MOPITT CO during ARCTAS

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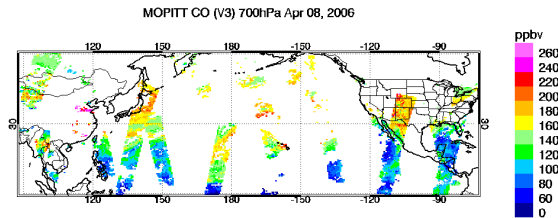
ACD, ESSL, NCAR

Near-Real-Time MOPITT CO
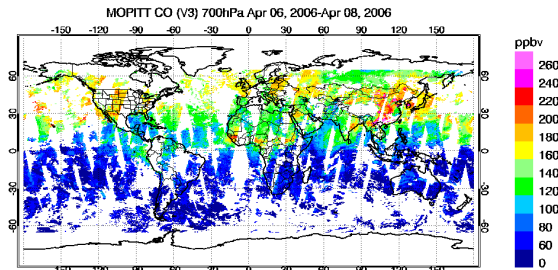

Expedited data
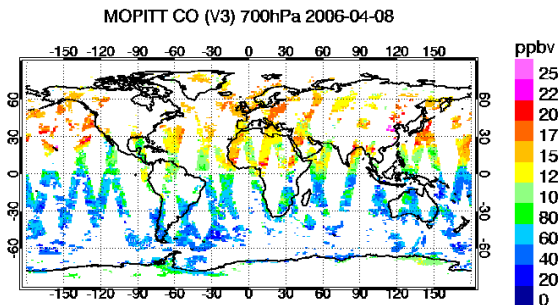
For region of interest

Available within a few hours of overpass, updated as available

Rapid Response

Global coverage < 65°N (without MODIS cloud mask)

Available within following day

Operational

Full globe

Available within a few days

Experimental Retrievals

Expedited and Rapid Response data

Using Near IR channels, different a priori profiles and covariance matrix

Thermal vs Near IR Channels

Operational Retrievals - Thermal IR

- Require accurate temperature profiles
- Higher sensitivity with large surface-atmosphere temperature contrasts

Solar - near IR

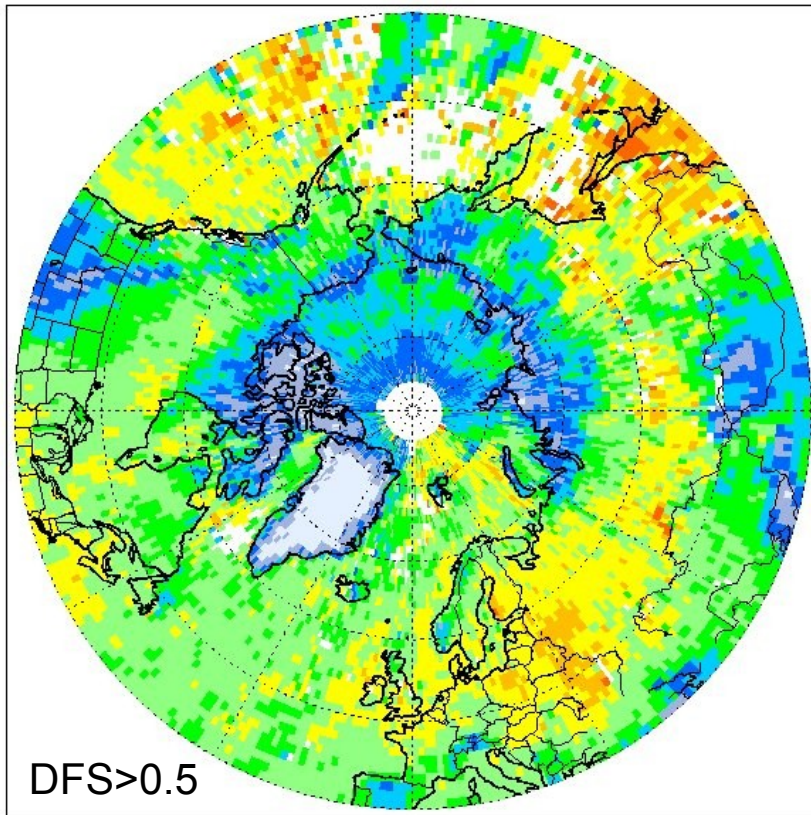- More sensitive to surface concentrations
- Not dependent on temperature profiles
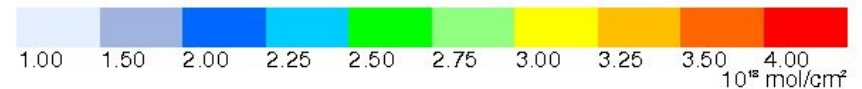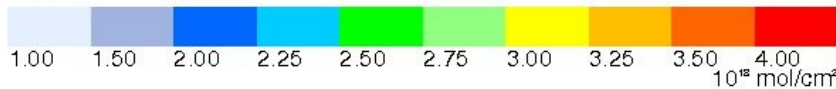- Greater sensitivity over highly reflective surfaces (snow, ice)
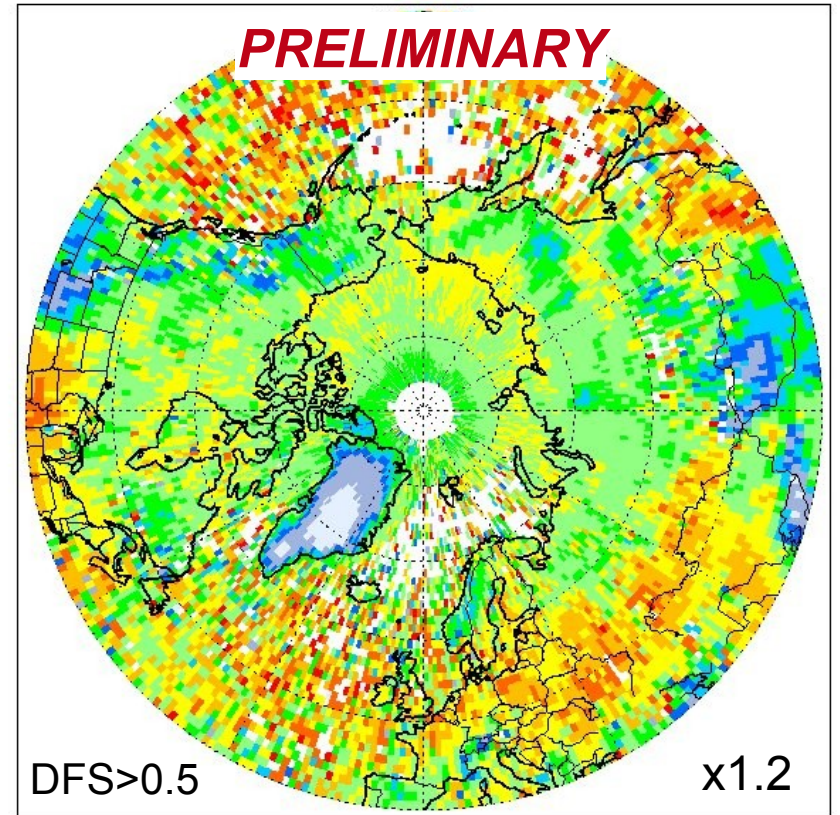- *Preliminary results - may have bias*

Thermal vs Near IR - CO column

TIR channels Column: 20060401-20060430

NIR channels Column: 20060401-20060430

PRELIMINARY

DFS>0.5

DFS>0.5

x1.2

1.00 1.50 2.00 2.25 2.50 2.75 3.00 3.25 3.50 4.00 10^{18} mol/cm²

1.00 1.50 2.00 2.25 2.50 2.75 3.00 3.25 3.50 4.00 10^{18} mol/cm²

Thermal channels appear biased low over snow and ice

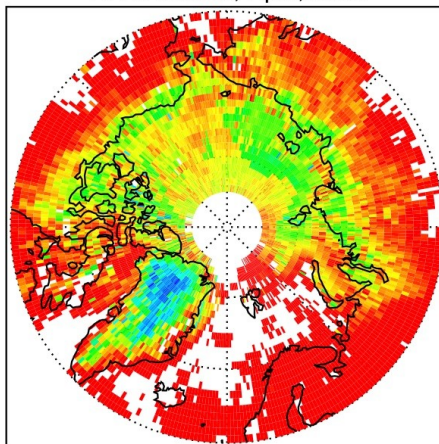Solar channels should be disregarded over open water
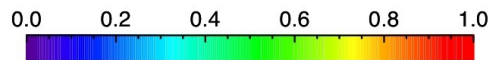
Thermal vs Near IR

Degrees of Freedom for Signal:

NIR higher than TIR over snow, ice
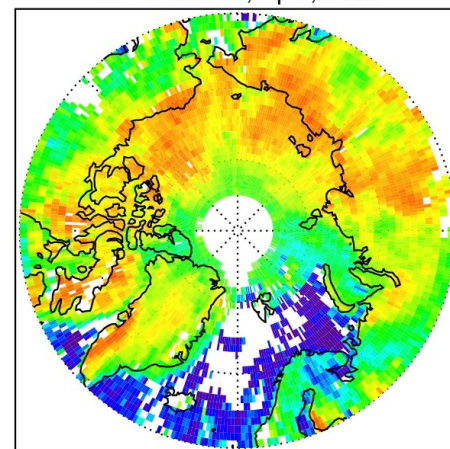
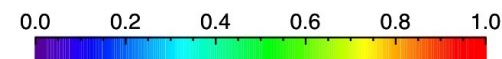Consistent in number of retrievals in month

TIR channels, April, 2006

NIR channels, April, 2006

Monthly-mean DFS

0.0   0.2   0.4   0.6   0.8   1.0

Monthly-mean DFS

0.0   0.2   0.4   0.6   0.8   1.0
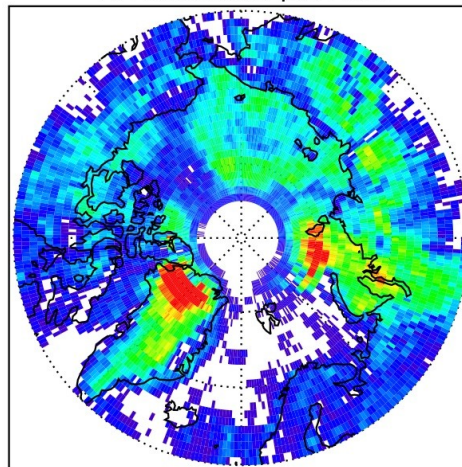
TIR channels, April, 2006

NIR channels, April, 2006

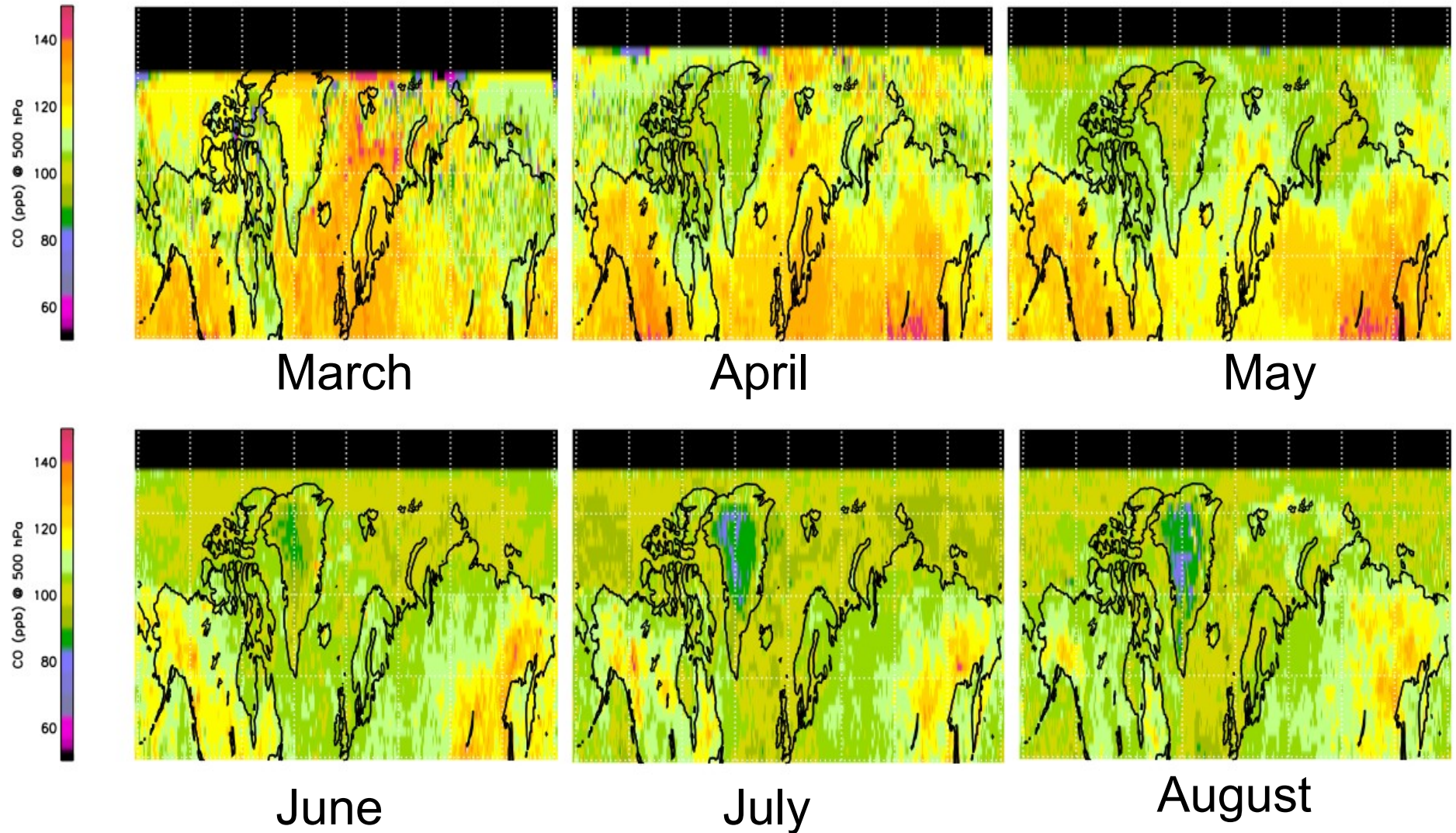Total No. Converged Retrievals

0   50   100   150   200

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0   50   100   150   200
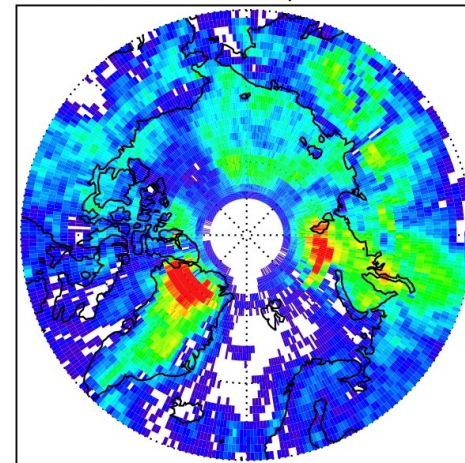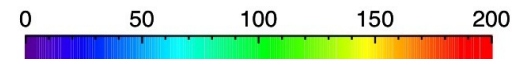
2002-2007 Monthly Averages: MOPITT CO at 500 hPa

Daytime only; *a priori* fraction < 0.5
Greenland systematically lower

Validation Needs

Previous Arctic CO validation data:

    Poker Flats, AK: aircraft can samples (NOAA/GMD)

        limited

    Thule, Greenland: ground-based FTIR (NCAR)

        daylight only

Need to evaluate differences between retrievals with thermal and solar channels

    Reflective surfaces (snow, sea ice) versus less reflective (open water, vegetation)

Validation over Greenland in Summer would be useful