Status of SASKTRAN Processing with OMPS LP Data

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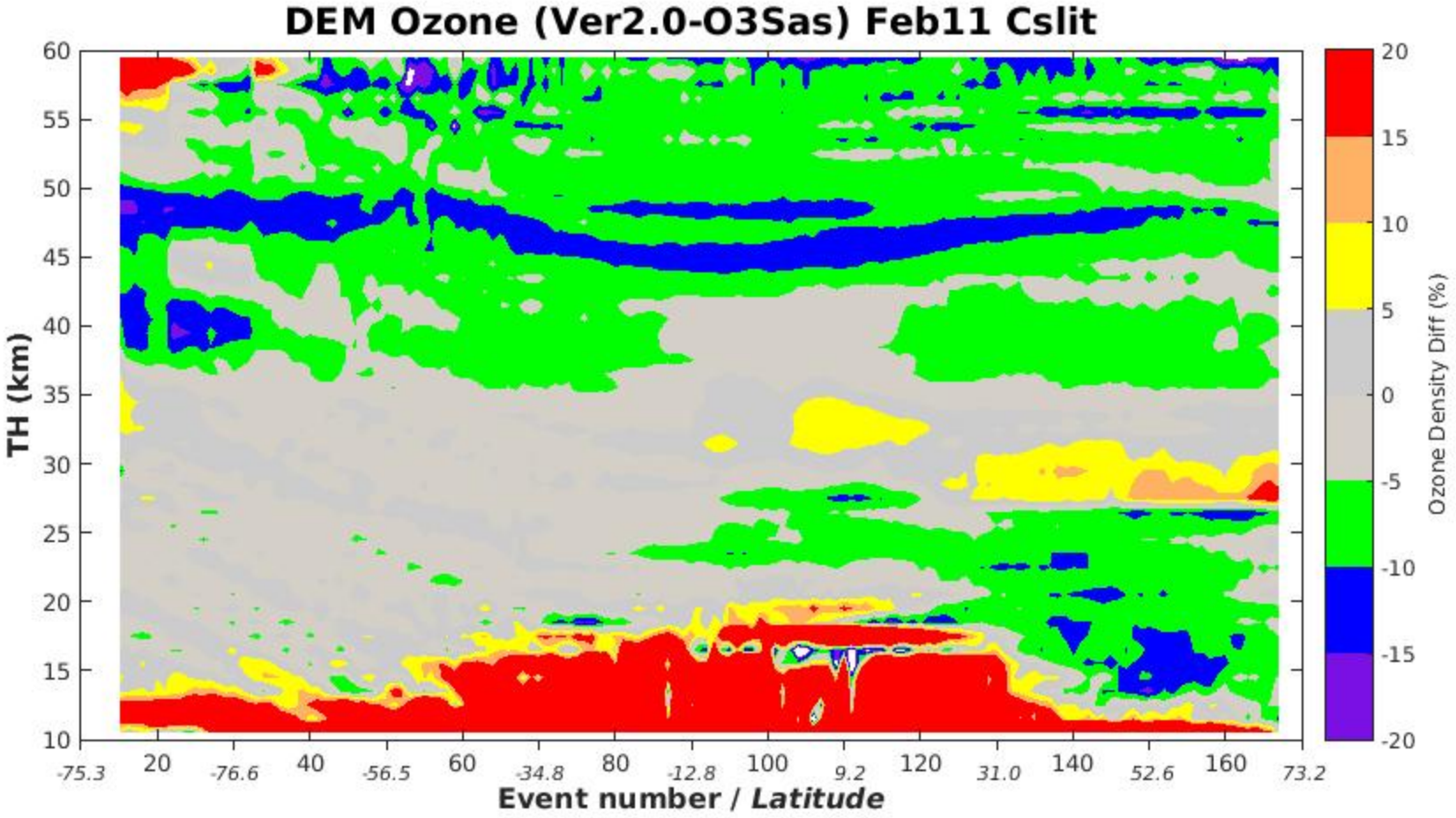
Background/Review

- Univ. Saskatchewan processing software for OSIRIS data (SASKTRAN) has been implemented on GSFC TLCF system for use with OMPS LP measurements.
- Ozone profile, aerosol extinction, reflectance retrievals are all done together.
- Ozone retrieval uses 7 UV doublets + 1 VIS triplet in retrieval of single profile.
- Aerosol extinction retrieval uses 745 nm radiance (paired with 470 nm).

SASKTRAN Testing on TLCF

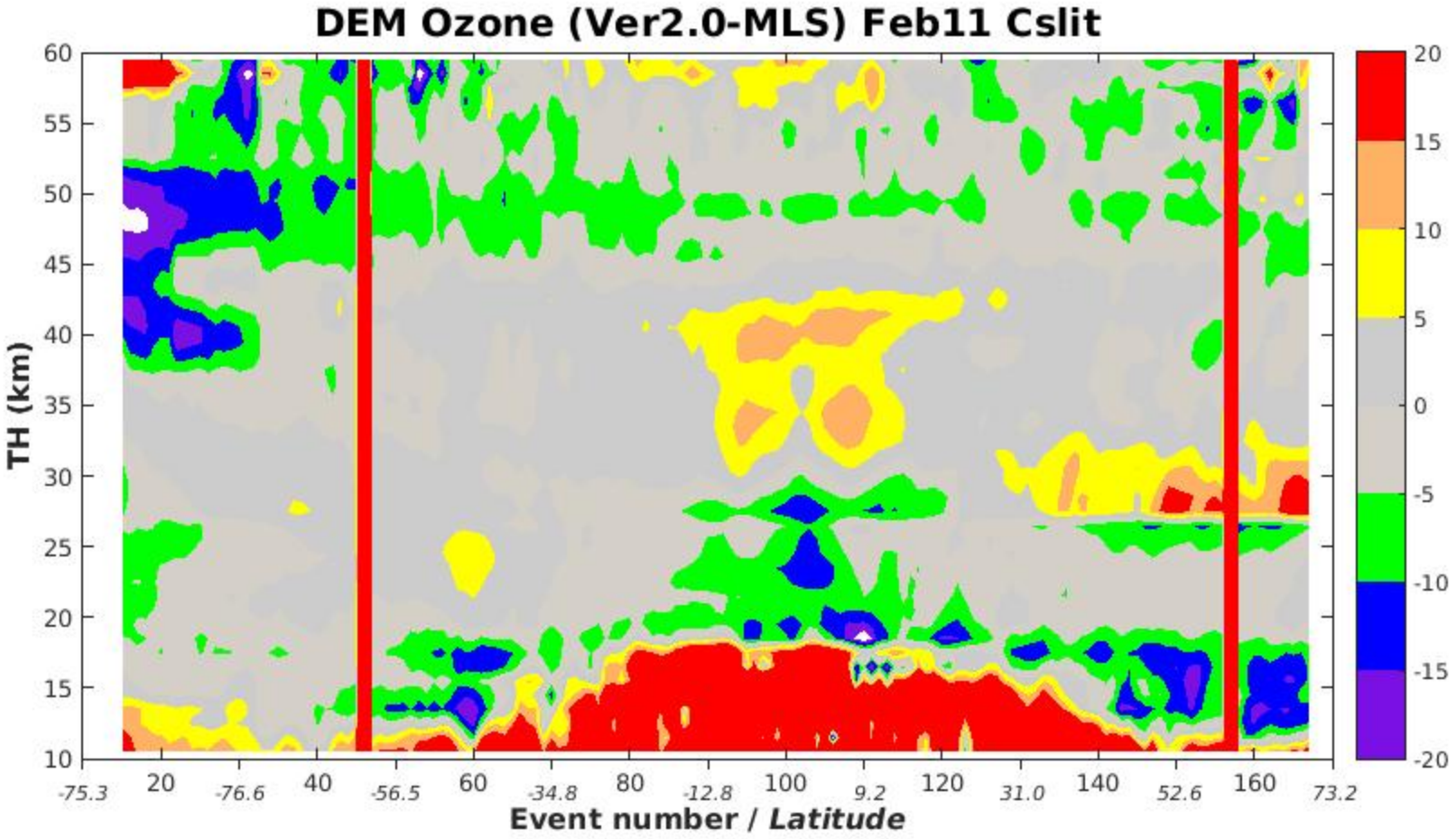
- We have recently processed two full days around Kelut eruption (2/11/2014, 2/21/2014) using rev-20 of SASKTRAN code.
- Processing 29 orbits (center slit only) on two 64-bit machines required ~43 hours.
  - Further options to improve processing time are in progress (see Update slide).
- Compare ozone and aerosol extinction results with current LP processing (V2 ozone, V0.5 aerosol) and MLS ozone.

Ozone – LP V2 vs. SASKTRAN



11 February 2014

Ozone – LP V2 vs. MLS



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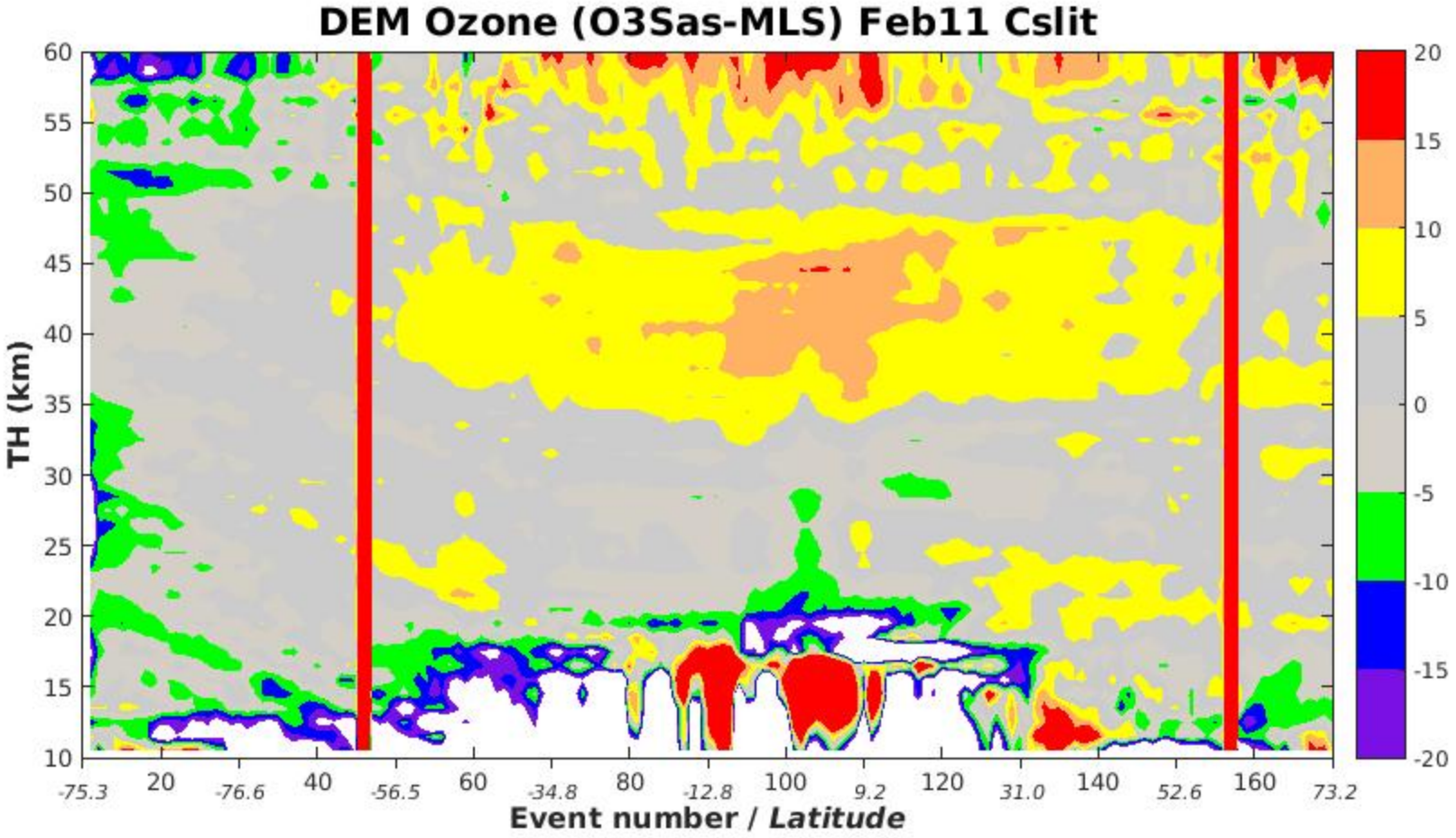
Ozone – SASKTRAN vs. MLS



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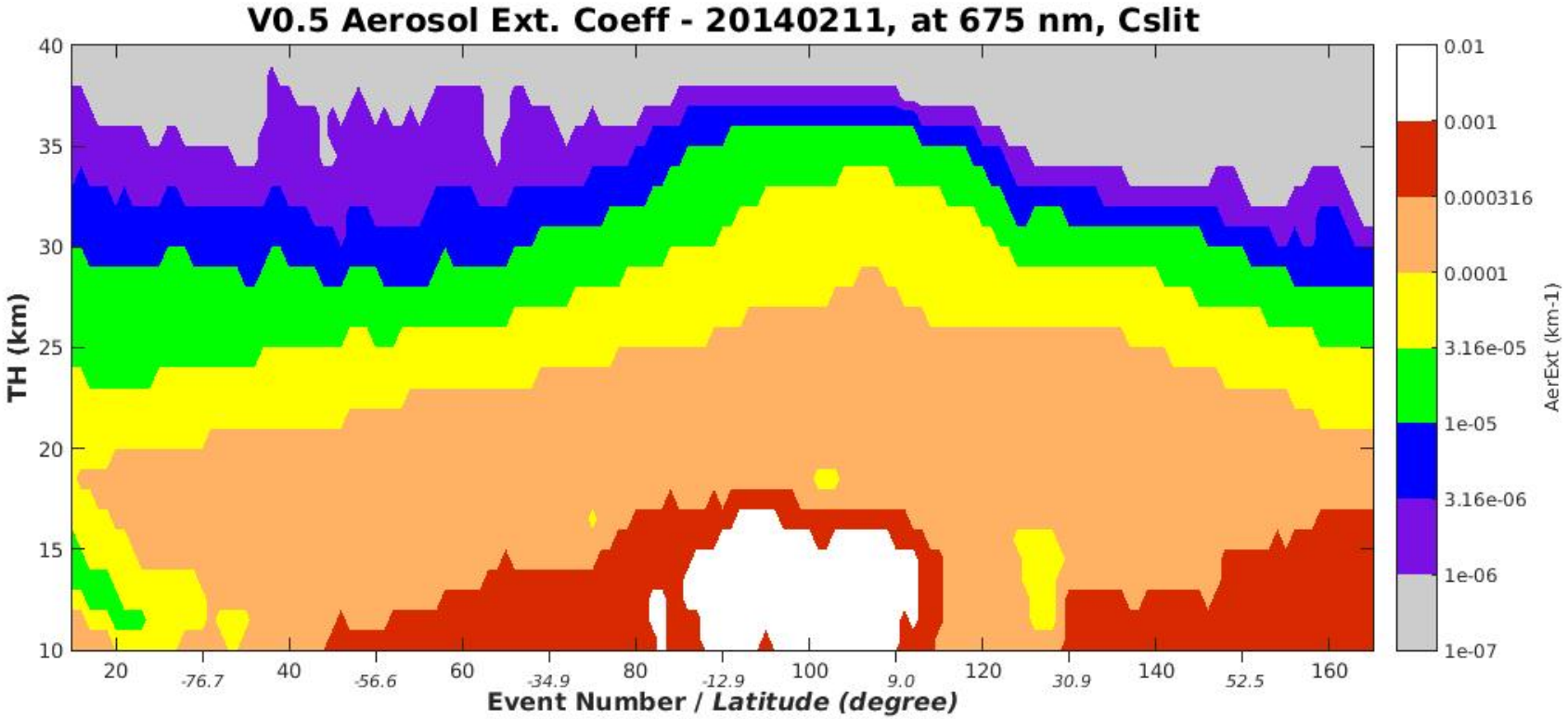
Aerosol Extinction – LP V0.5



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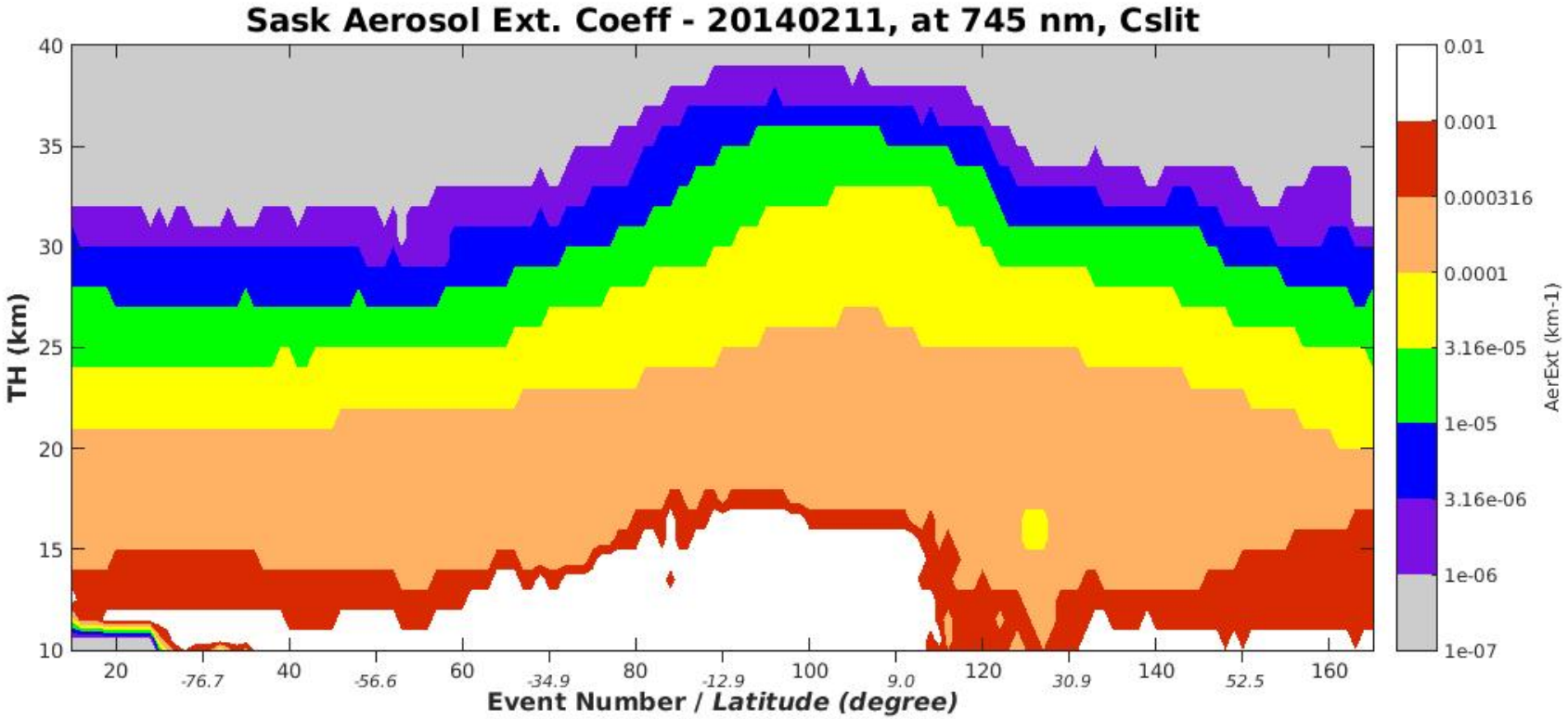
Aerosol Extinction – SASKTRAN



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SASKTRAN Update

- U. Sask. has recently delivered updated SASKTRAN software (rev. 25) with some specific changes:
  - Corrected bug in convergence testing → fewer iterations required.
  - Options for simplified vertical grid in R/T model (Δz = 1 km is default; Δz = 3 km, Δz = 5 km over part or all of altitude range now available).
  - Normalize aerosol measurement vector using all altitudes within 1 σ of minimum value.
  - Set assumed noise to 1% of radiance, add error in measurement vector to output file.
  - Aerosol extinction now provided in [km^{-1}].
- Initial single event testing gives ~2*x* improvement in processing time (no change to R/T grid).
- U. Sask. has processed full month with coarse R/T grid (Δz = 5 km) and provided these data for evaluation.

LP Processing – Next Steps

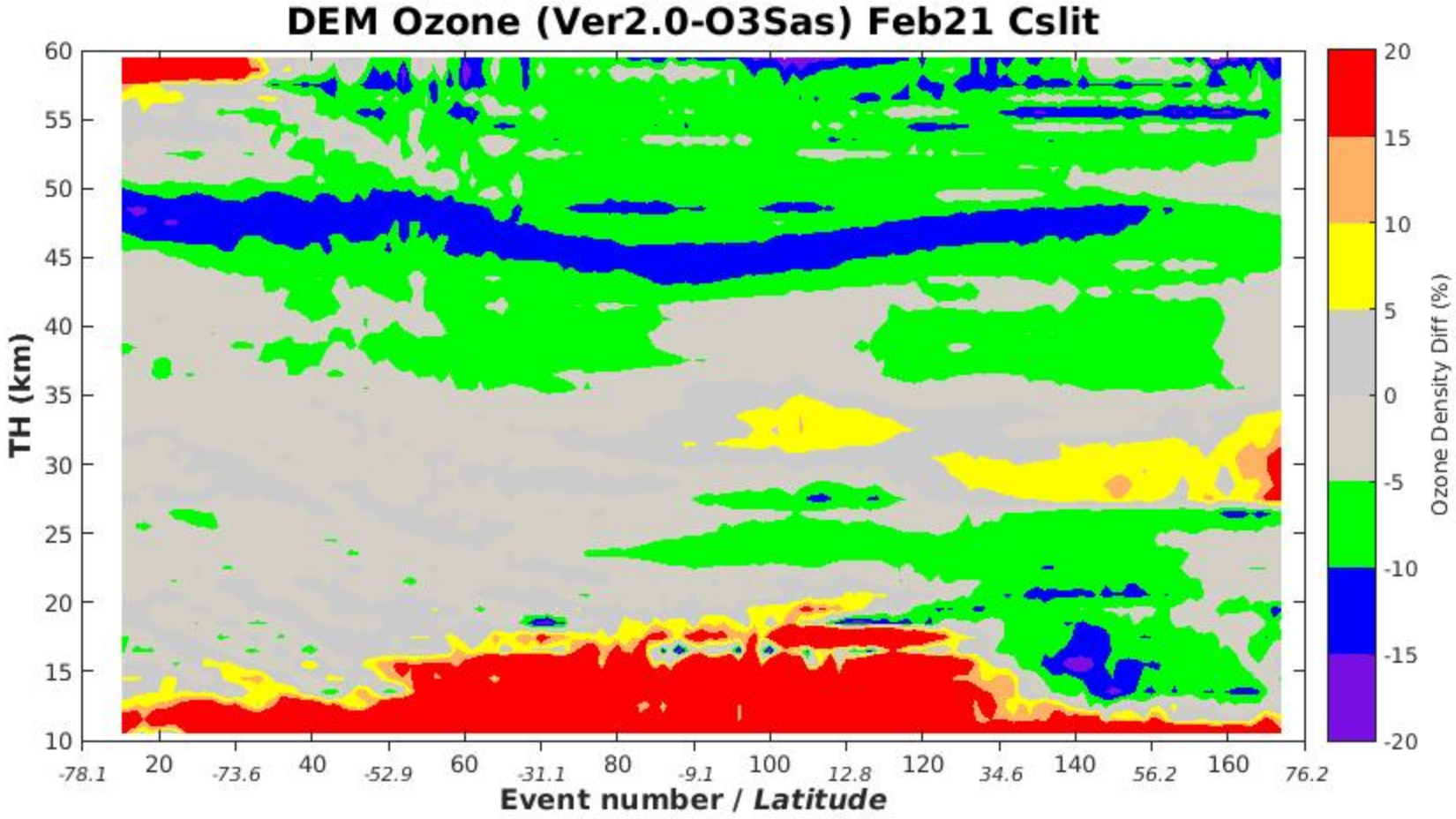
- We plan to process extended period of LP data (July-December 2015?) through SASKTRAN code to evaluate the aerosol product and the aerosol correction impact on ozone data.
  - Use only VIS triplet in ozone retrieval?
- Use updated L1B and L1G data set for this processing. Specific improvements are described on next slide.
- Most revisions have completed initial testing. Plan to demonstrate successful operation in forward processing before reprocessing L1 data.
- Put these data in separate archive set (AS 61004) for user convenience.

LP Level 1 Changes

1. Add reflectance output [L1G].
   - Done. Running in AS 60000 (not used by current L2 code).
2. Day 1 solar irradiance (IRF) adjustment for wavelength shift [L1B].
   - Code implemented. Awaiting verification of implementation.
3. Sun-Earth distance correction to IRF [L1B].
   - Done. Ready to introduce in AS 60000.
4. Ad hoc VIS stray light adjustments [L1B].
   - Done. Ready to introduce in AS 60000.
5. Altitude registration static and annual variation adjustments [L1B].
   - Done. Ready to introduce in AS 60000. Shift due to star tracker change in April 2013 will be included.
6. Radiance calibration adjustments for wavelength shift [L1B].
   - In design phase.

Backup Slides

Ozone – LP V2 vs. SASKTRAN



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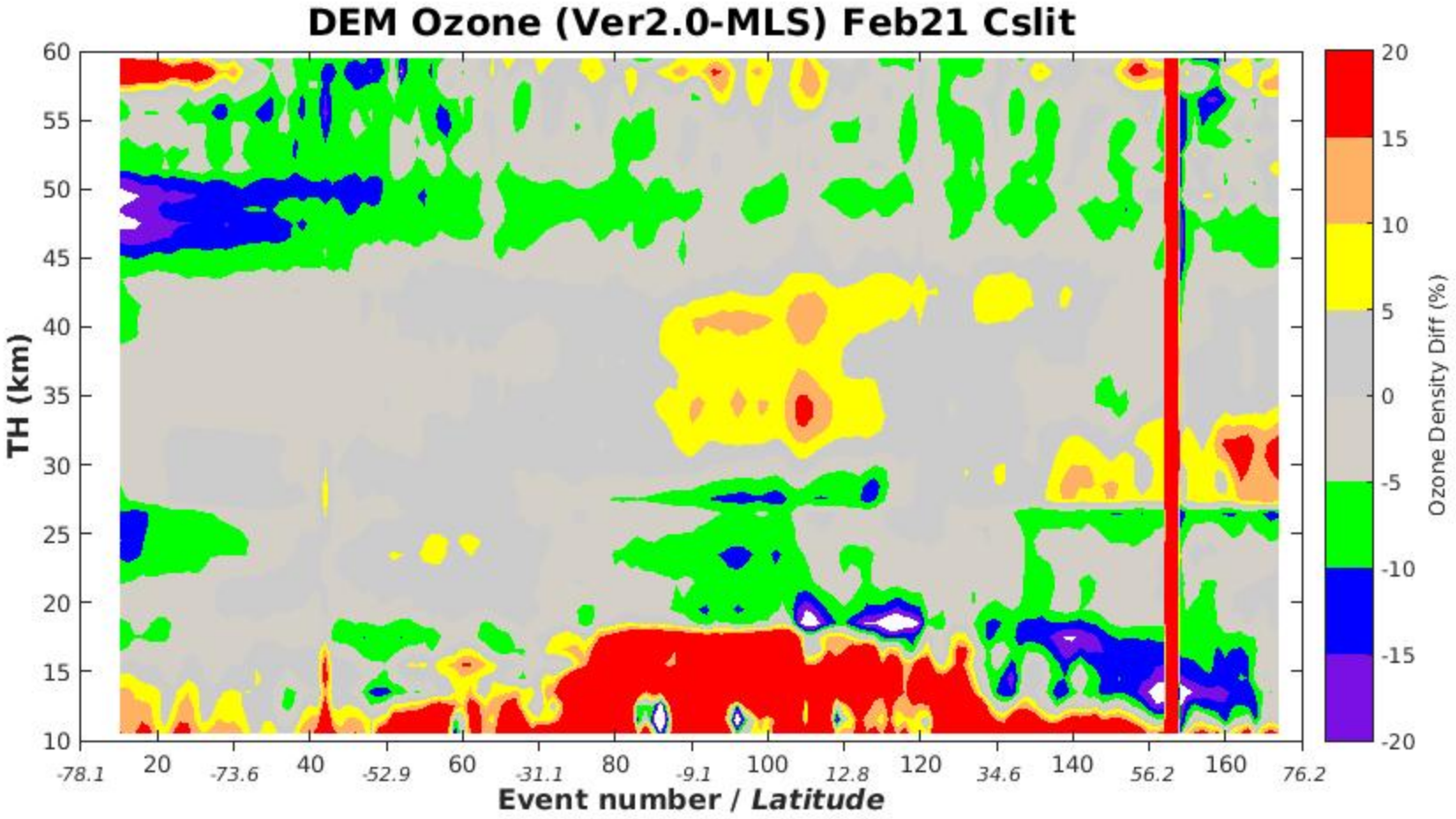
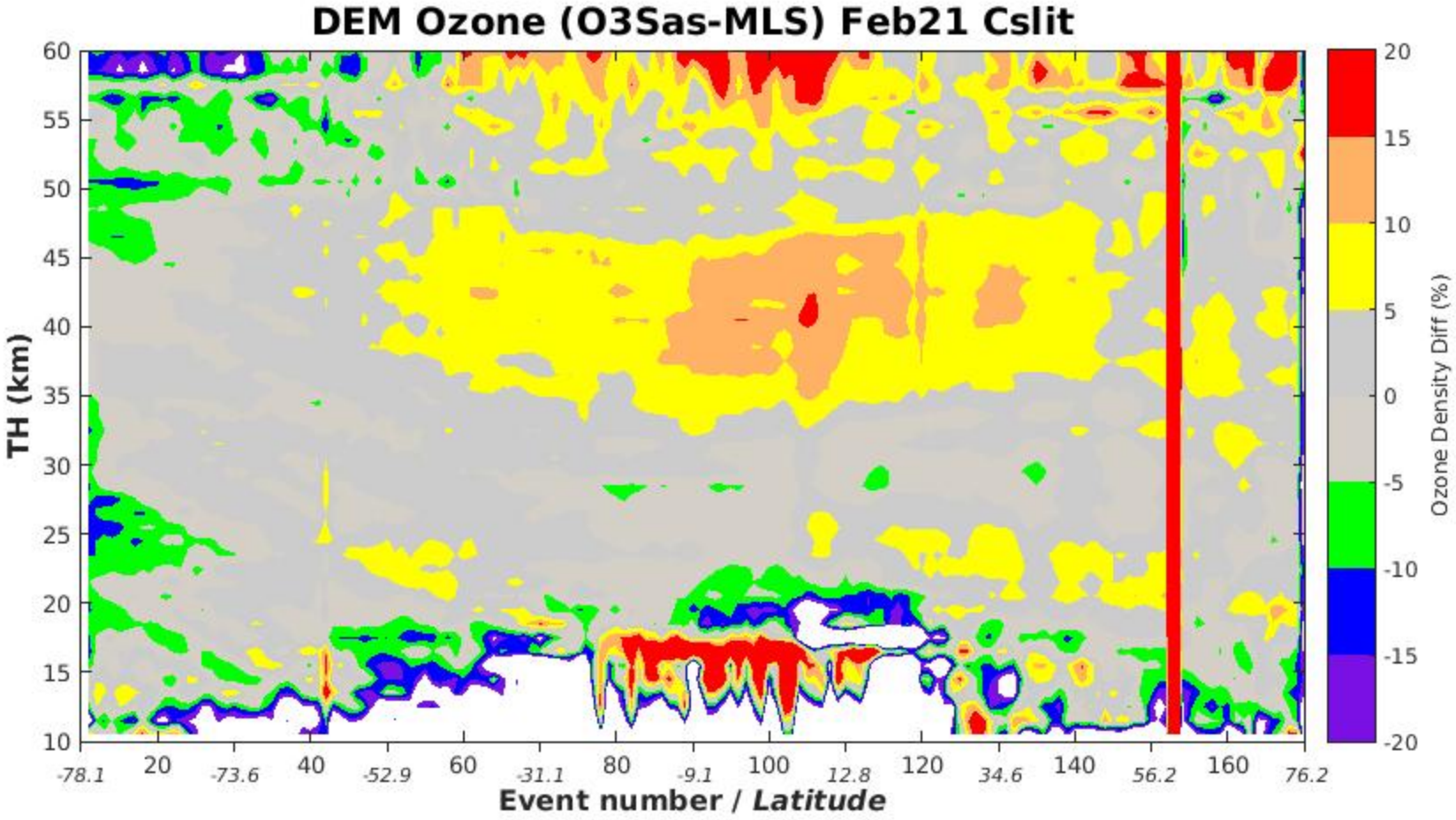
Ozone – LP V2 vs. MLS



21 February 2014

Ozone – SASKTRAN vs. MLS



21 February 2014