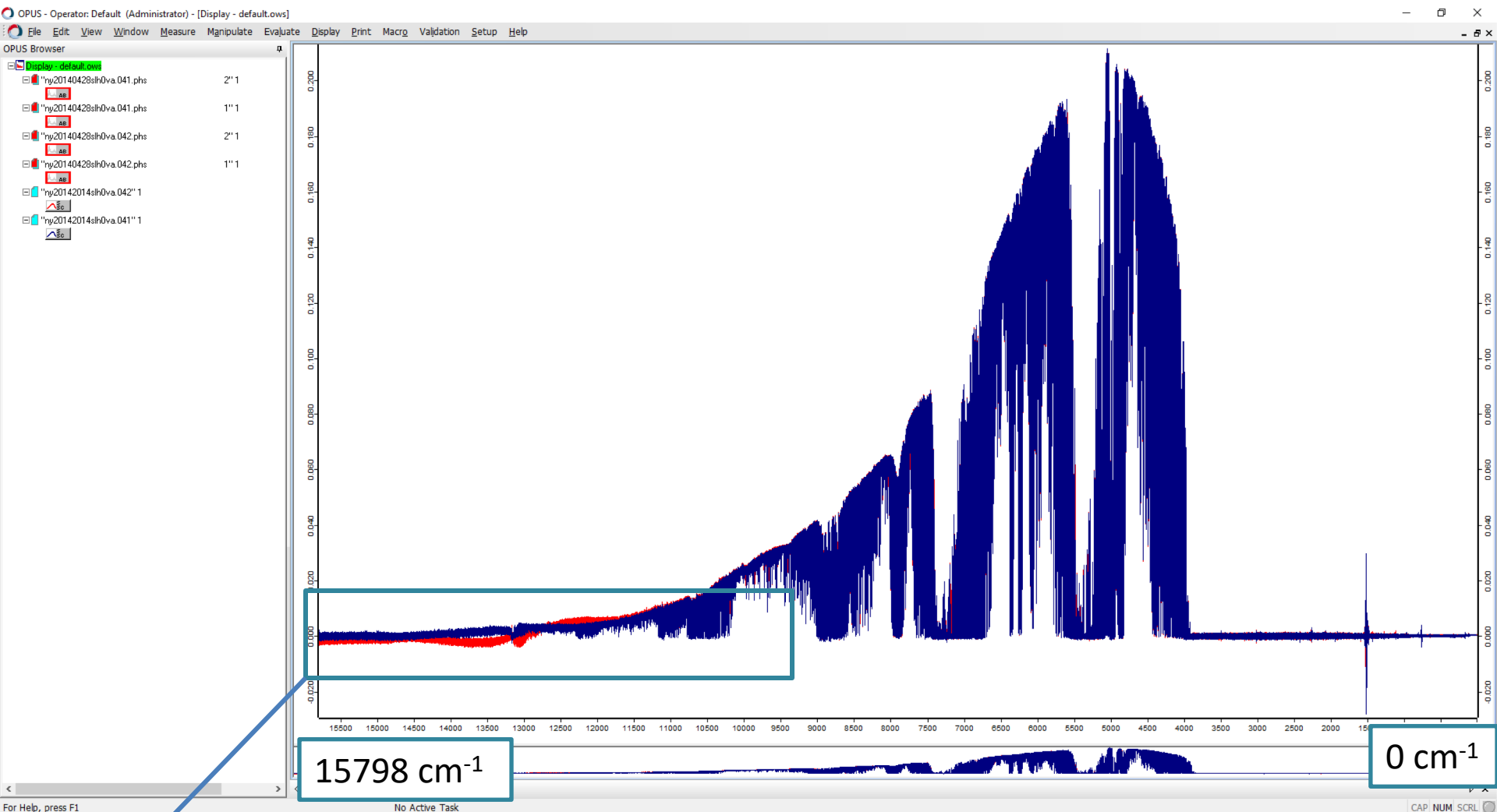
Discontinuity lead to strange intensities, effect on other wavenumbers

Ny Alesund Phase Interpolation tests

15798 cm^{-1}

0 cm^{-1}

Tests with a more smooth interpolation

Ny Alesund Phase Interpolation tests

15798 cm^{-1}

0 cm^{-1}
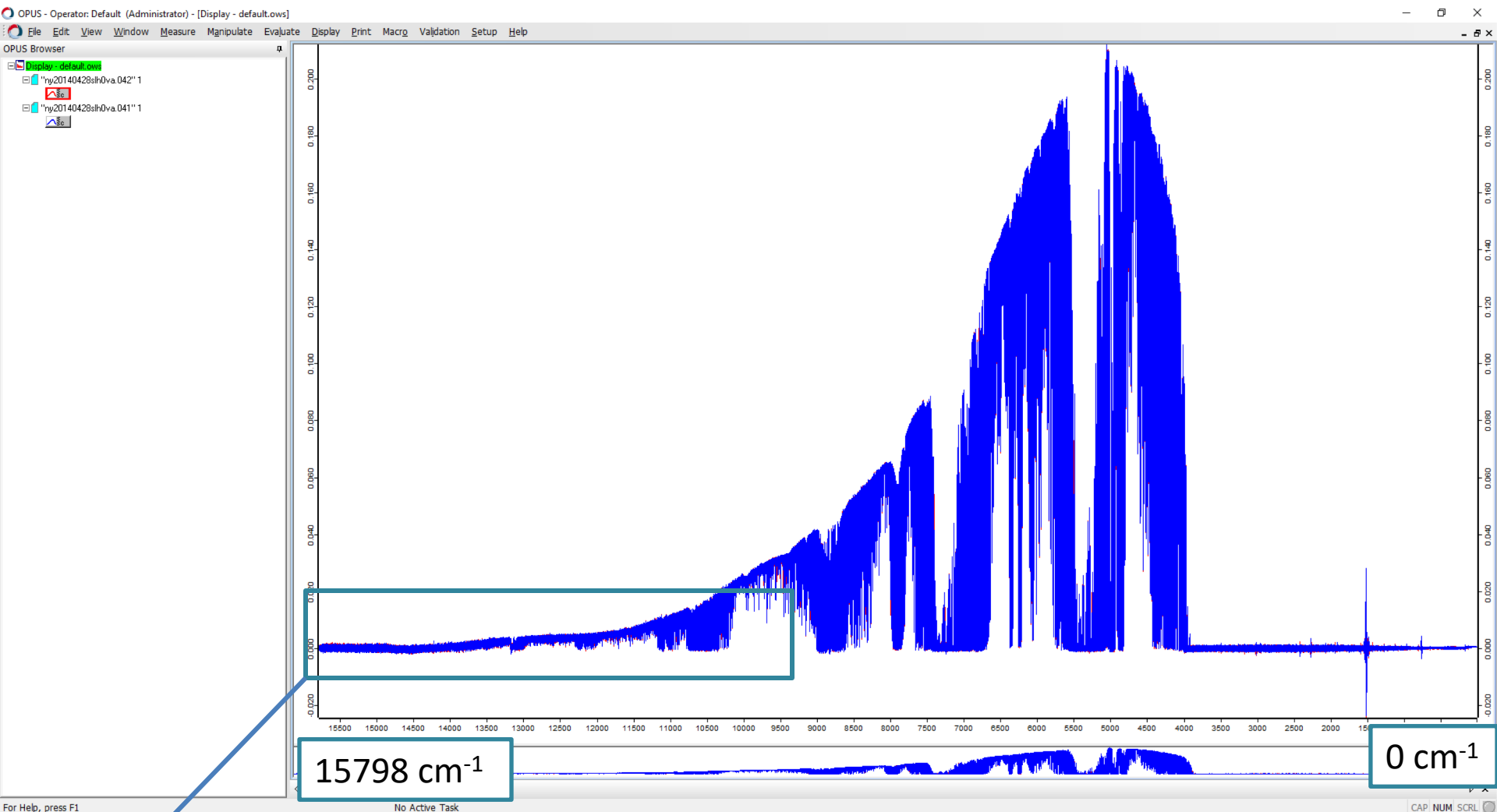
No strange intensities

Orleans InGaAS

- Does the intensity of the spectra follow the intensity of the symmetrical low res spectra?
- No!

15798 cm^{-1}

10000 cm^{-1}
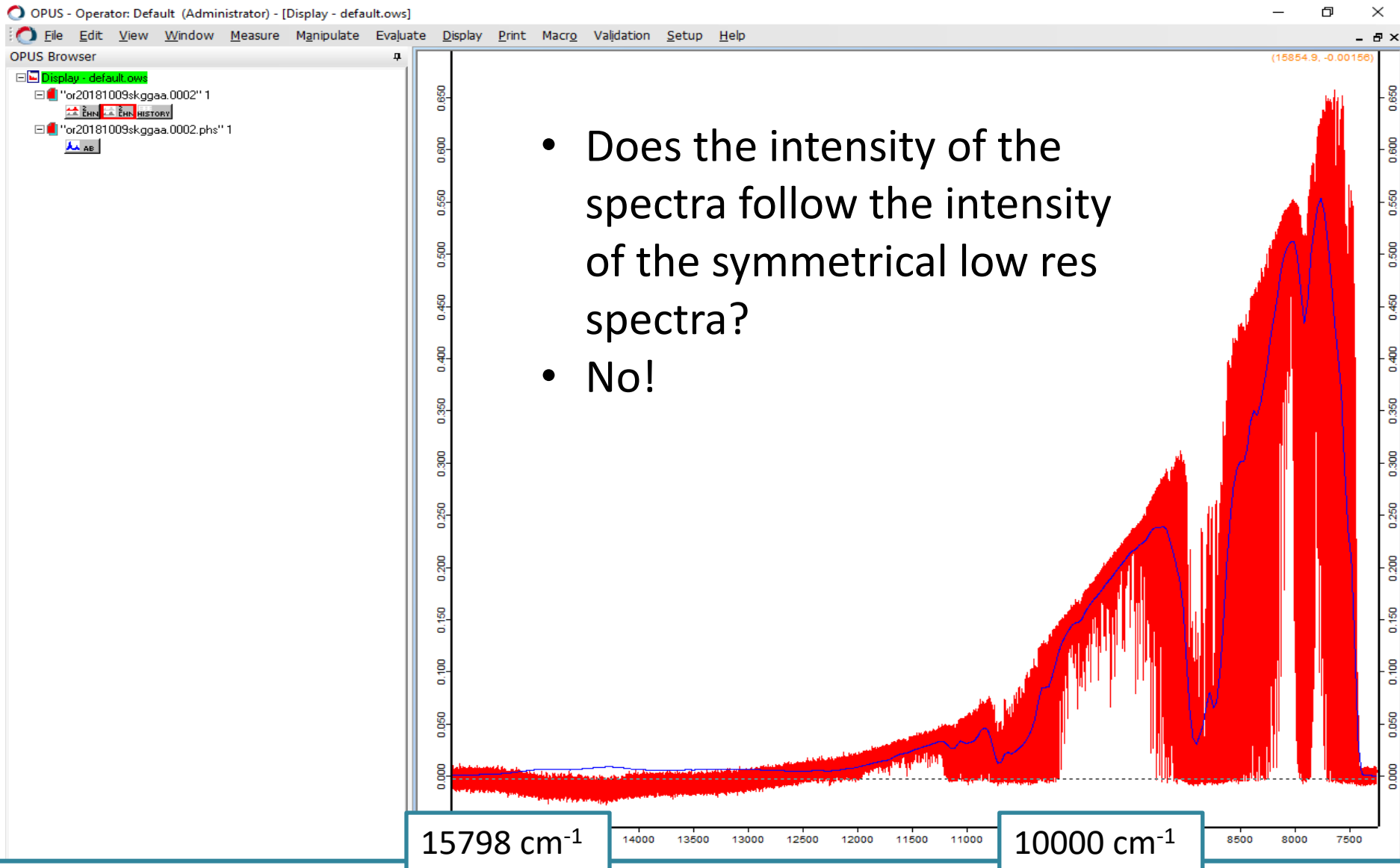
Comparison with intensity of symmetrical low res spectra PCT=0.02

Orleans InGaAS

- Does the intensity of the spectra follow the intensity of the symmetrical low res spectra?
- Yes!

15798 cm^{-1}

10000 cm^{-1}
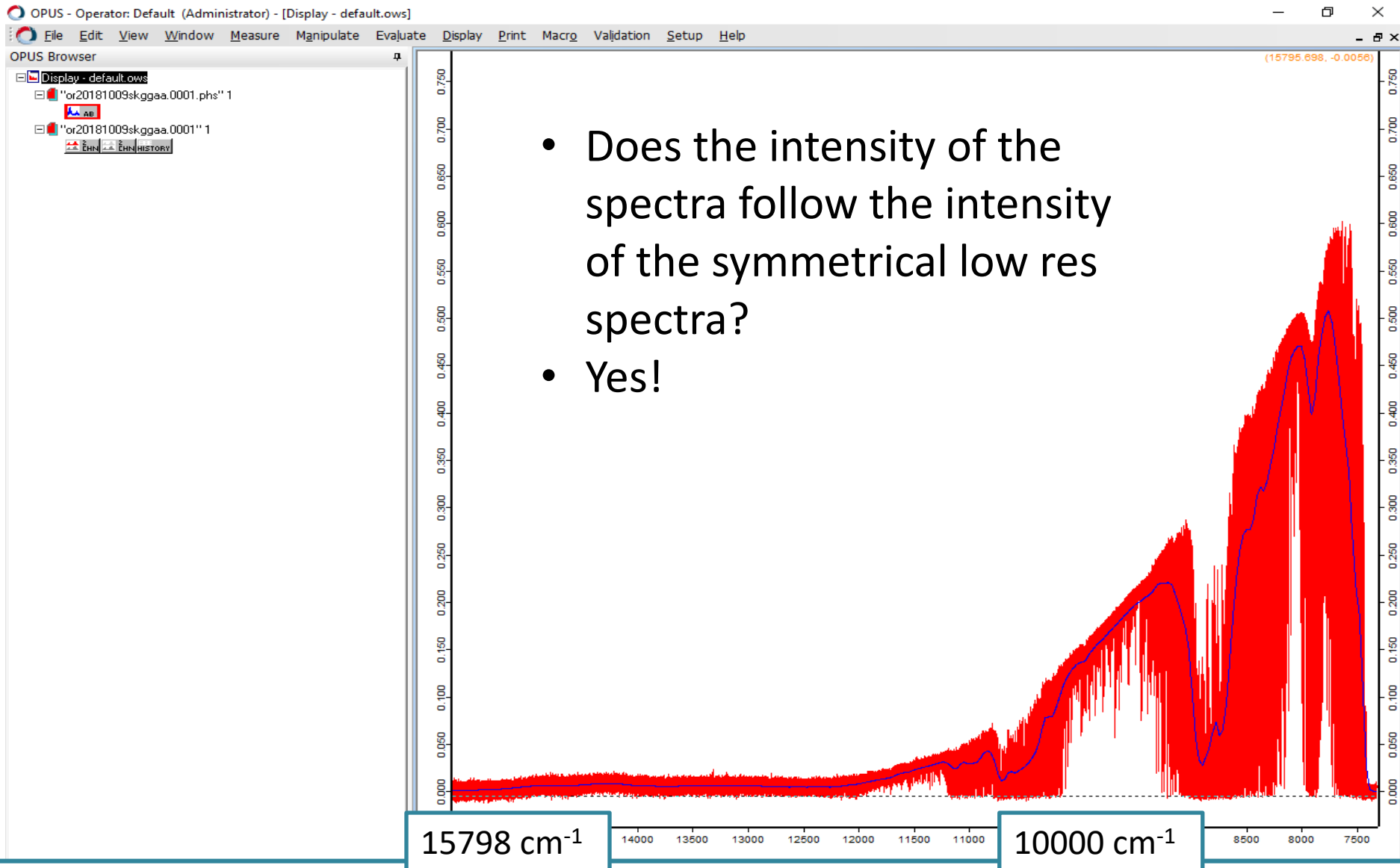
Comparison with intensity of symmetrical low res spectra PCT = 0.005

Ny Alesund Phase Interpolation tests

2000 cm^{-1}

0 cm^{-1}
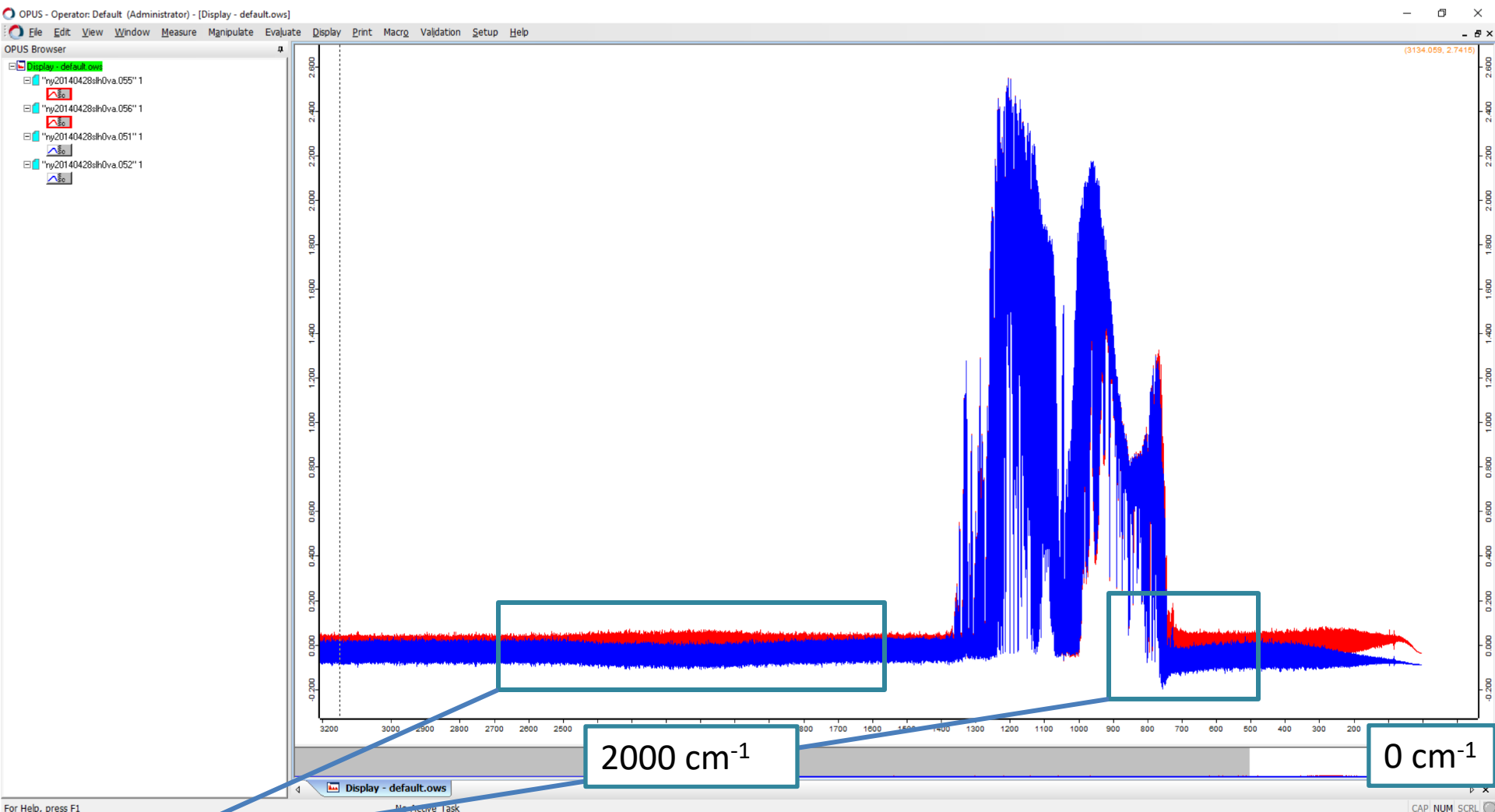
MCT negative intensities removed

Orleans Si
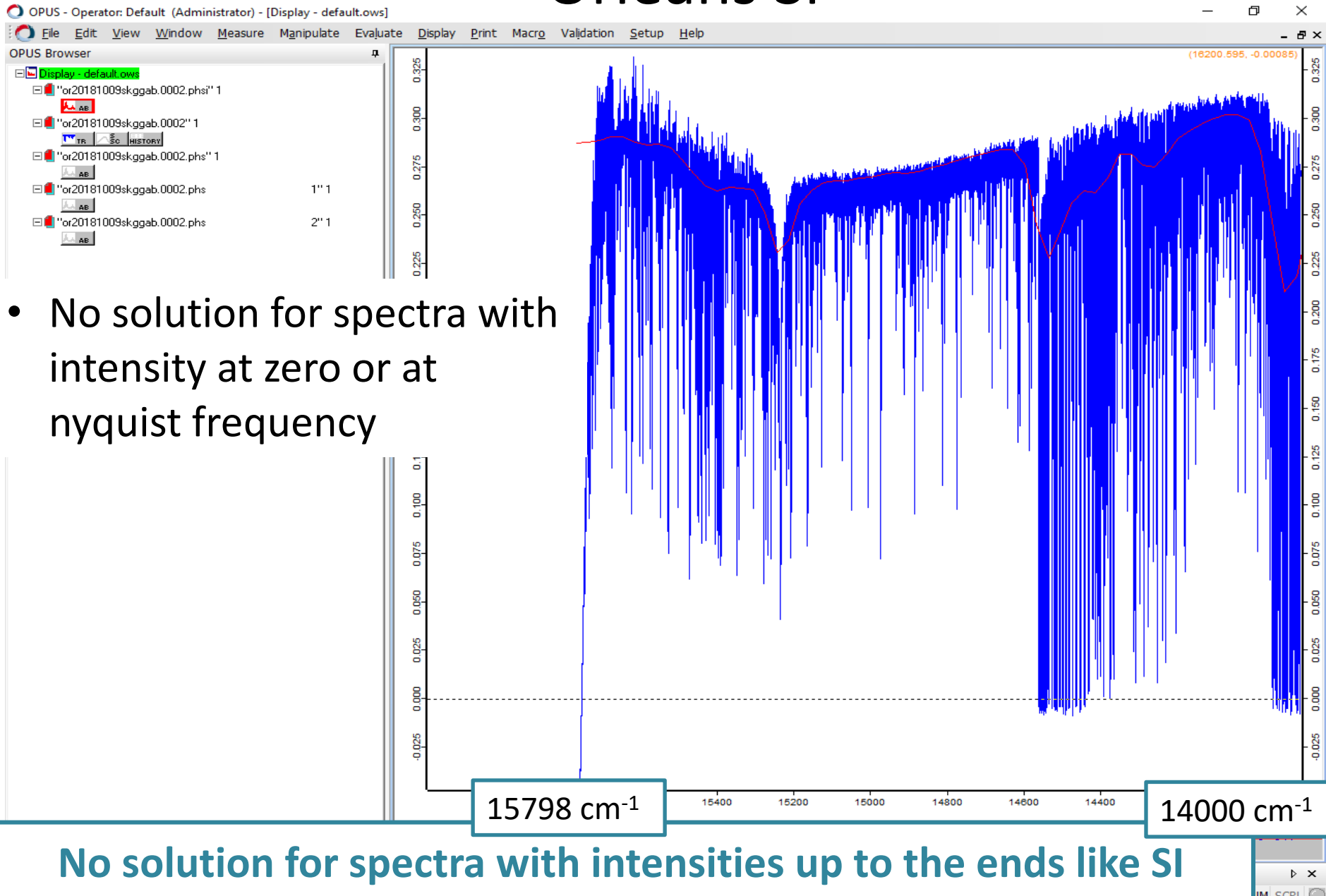
- No solution for spectra with intensity at zero or at nyquist frequency

15798 cm^{-1}

14000 cm^{-1}

No solution for spectra with intensities up to the ends like SI