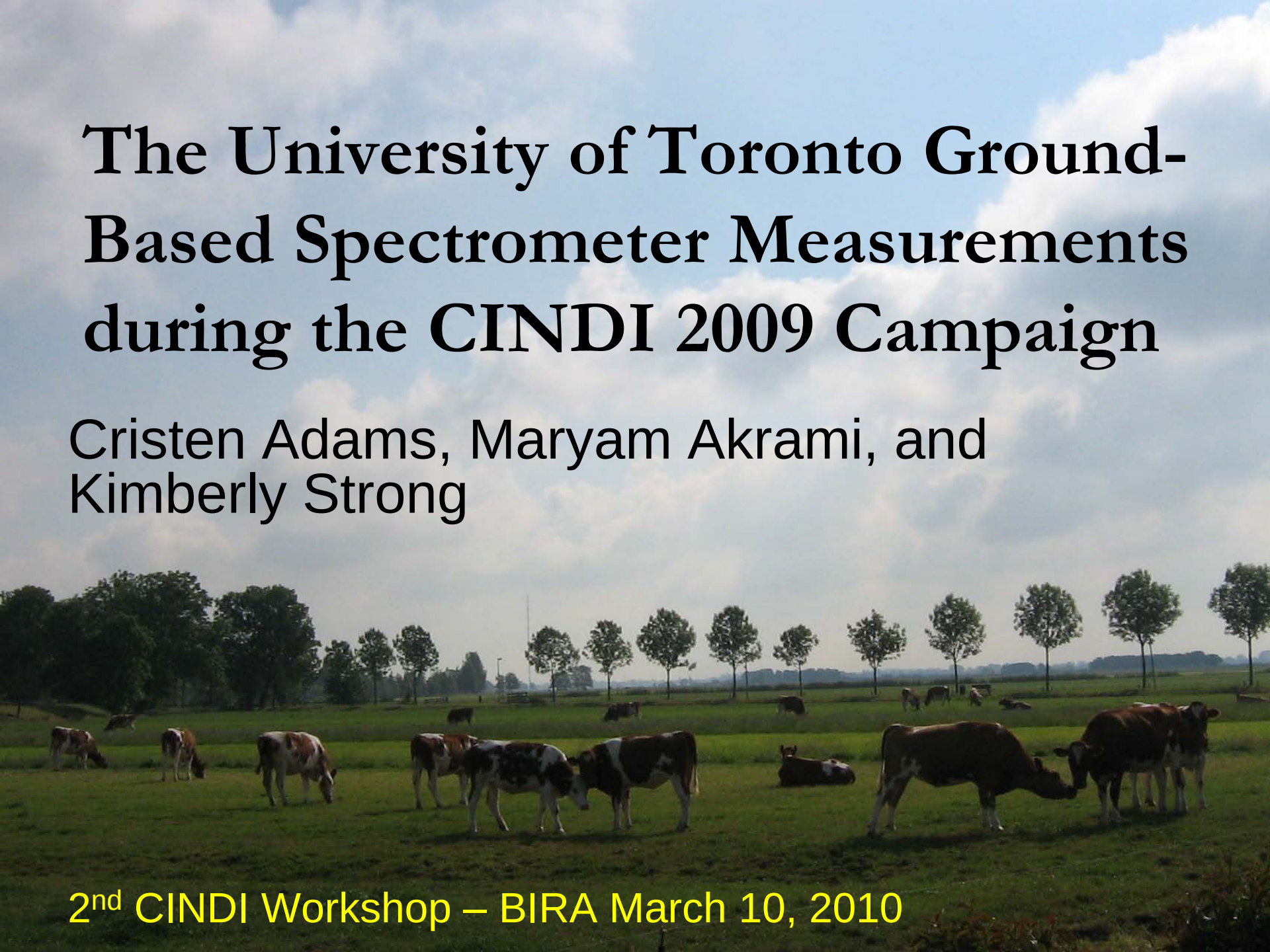
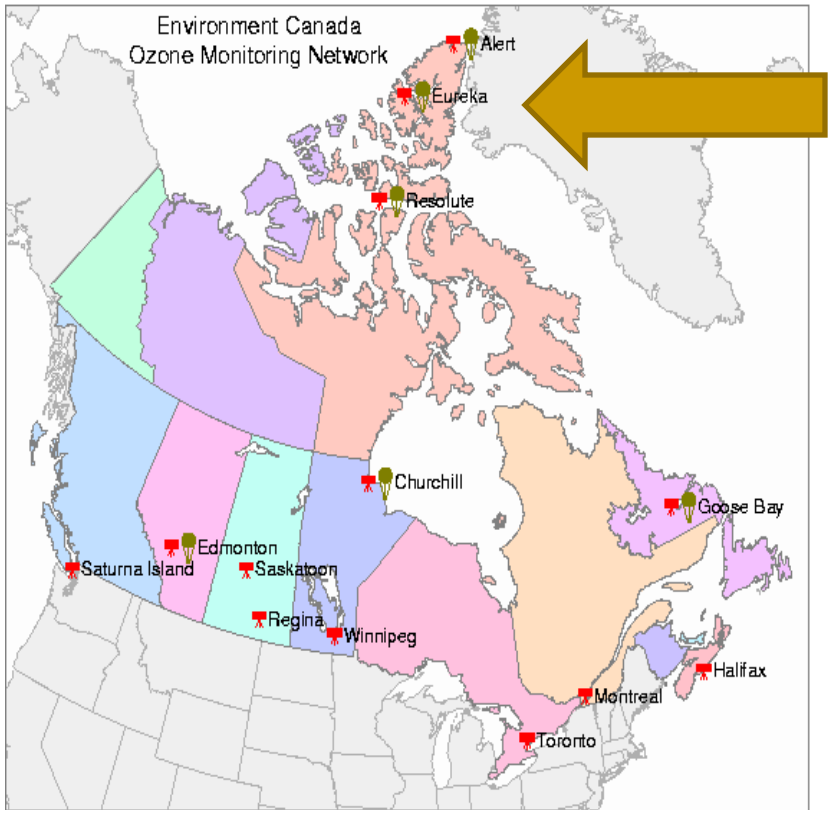
The University of Toronto Ground-Based Spectrometer Measurements during the CINDI 2009 Campaign

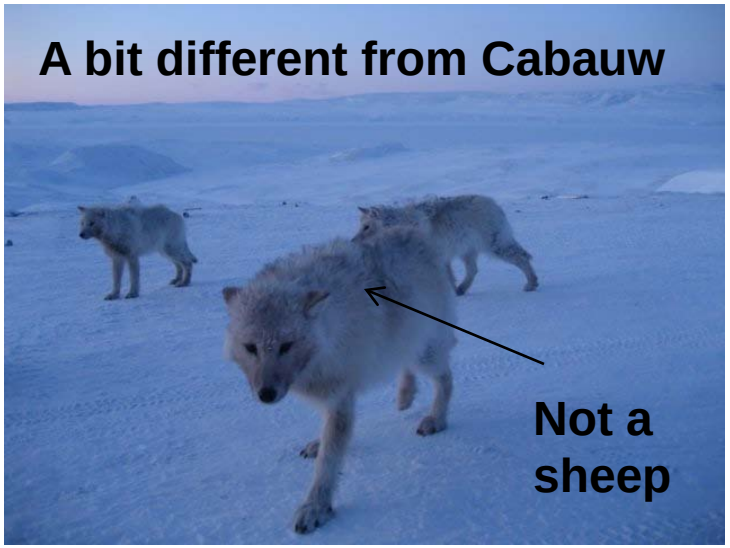
Cristen Adams, Maryam Akrami, and Kimberly Strong



2nd CINDI Workshop – BIRA March 10, 2010



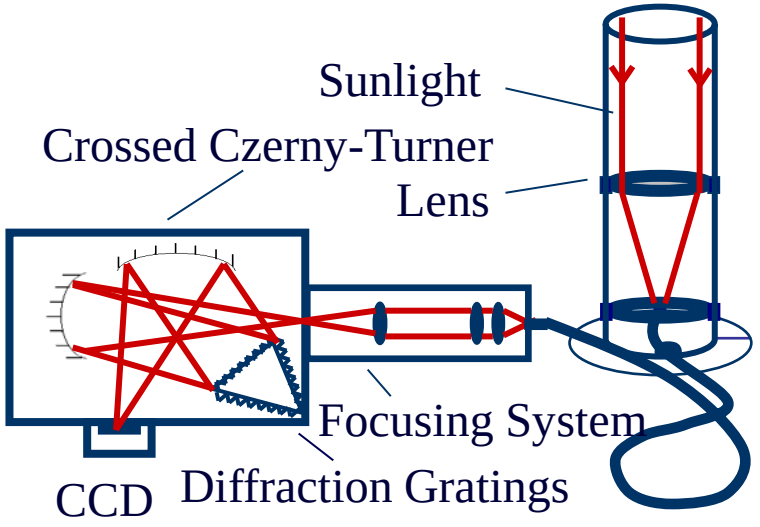
- I (Cristen Adams) am at Eureka for the 2010 ACE Satellite Validation Campaign
- Polar Environment Atmospheric Research Laboratory (PEARL) run by the Canadian Network for the Detection of Atmospheric Change (CANDAC) at 80ºN

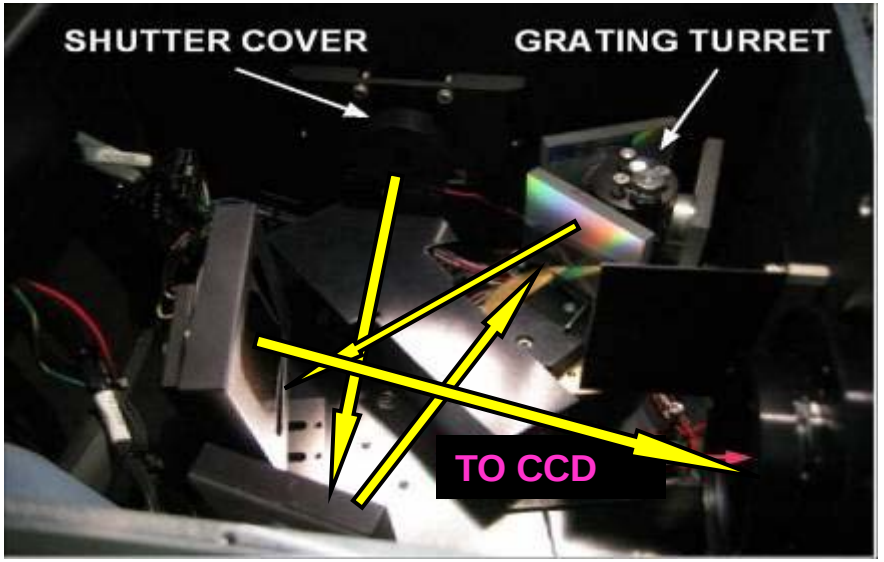


Photos by Rodica Lindenmaier and Emily McCullough

The Ground-Based Spectrometers (GBS's)

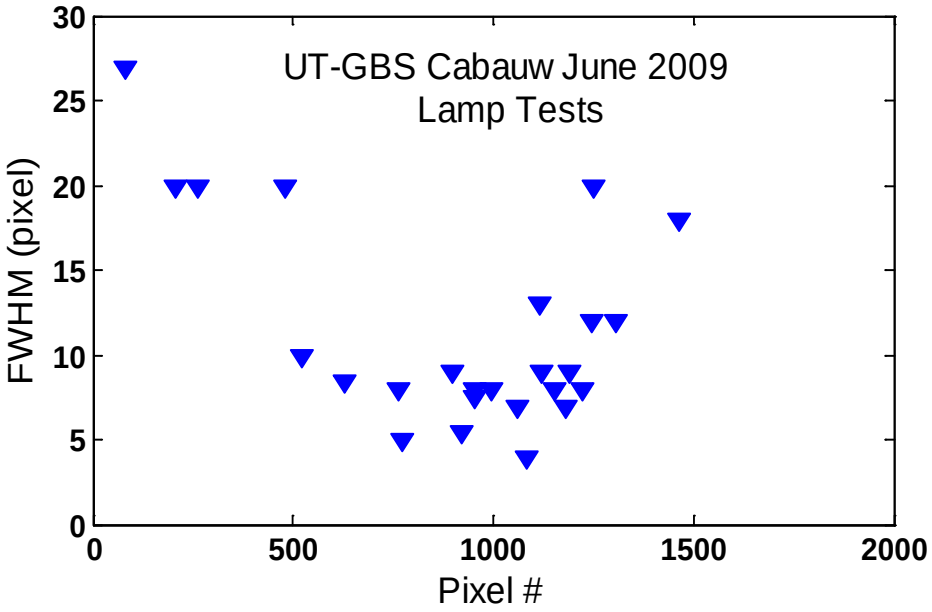
- UV-visible, triple-grating spectrometers
- Cooled CCD detector

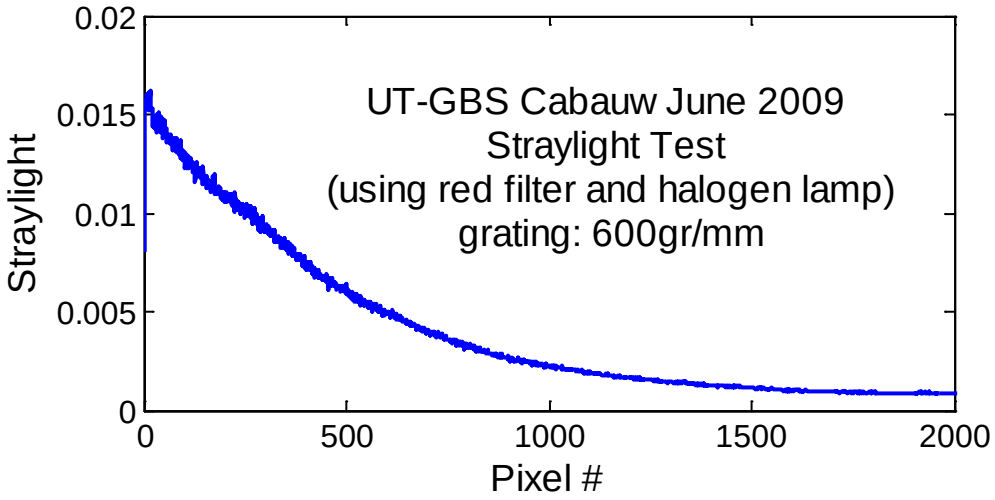




Lab tests

Currently working on improving this for this Spring's Eureka campaign. Prelim tests show that changes to our input optics help a lot. Thanks everyone for all the ideas about this!





Set-up at Cabauw

- Zenith-sky set-up outside in an air conditioned box.
- On the whole, instrument worked very well.
- Added tracker above instrument for our first-ever MAX-DOAS measurements

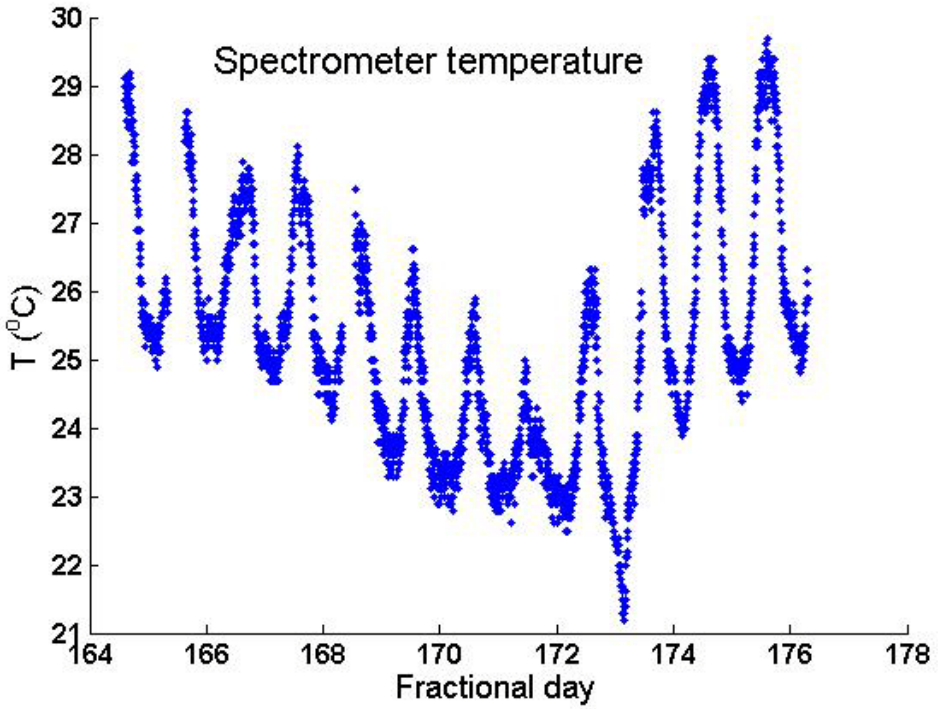
A few notes

- Instrument ate **three** shutters over the campaign. Finished the campaign (June 22 onward) with no shutter at all.
  - → **Possible problems with intensity ratios.**

- Due to computer communication issues, lost data on:
  - 22 UTC June 24th to 7:30 UTC June 25th
  - 20 UTC June 27th to 10:30 UTC June 28th

- Our Cabauw setup had some temperature stability problems
  → **systematics**

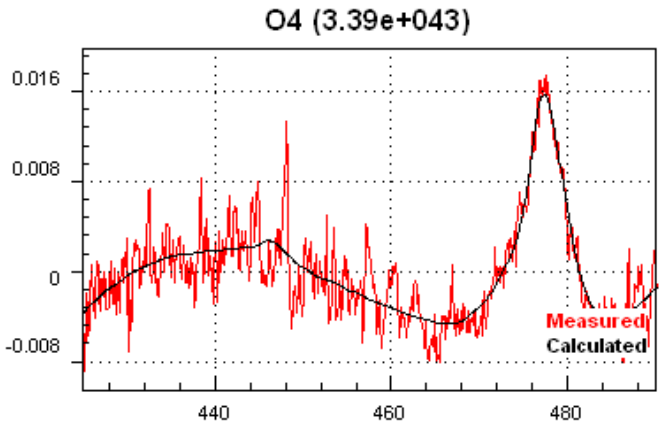
Also trying to improve this here at Eureka. Again thanks for all the advice!

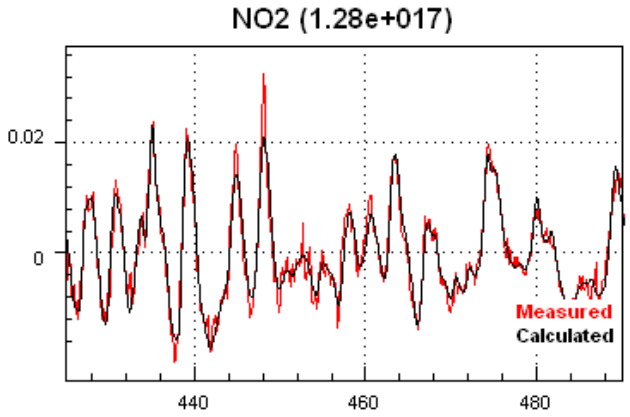


Measurement summary

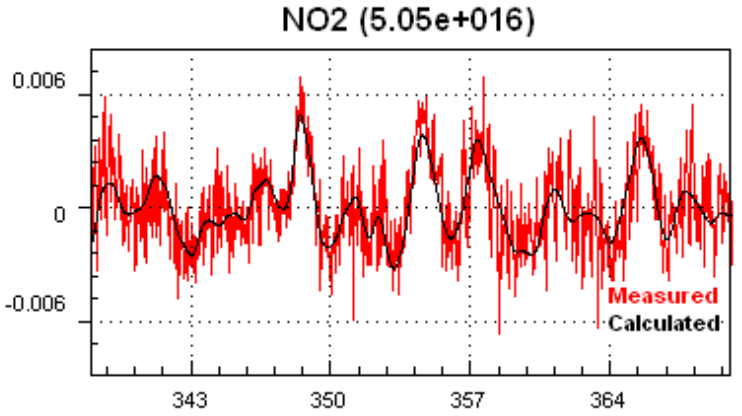
	Viewing	Wavelengths	Analysis status of ozone/NO_2
Semi-blind intercomparison	Zenith-sky	Visible	Complete
Other trace gases week	MAX-DOAS (our first ever!)	UV	Complete
First two weeks of extended phase	MAX-DOAS	Visible	Complete
Final week of extended phase	Zenith-sky	UV	To be analyzed

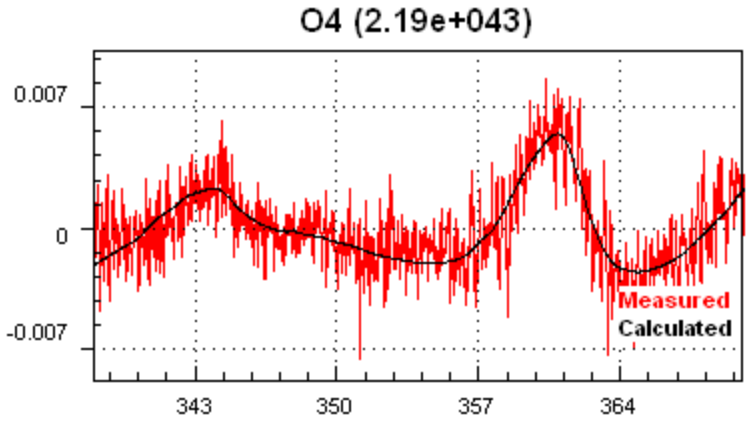
Vis DOAS Fits



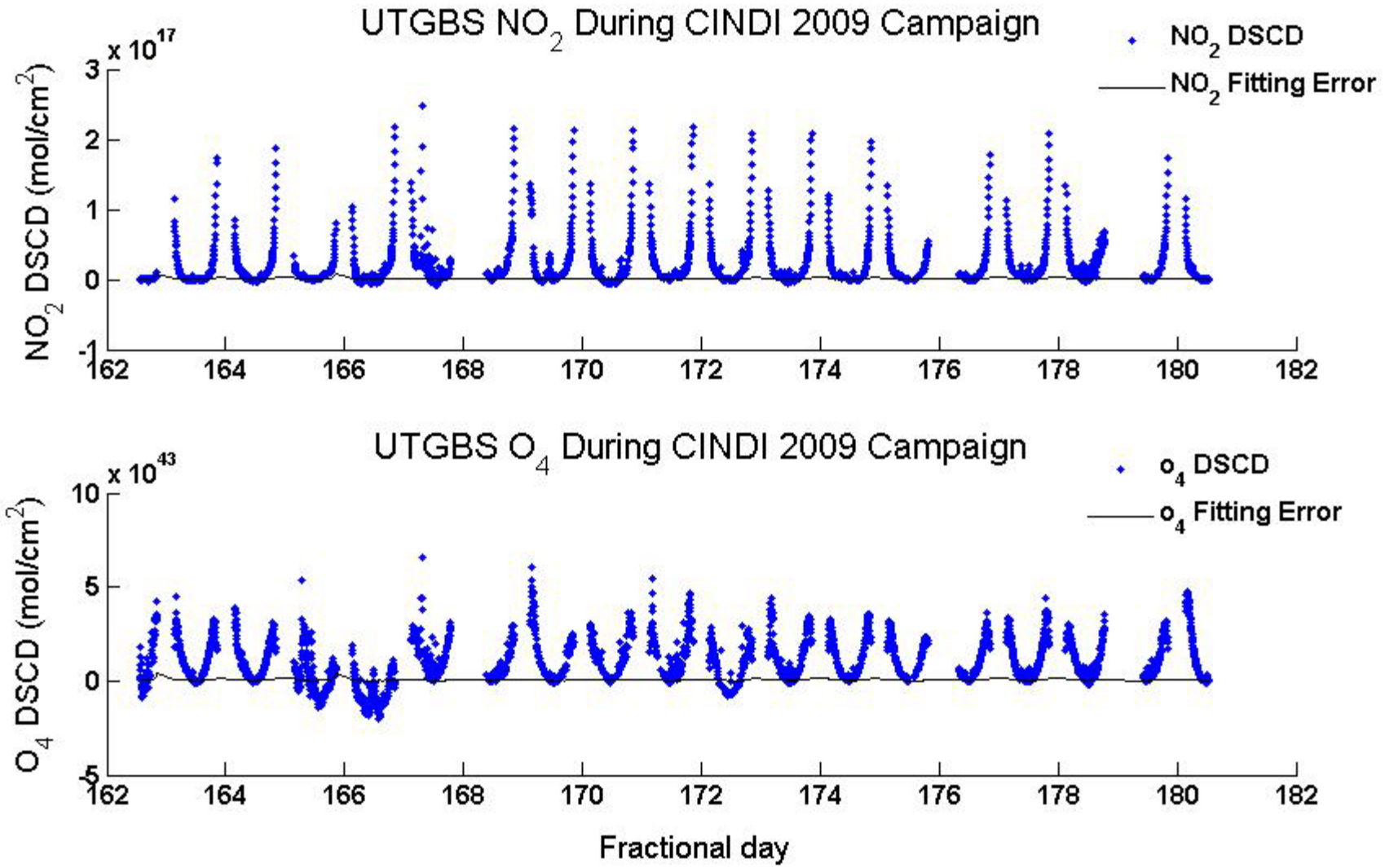


UV DOAS Fits

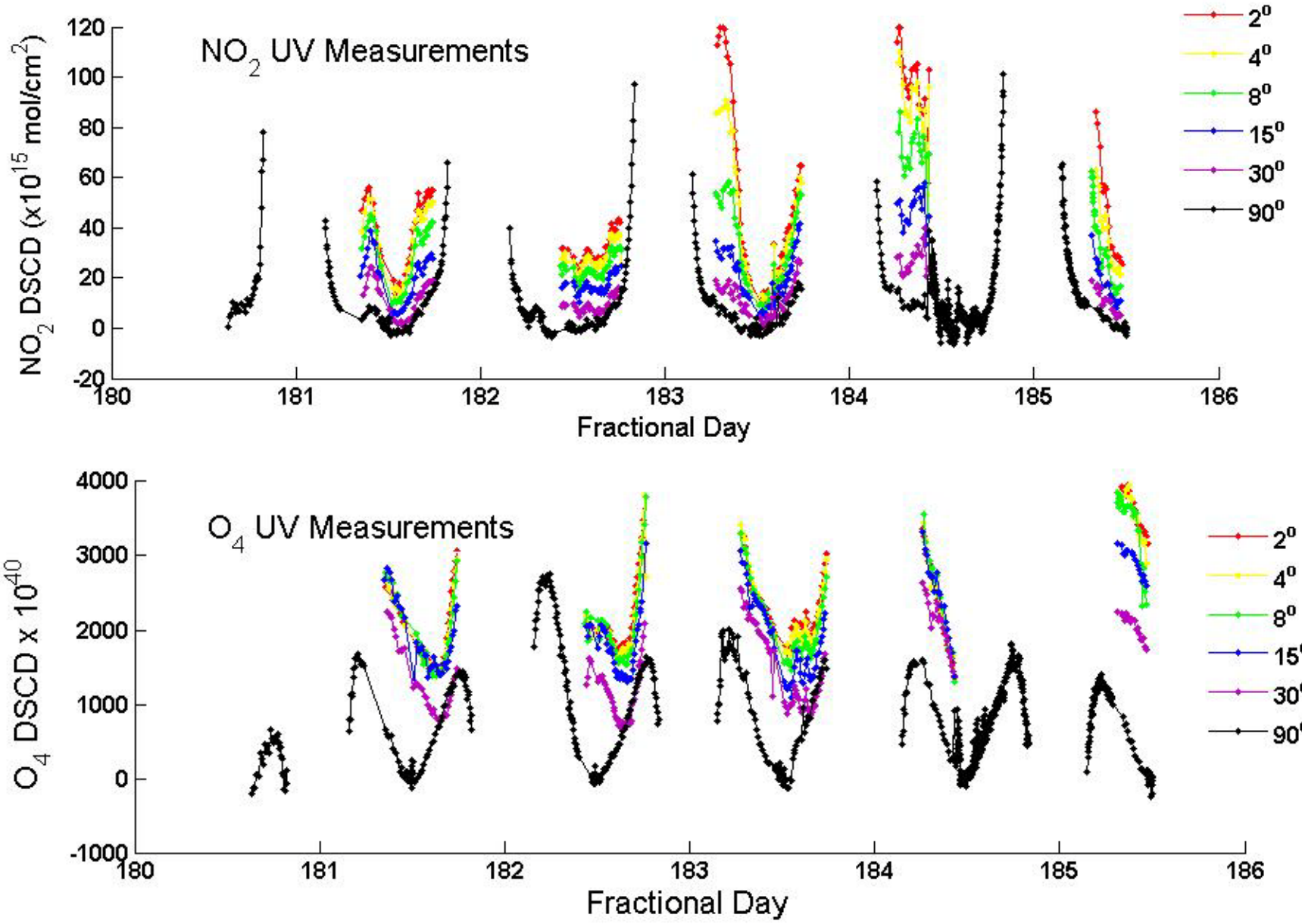




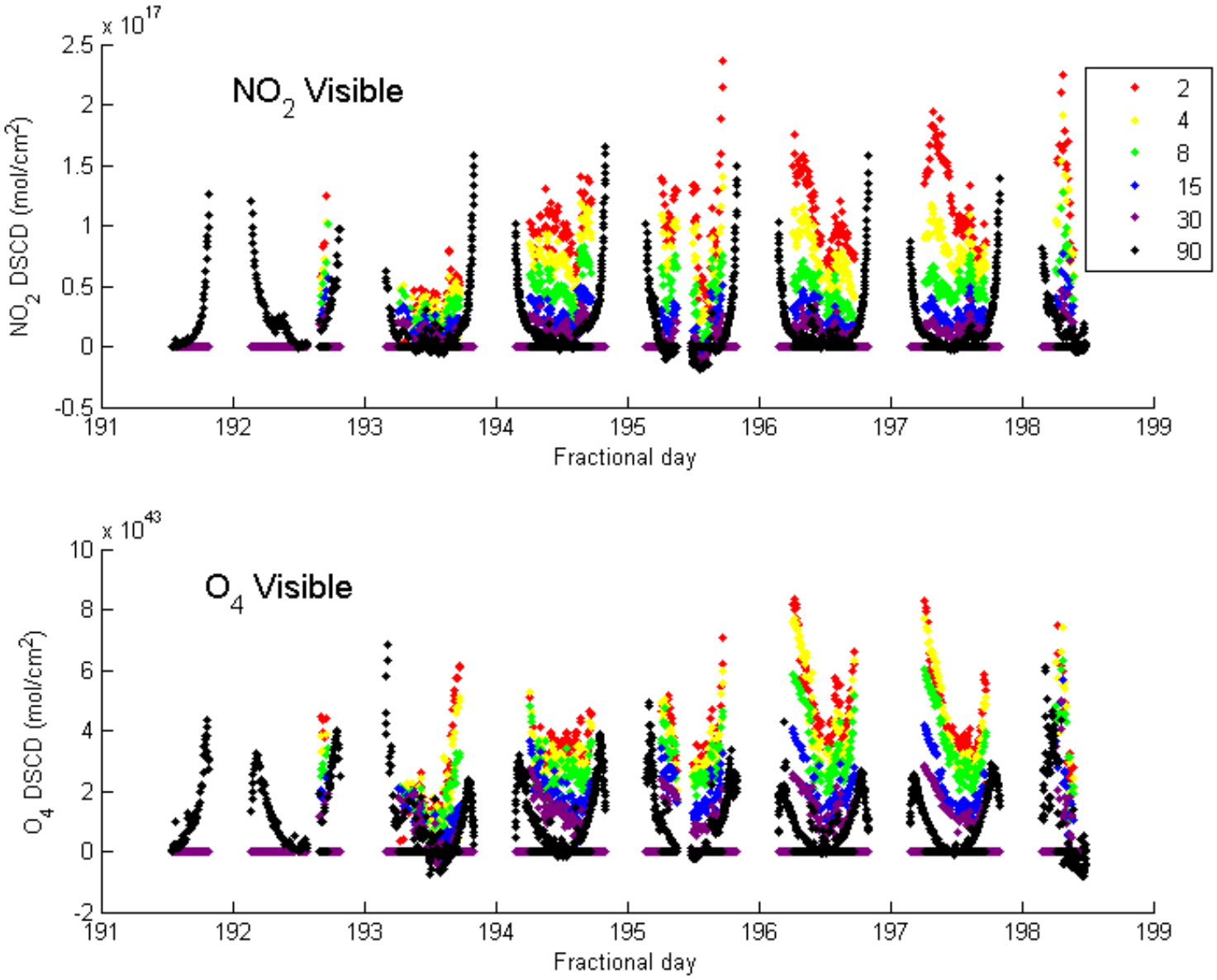
NO_2 and O_4 zenith-sky visible dataset (semi-blind intercomparison week)



Other trace gases week

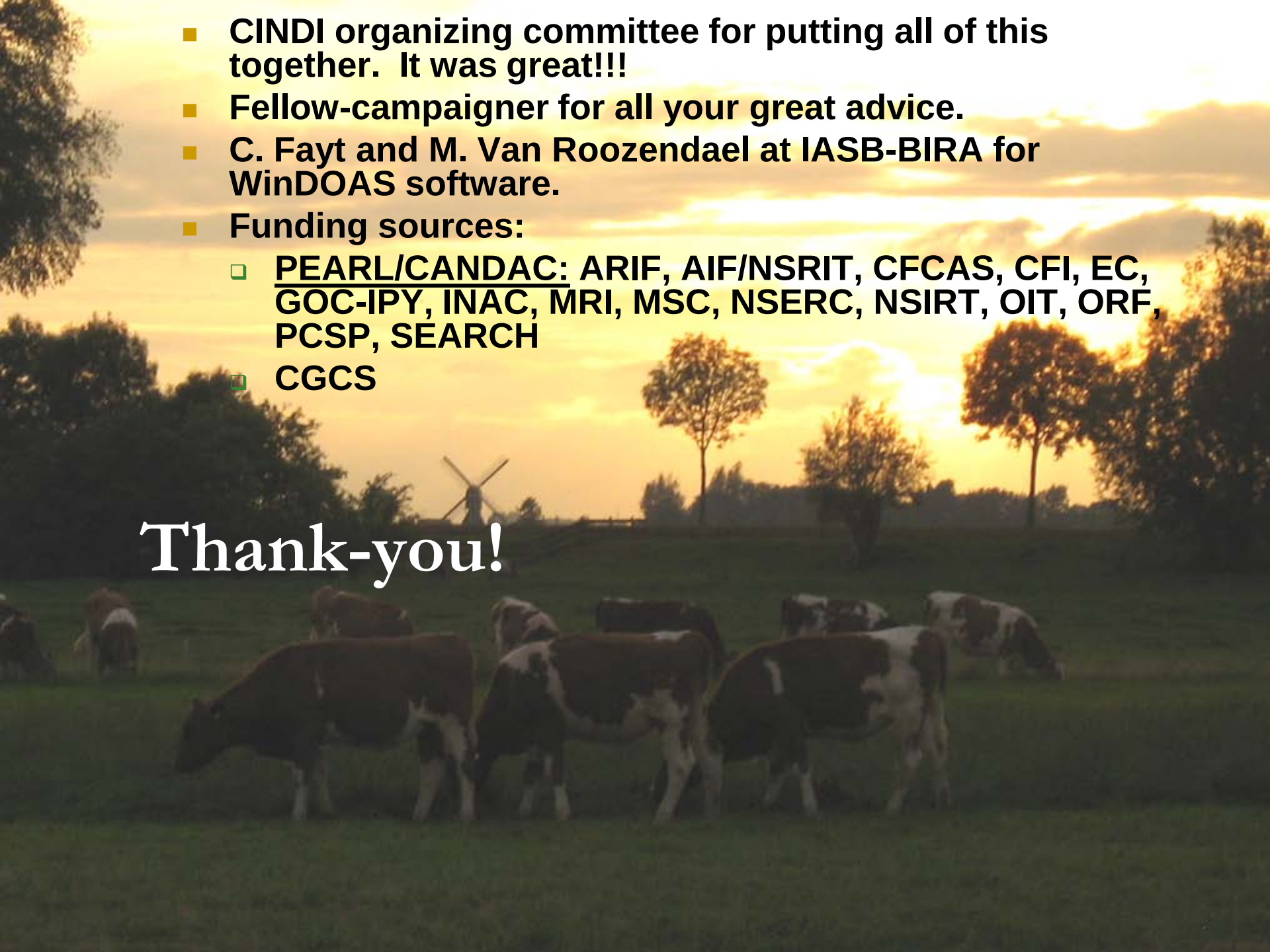


Extended phase



Still on the to-do list

- Complete analysis of zenith-sky UV measurements.
- See if I can reduce some of those residuals (still no luck!).
- Try to retrieve HCHO.
- Compare our MAX-DOAS data with other instruments for latter part of the campaign.
- Contribute to CINDI publications – Please let us know what you need.



- CINDI organizing committee for putting all of this together. It was great!!!
- Fellow-campaigner for all your great advice.
- C. Fayt and M. Van Roozendael at IASB-BIRA for WinDOAS software.
- Funding sources:
  - PEARL/CANDAC: ARIF, AIF/NSRIT, CFCAS, CFI, EC, GOC-IPY, INAC, MRI, MSC, NSERC, NSIRT, OIT, ORF, PCSP, SEARCH
  - CGCS

Thank-you!