Operational Ozone Products Available from NOAA/NESDIS

Date: 08/16/2017

Vaishali Kapoor, OSPO
Robert Lindsay, Maximus

Introduction

- There are many organizations, agencies and instruments that make ozone products from satellite data.
- These slides explain the operational ozone products produced by the National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite, Data, and Information Service (NESDIS) that are available to support near-real time operations.
- These products are used by United States and international environmental modeling groups for input into weather models, into other satellite algorithms to enhance radiative transfer models, for UV forecast models, and for climate monitoring.
- These products are available to users in a variety of formats such as BUFR, Binary, GRIB, GRIB2, and ASCII.
- Slides will also provide information on how to obtain operational access to the following products.

Solar Backscatter Ultraviolet Version 2 (SBUV/2) Products

- **NOAA currently produces near-real-time (NRT) total ozone and profile ozone products from the SBUV/2 instruments on the NOAA Polar-orbiting Operational Environmental Satellites (POES) NOAA-19.**

SBUV/2

- The SBUV/2 instruments are non-scanning, nadir viewing (field-of-view directly below the satellite path) instruments designed to measure scene radiance in the spectral region from 160 to 400 nm. SBUV/2 data are used to determine total and profile ozone in the atmosphere, and solar spectral irradiance.

- An improved version of the SBUV/2 (Version 8) algorithm was implemented in January 2007. Products are available in binary or WMO compliant BUFR formats.

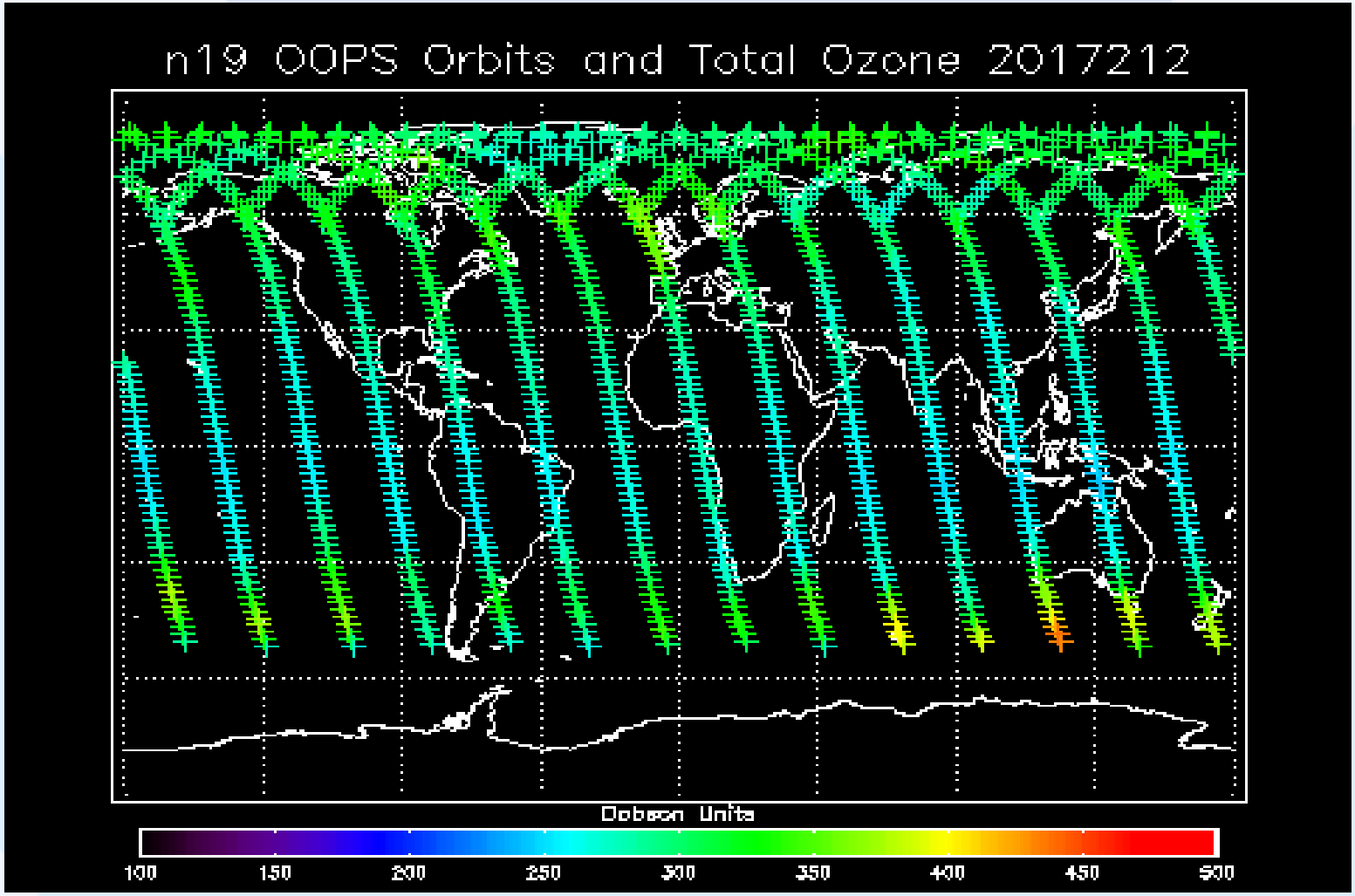
SBUV/2

- All SBUV/2 products are available in daily (from the Operational Ozone Processing system - OOPS) or orbital format (from the Real-time Ozone Processing Extended System - ROPES) for near-realtime users.

- The products in binary format are archived at CLASS, accumulated in monthly datasets available within 3 days after each new month.

- http://www.ospo.noaa.gov/ml/air/ozone.html

Orbital Tracks of Total Column Ozone
NOAA-19 SBUV/2

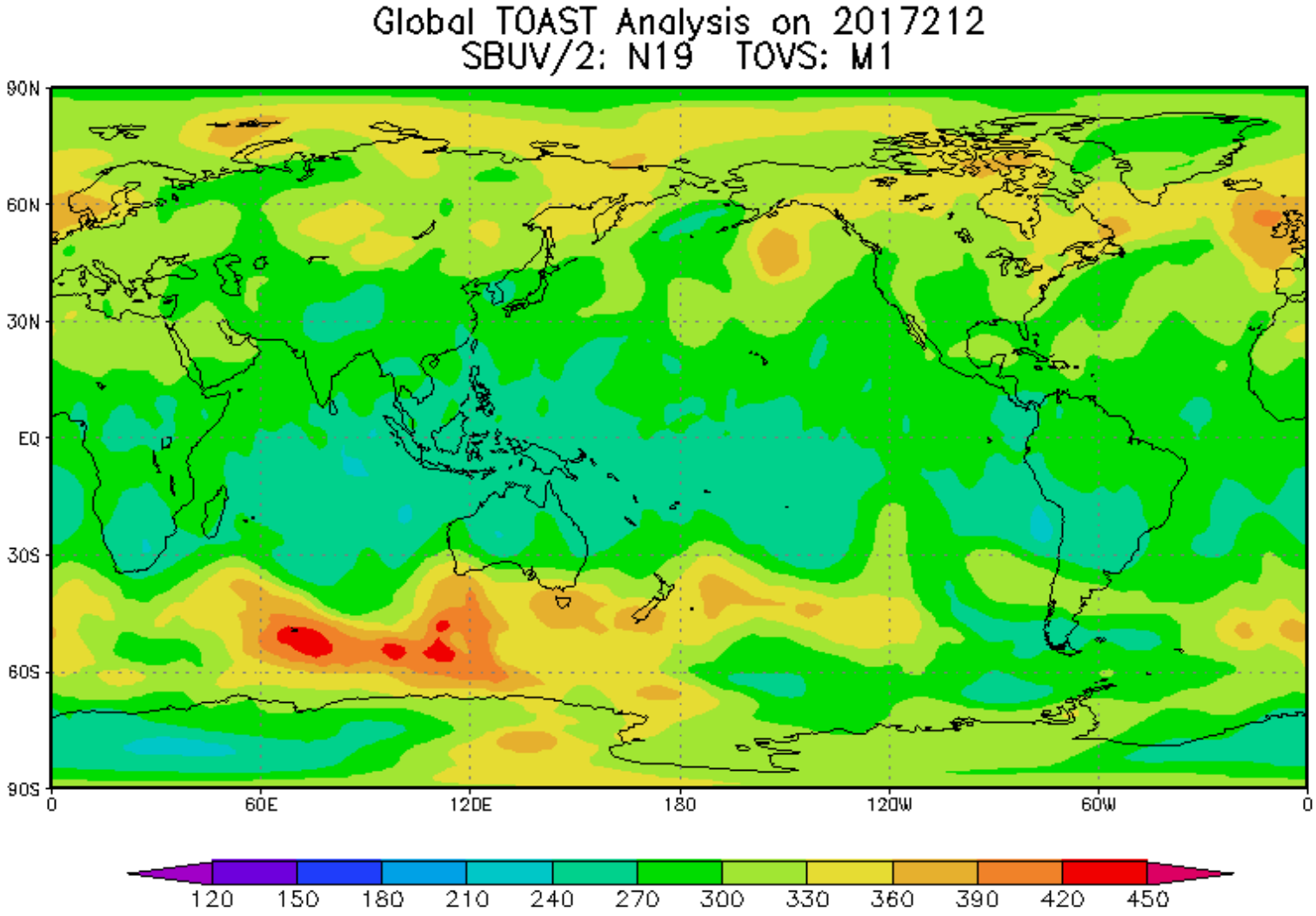


SBUV Page: http://www.osdpd.noaa.gov/ml/air/sbuv.html

TOAST
(Total Ozone Analysis using Stratospheric & Tropospheric components)

- **TOAST is a near real-time operational ozone map generated by combining Advanced TIROS Operational Vertical Sounder (ATOVS) tropospheric and lower stratospheric (4 to 23 km) ozone retrievals with SBUV/2 spatially smoothed mid-to-upper stratospheric (24 to 54 km) layer ozone retrievals. Products are created daily in imagery (png), binary or GRIB format.**

TOAST from NOAA-19 and Metop-B TOVS

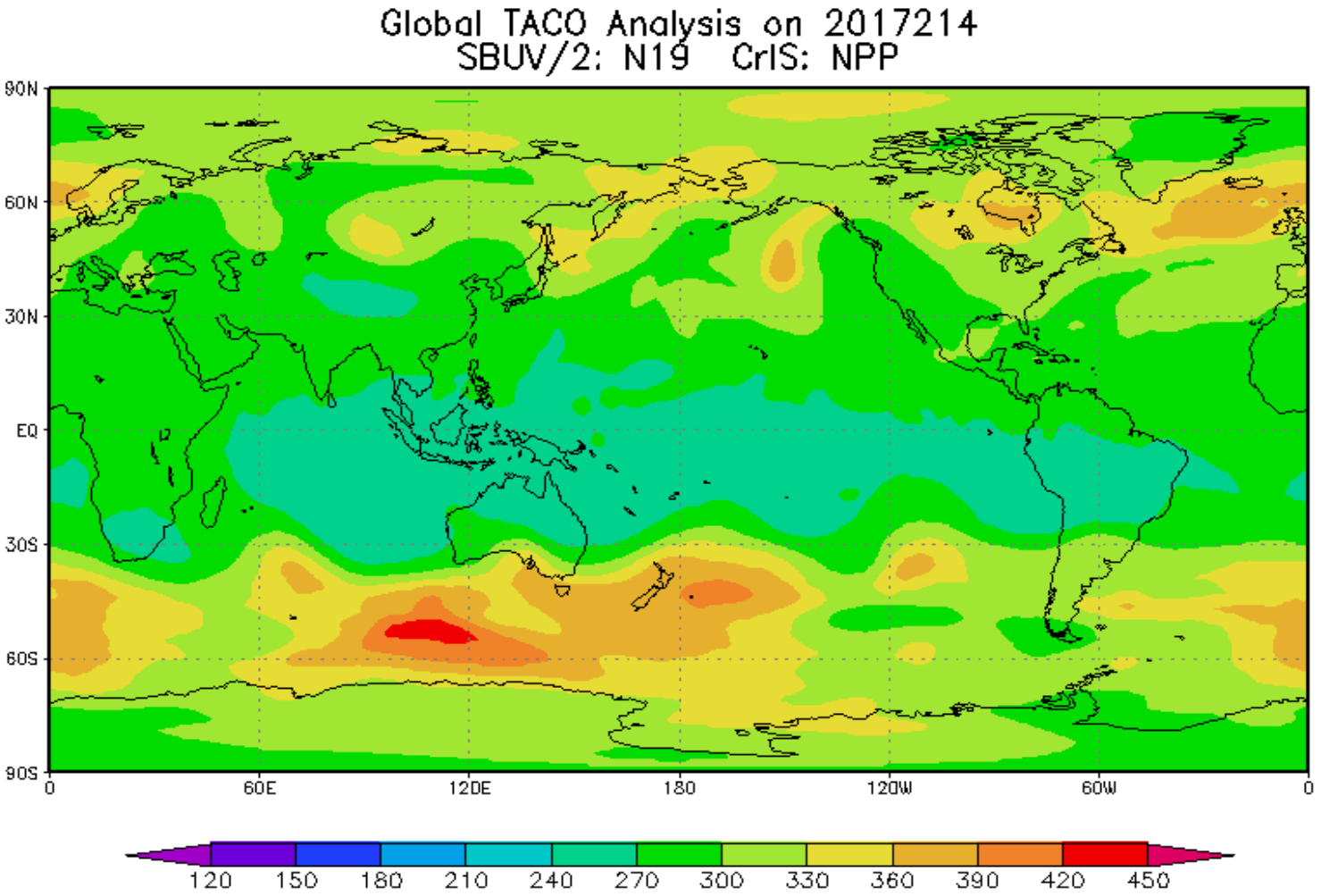


TOAST Page: http://www.ospo.noaa.gov/Products/atmosphere/toast/index.html

Enhanced TOAST

- An algorithm using Total Ozone Analysis of CrIS (NUCAPS) and SBUV/2 (V8Pro) has been developed to generate combined IR and UV ozone retrievals. This algorithm is a new version of the current TOAST.
- The most significant improvement of the algorithm is in the IR-derived product replacement of the column amount retrievals from the High resolution InfraRed Sounder (HIRS) with the CrIS profile retrievals. This allows the algorithm to provide ozone not only global 1°x1° total amount map but also the same spatial resolution profile maps at 12 Umkehr layers. The new products have significantly increased accuracy in their troposphere ozone estimation.

TOAST from S-NPP CrIS and NOAA-19 SBUV/2



E TOAST Page: http://www.ospo.noaa.gov/Products/atmosphere/etoast/index.html

Global Ozone Monitoring Experiment (GOME-2) Total Ozone Products

- The GOME-2 instrument was designed by the European Space Agency to measure radiation in the ultraviolet and visible part of the spectrum (240 - 790 nm) and derive measurements of atmospheric ozone and other trace gases. It is a scanning instrument (scan width 1920 km) with near global coverage daily. The field-of-view on the ground is 80 km X 40 km.

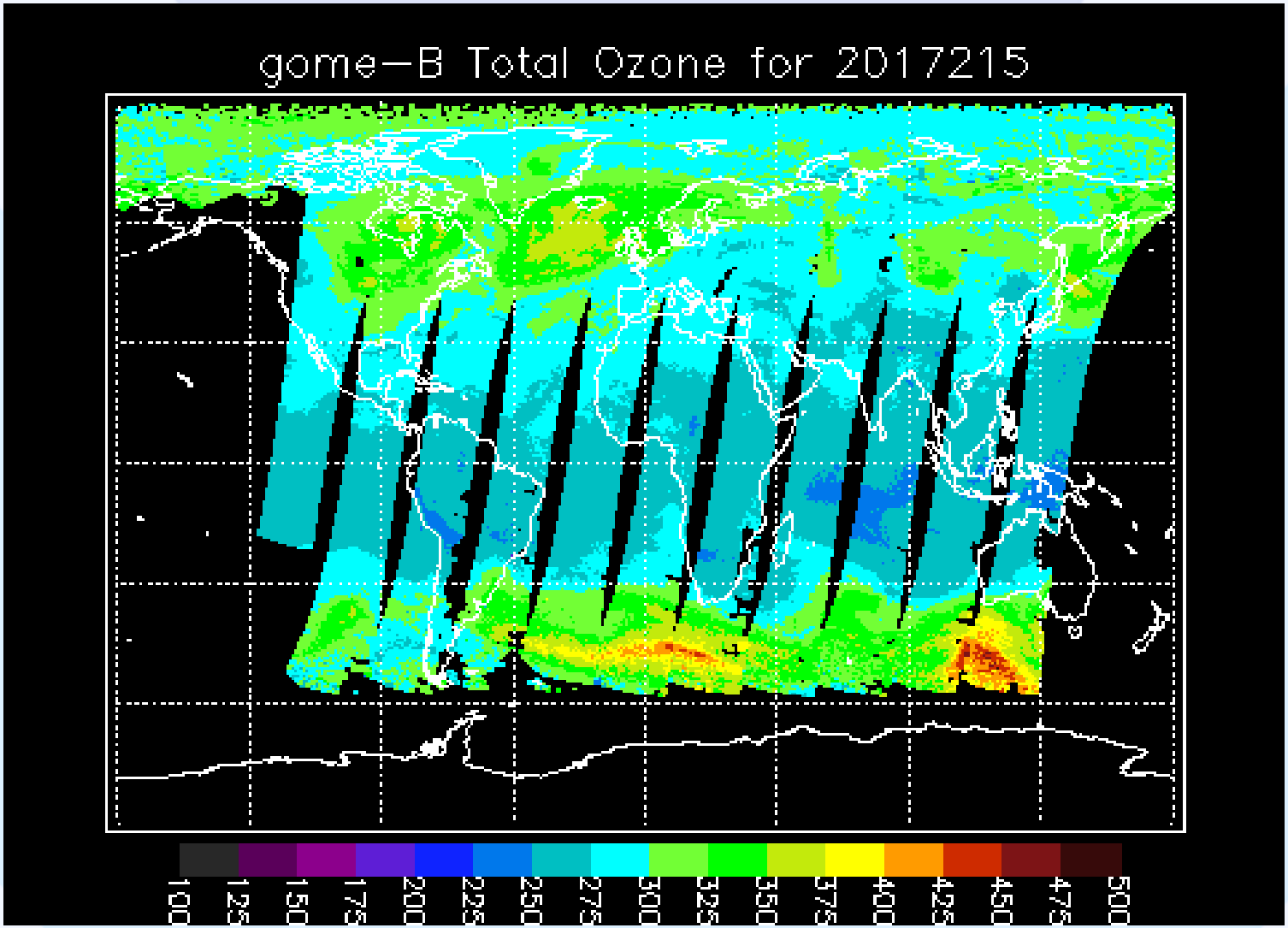
- The GOME-2 (MetOp-B and MetOp-A) total ozone product, UV Aerosol Index and UV Reflectivity estimates, from the V8TOz algorithm are available in binary and BUFR formats. The algorithm also produces aerosol index and reflectivity values, which are included in the total ozone binary product.

- Granule products are available as imagery (gif), binary or BUFR, and daily products (1 x 1.25 deg maps) are available in ASCII or GRIB2 format.

- Magnesium II index (MgII) information is provided in a daily ASCII file for our solar and space users.

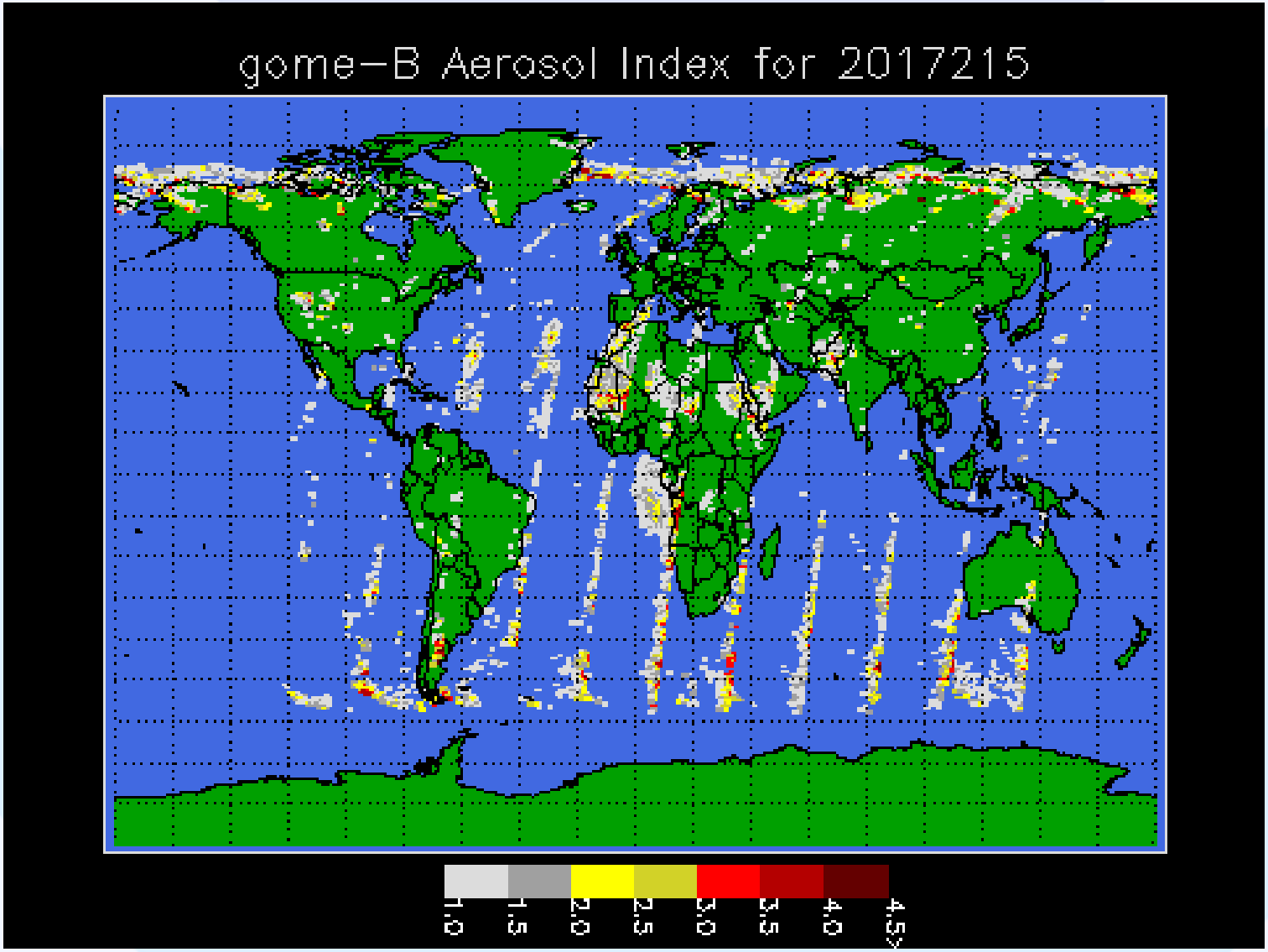
- MetOp-B GOME-2 1B granules (raw data), total ozone binary files, gridded ASCII files and MgII index files are currently archived at CLASS.

Total Column Ozone for GOME-2 on MetOp-B

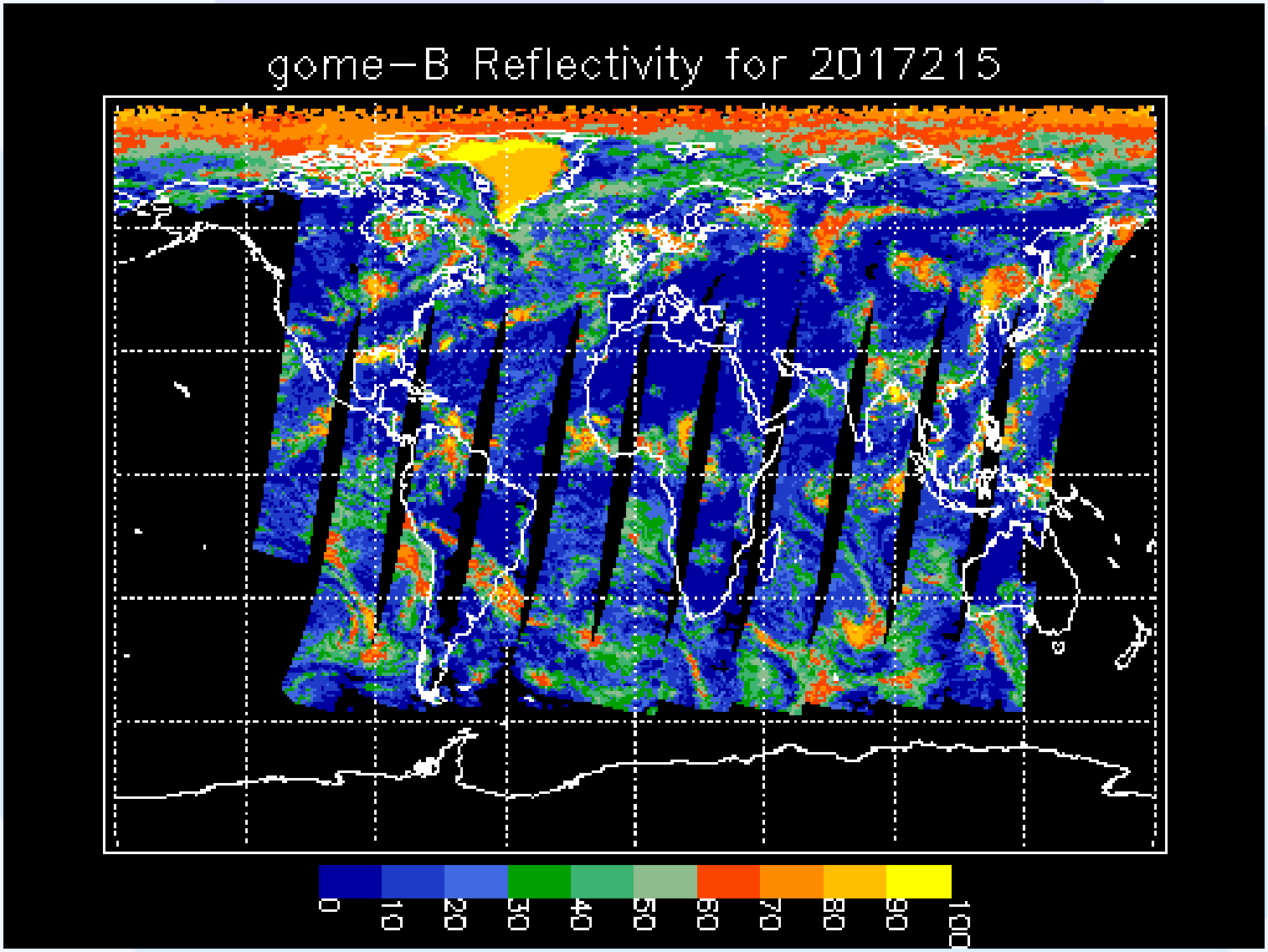


Gome Page: http://www.ospo.noaa.gov/Products/atmosphere/gome/gome-B.html

Aerosol Index for GOME-2 on MetOp-B



UV Reflectivity for GOME-2 on MetOp-B

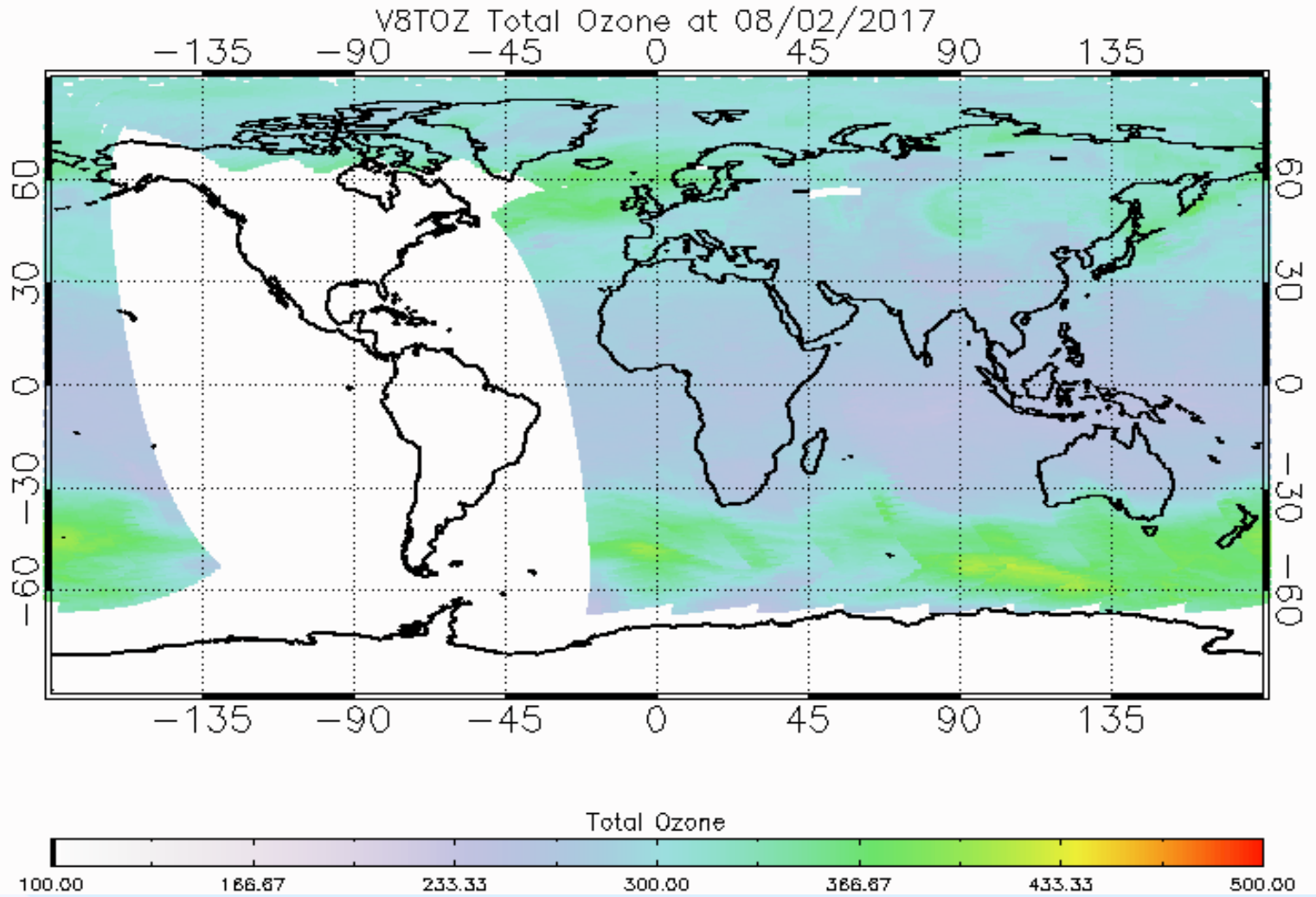


OMPS

- OMPS (Ozone Mapper Product Suite) is a three-part instrument: a nadir mapper that maps global ozone with about 50-km ground-resolution, a nadir profiler that measures the vertical distribution of ozone in the stratosphere, and a limb profiler that measures ozone in the lower stratosphere and troposphere with high vertical resolution.

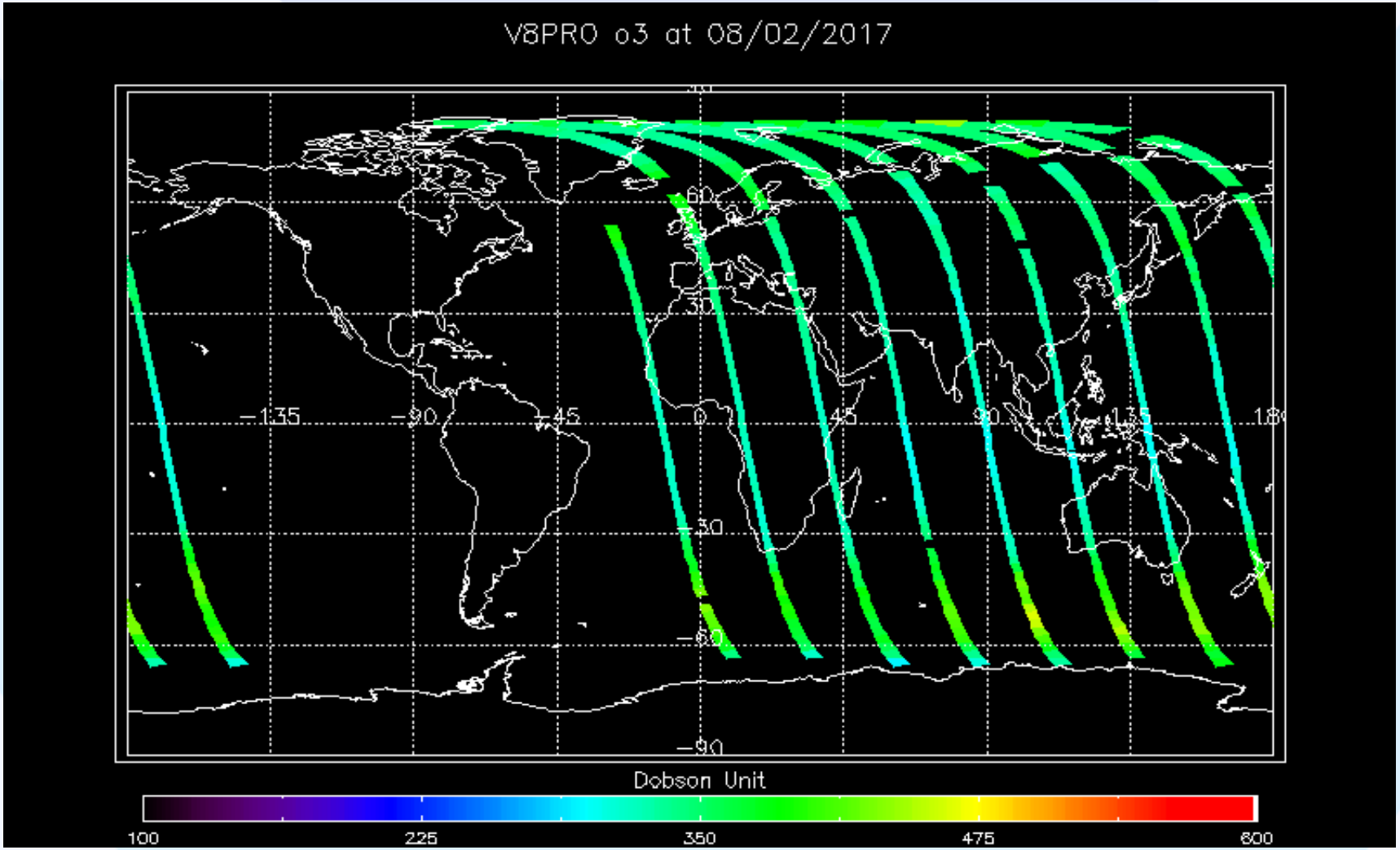
- OMPS, an advanced suite of two hyper spectral instruments, extends the 35-plus year total-ozone and ozone-profile records. These records are used by ozone-assessment researchers and policy makers to track the health of the ozone layer. The improved vertical resolution of OMPS data products allows for better testing and monitoring of the complex chemistry involved in ozone destruction near the troposphere. OMPS products, when combined with cloud predictions, also help produce better ultraviolet index forecasts.

OMPS V8TOz



http://www.ospo.noaa.gov/data/atmosphere/ozone/Products_atmosphere_OMPS.html

Orbital Tracks of Total Column Ozone S-NPP OMPS V8Pro



http://www.ospo.noaa.gov/data/atmosphere/ozone/Products_atmosphere_OMPS.html

How to Obtain Access

- **Operational users can obtain access to these near-real time products via PDA. To set up access.**

Contact -

- **Donna McNamara@noaa.gov**
- **Vaishali.Kapoor@noaa.gov**

Websites for More Information

Operational Pages:

Main Ozone Page: http://www.ospo.noaa.gov/ml/air/ozone.html

SBUV Page: http://www.osdpd.noaa.gov/ml/air/sbuv.html

Gome Page: http://www.ospo.noaa.gov/Products/atmosphere/gome/gome-B.html

TOAST Page: http://www.ospo.noaa.gov/Products/atmosphere/toast/index.html

Enhanced TOAST Page:
http://www.ospo.noaa.gov/Products/atmosphere/etoast/index.html

OMPS Page:
http://www.ospo.noaa.gov/data/atmosphere/ozone/Products_atmosphere_OMPS.html

Archive Page:

Class: http://www.class.ncdc.noaa.gov/saa/products/welcome

Research Group:

STAR: http://www.star.nesdis.noaa.gov/smcd/spb/ozone/

Additional Contacts

- **Robert Linday – Robert.Lindsay@noaa.gov**, Maximus, MD
- **Venkata Anne Rao – Venkata.Rao.Anne@noaa.gov, SGT, MD**
- **Eric Beach - Eric.Beach@noaa.gov, STAR, MD**
- **Jianguo Niu – Jianguo.Niu@noaa.gov, STAR,MD**
- **Zhihua Zhang – Zhihua.Zhang@noaa.gov, STAR,MD**
- **Trevor Beck – Trevor.Beck@noaa.gov, STAR, MD**
- **Yakov Pachepsky – Yakov.Pachepsky@noaa.gov, STAR, MD**
- **Matt DeLand - Matthew.Deland@ssaihq.com, SSAI, MD**
- **Liang-Kang Huang – Liang-Kang.Huang@ssaihq.com, SSAI, MD**