



SCOPE-Nowcasting

World Meteorological Organization

Weather • Climate • Water

Sustained, Co-Ordinated Processing of Environmental Satellite Data for Nowcasting

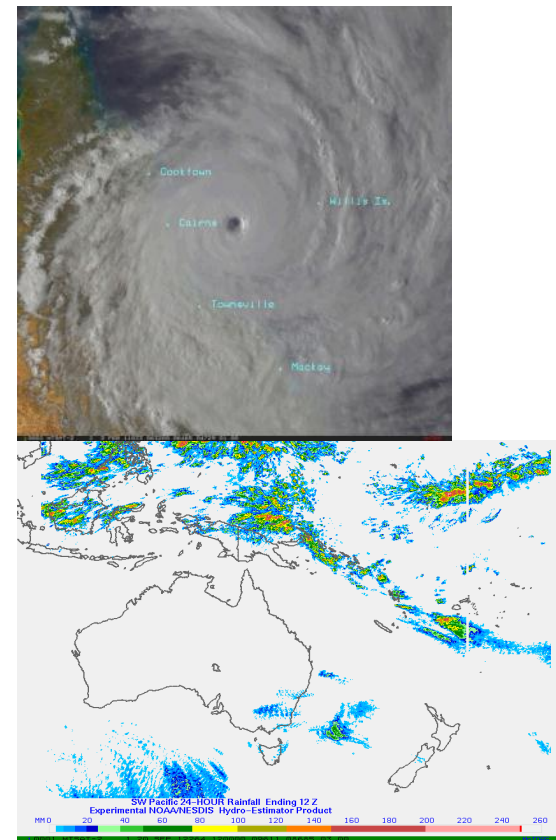
Presented to the 3rd meeting of the Coordinating Group of the RA II WIGOS Project

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SCOPE-Nowcasting

- Sustained,
- Co-Ordinated
- Processing of
- Environmental Satellite Data
- for
- Nowcasting



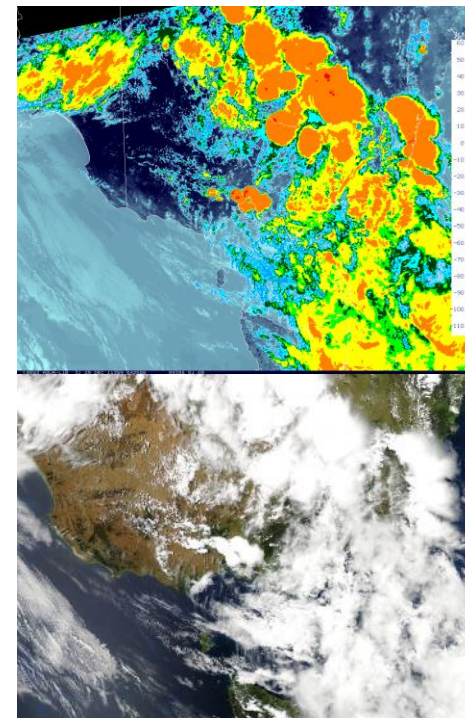
Background

- Concept arose from discussions in 2010 (in the 5th meeting of the WMO Expert Team on Satellite Utilization and Products – ET-SUP-5)
- Recognised the benefits of the SCOPE for Climate Monitoring (SCOPE-CM) initiative, where the value of different models of cooperation among satellite operators in generating satellite datasets for climate has been demonstrated through theme-driven pilot projects.
- SCOPE-CM information:
 - http://www.wmo.int/pages/prog/sat/scope-cm_en.php



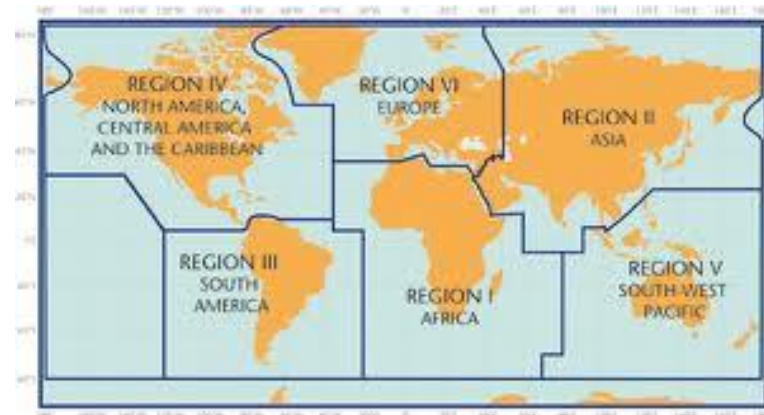
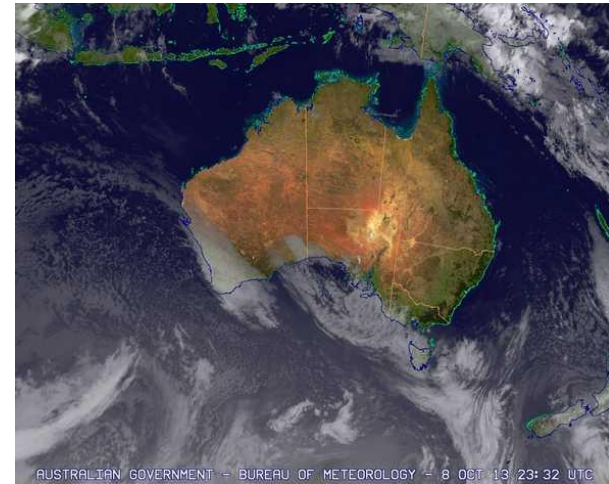
Rationale

- It was felt by ET-SUP-5 that the SCOPE concept could be usefully applied to the nowcasting domain, given that:
 - The related science is reasonably mature;
 - An organized user community is available;
 - An established description of the needs of this community exists; and
 - There are opportunities and synergy with other initiatives.



Requirements

- Particular relevance to Asia-Oceania (WMO Regions II and V)
 - 5 geostationary operators
 - Multiplicity of products and formats
 - Multiple dissemination mechanisms
- Increasing cooperation
 - Aviation operations
 - Regional Forecast Forums



Aims

Operational

- Provide consistent and reliable satellite products to users to support nowcasting
- Demonstrate the concept through a number of pilot projects

Strategic

- Build strong relationships between product developers across different agencies
- Foster scientific collaboration across satellite operators
- To sustain product dissemination and facilitate user uptake.



Project Plan

Phase I (2012-2014): Inception and Demonstration

- Establish ad-hoc Working Group:
 - ET-SUP Members
 - WWRP and SWFDP rep
 - WMO Space Programme
- Agree on concept and pilot project criteria
- Agree on pilot projects and individual providers, hosts, clients, schedules
 - Each pilot: Demonstration of impact; identify areas of synergy, collaboration, harmonization
- First meeting of all SCOPE-NWC initial partners
 - Establishment of initial network and structure, including governance and terms and conditions of all partners



SCOPE-Nowcasting Products

- Products need to be consistent across platforms and use standard formats
- Four broad categories of SCOPE-NWC products are envisaged
 - Basic Nowcasting Products
 - Advanced Nowcasting Products
 - Realtime Ocean Products
 - Realtime Atmospheric Composition Products: these include fire detection, smoke, sand and dust, aerosols



SCOPE-Nowcasting Criteria

ET-SUP-7 (May 2013) outlined a number of criteria for SCOPE-Nowcasting projects. These are:

- a) use of multi-satellite data;
- b) dataset formats can be read by standard tools;
- c) concise product documentation;
- d) open and easy access;
- e) available in near-real time (<6h);
- f) availability of training information; and
- g) an official commitment from all agencies involved in the project.



SCOPE-Nowcasting - Pilot project outlines

Category	Product	Region	Provider	User	Gaps
Basic nowcasting	RGB composites	WMO Region II (Asia) and Region V (SW Pacific)	JMA, CMA, KMA	NMSs in Region II and V	No standard products available; products limited
Advanced nowcasting	Volcanic Ash Products	Global	CMA, JMA, KMA, EUMETSAT, NOAA	NMHSs, VAACs	No standard products available; products limited
Advanced nowcasting	Blended satellite global precipitation product (GEO+LEO)	Global coverage	Hydro Estimator, NASA TRMM (3B42), NOAA (real-time MW)	Civil authorities, NMHSs, Flash flood guidance systems, general users	Rapid, facilitated access to quantitative precipitation estimates
RT Atmospheric Composition products	Dust Monitoring and Prediction Products	WMO Region II (Asia) and V (South-West Pacific)	CMA, JMA, KMA	SDS-WDCs, NMSs (to issue results and warnings) in RA II and RA V	Regional diversity of aerosol-related products not harmonized



Expected Benefits

- The expected benefits of this approach are:
 - Improved access to satellite data by WMO member states;
 - Improved confidence in products generated through SCOPE-Nowcasting;
 - Reduced operating costs associated with technological change and software upgrades;
 - Reduced training overheads;
 - Improved cooperation between NMHSs through access to shared products; and
 - Strong connections between scientists across agencies as a foundation for increased collaboration.



Progress to Date

- Presentation to CGMS-41 in Tsukuba in 2013
 - Actions arising:
 - CGMS members to nominate focal points for the SCOPE-Nowcasting (NWC) initiative as appropriate (by 15 August 2013)
 - Feedback from CGMS members sought on the final makeup of the SCOPE-NWC pilot projects (by 1 September 2013)
- First meeting of SCOPE-Nowcasting Team – 19-22 November 2013, WMO Geneva
 - Participation from CMA, JMA, KMA, EUMETSAT, NOAA and Bureau of Meteorology
- Four pilot projects in progress



SCOPE Nowcasting First Workshop

19-22 November 2013 at WMO

Meeting Goals

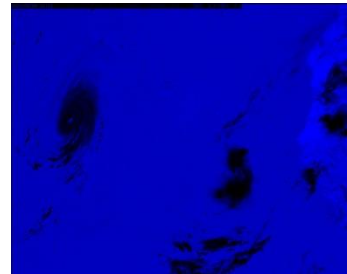
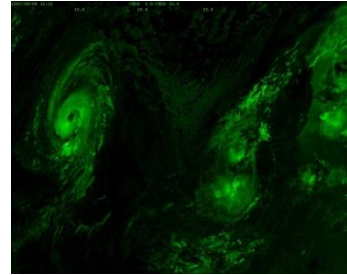
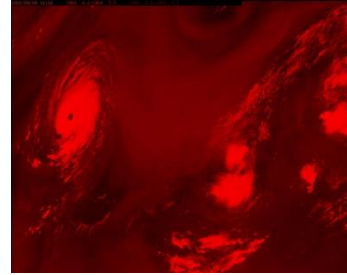
- Review the SCOPE-Nowcasting concept;
- Review and refine each of the pilot projects with regard to the criteria established at ET-SUP-7; and
- Prepare an action plan for the next 3-5 years for each of the pilot projects.



Pilot Project 1: Basic Nowcasting

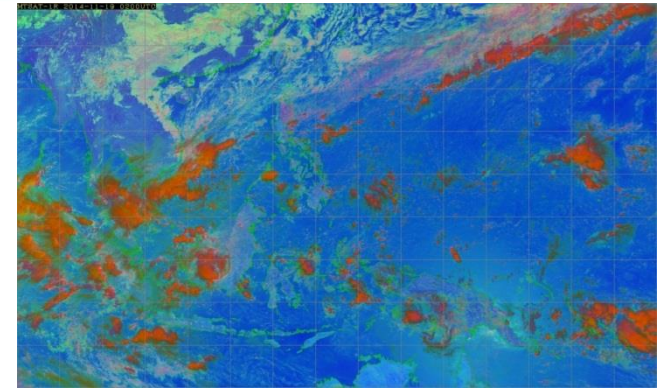
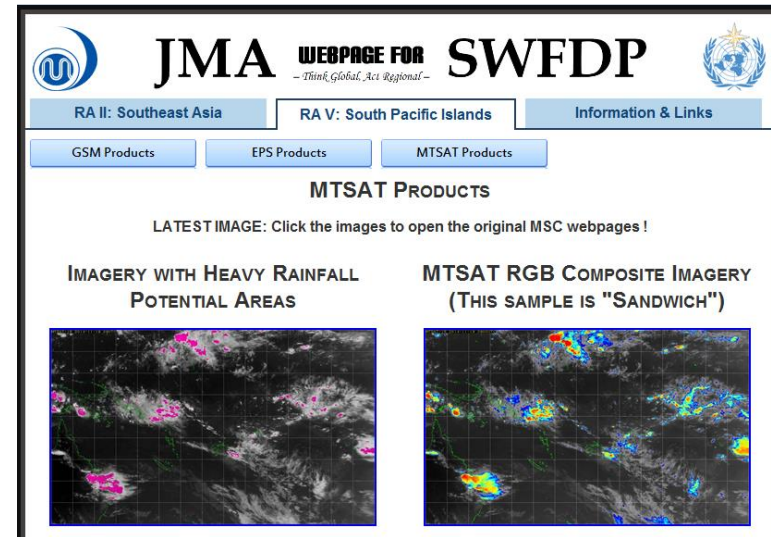
Regionally-consistent RGB composites :

- i. There is a de facto standard for RGBs in existence which has been generated by EUMETSAT and endorsed by WMO
- ii. RGBs provide a mechanism for conveying multi-spectral data in a relatively low volume product
- iii. The next generation of geostationary satellites in the region - Himawari-8, FY-4A and Geo-KOMPSAT-2A – will provide an appropriate platform for delivery of these products.



Achievements

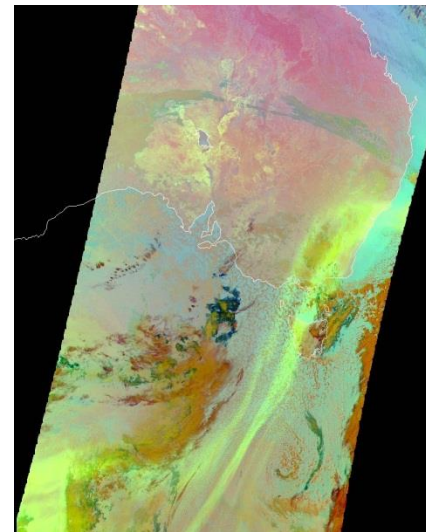
- JMA have agreed to disseminate RGB products as part of the Himawari-8 product suite
- JMA have provided RGB products to support SWFDP in the South Pacific
- http://ds.data.jma.go.jp/mscweb/data/sat_dat/img/rw/rgb_img.html
- Documentation is also provided
- CMA and KMA are also considering RGBs for their next-generation GEOs
- Fact sheet has been prepared and a user survey will be issued for RA-II and RA-V



Pilot Project 2: Advanced Nowcasting

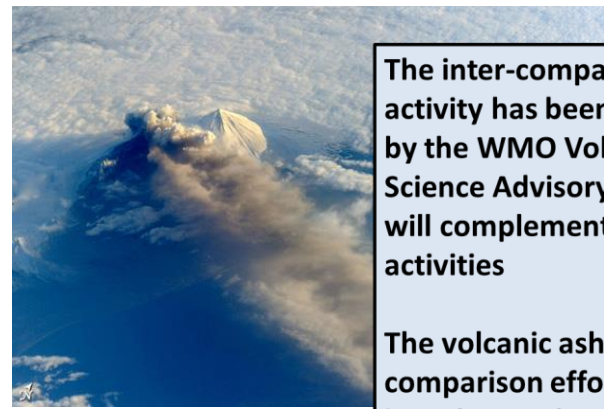
A globally-consistent volcanic ash product (from GEO and LEO):

- i. There is a clear need expressed by ICAO for a consistent product to be made available globally
- ii. A number of centres have made recent advances in developing satellite-based volcanic ash products; these could form the basis of a standard
- iii. More global coordination is required;
- iv. The need for this activity has been recognized by CGMS



Achievements

- Presentation to WMO Volcanic Ash Science Advisory Group in November 2013
- JMA established a volcanic ash testbed for comparing different algorithms
- Organisation of a Volcanic Ash Intercomparison Workshop
 - 29 June – 2 July 2015 at the University of Wisconsin-Madison, USA.
 - http://cimss.ssec.wisc.edu/meetings/vol_ash15/



The inter-comparison activity has been endorsed by the WMO Volcanic Ash Science Advisory Group and will complement their activities

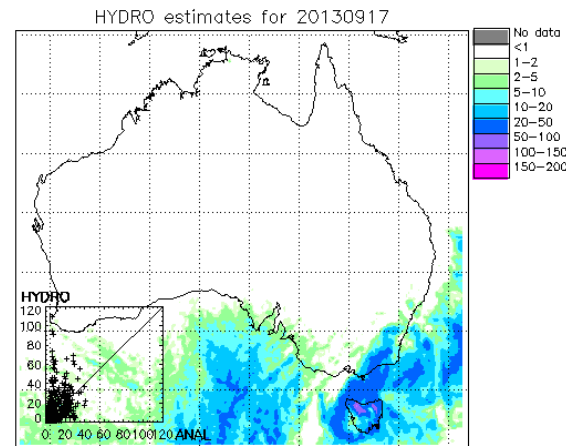
The volcanic ash inter-comparison effort will benefit significantly from the example set by the (much larger) meteorological cloud remote sensing community through the highly successful CREW



Pilot Project 3: Advanced Nowcasting

A globally-available consistent precipitation estimation and nowcasting product :

- Users would include civil authorities, flash flood guidance systems
- A clear requirement exists for rapid, facilitated access to quantitative precipitation estimates
- Products will include:
 - Precipitation Intensity (2 to 4 hours latency)
 - Nowcasting of precipitation Intensity (3 hours in Advance)
 - Cumulated Precipitation in the last 24, 48 and 72 hours



Achievements

- SIGMA-SCOPE website has been set up by INPE (Daniel Vila and Luiz Machado)
- <http://sigma.cptec.inpe.br/scope/>
- Brings together near real-time GEO and LEO rain products and a short-term (2-3 hours) projection product for use in real time
- SWFDP regions have been added to the interface



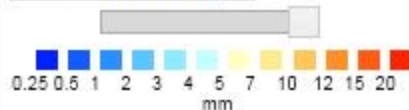
SCOPE - NWC

Co-Ordinated Processing of Environmental
Satellite Data for Nowcasting



☒ GHE

2014-11-19 22:00



☐ TMPA - 24h

☐ TMPA - 48h

☐ TMPA - 72h

☒ Countries

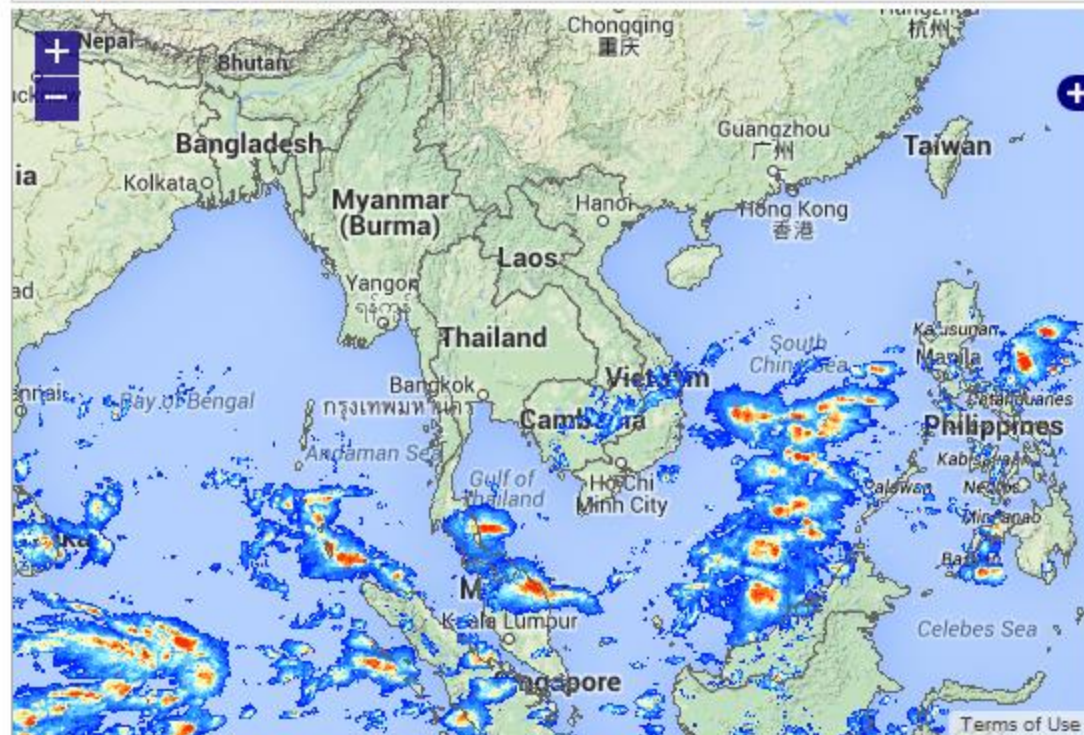
☐ States

☐ Southern Pacific

☐ South Eastern Asia

☒ Animation ☐ Distance

105.979 27.882



Pilot Project 4: Sand and Dust Forecasting

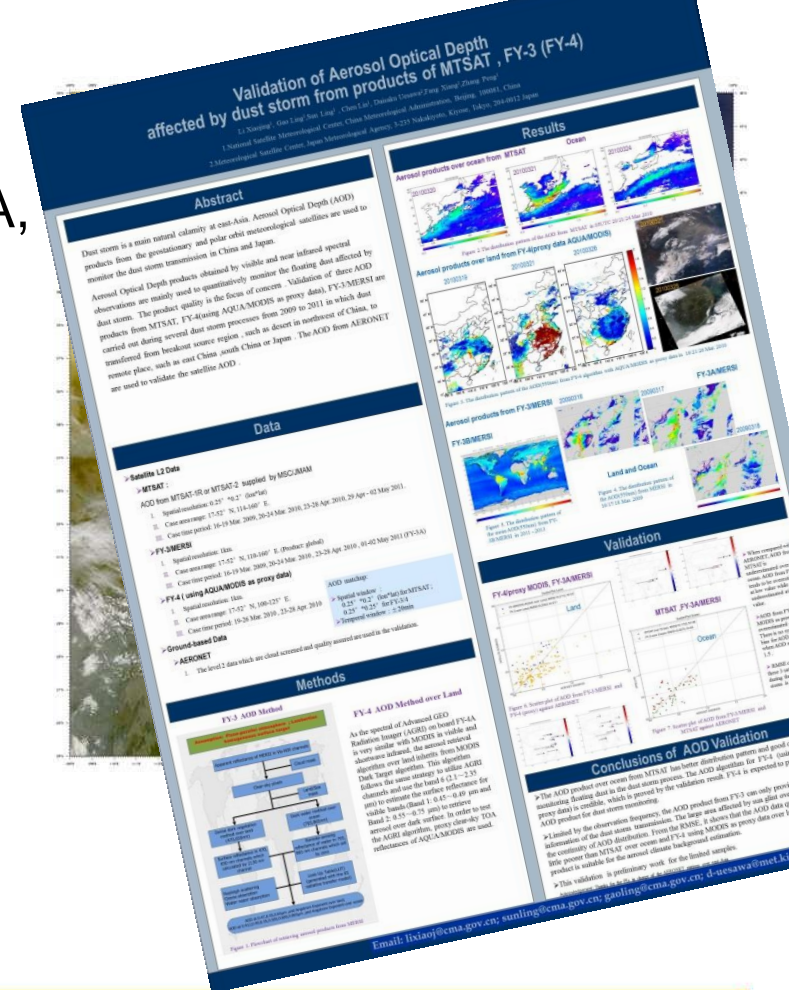
Regionally consistent Aeolian dust products based on a common algorithm.

- i. There is currently inconsistency of products available in the region
- ii. JMA have conducted experiments applying the GOES-R dust algorithm to the provisional response function of Himawari-8/AHI with closest MODIS channels as pseudo data.
- iii. JMA will validate the algorithm with surface observation data using Himawari-8 data after the launch of Himawari-8.
- iv. It was agreed that this approach could also be adopted by CMA for FY-4A.



Achievements

- Sharing of in situ datasets between CMA, JMA and KMA for validation of selected case studies
- CMA, JMA and KMA are testing and validating present and next-generation dust products against case studies



Next Steps

- Existing pilot projects will continue into 2016
- Ongoing meetings of the team through three-monthly teleconferences
- Review of project at IPET-SUP in February 2016
 - Consideration of additional pilot projects
- More information:
 - http://www.wmo.int/pages/prog/sat/scope-nowcasting_en.php





**World
Meteorological
Organization**

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Thank you for your attention

www.wmo.int/sat