



Australian Government

Bureau of Meteorology

Himawari-8 satellite image utilization and user readiness for the new data – the Australian VLab Centre of Excellence experience

2016 OCONUS Technical Interchange Meeting

Bodo Zeschke

Australian Bureau of Meteorology Training Centre

Australian VLab Centre of Excellence



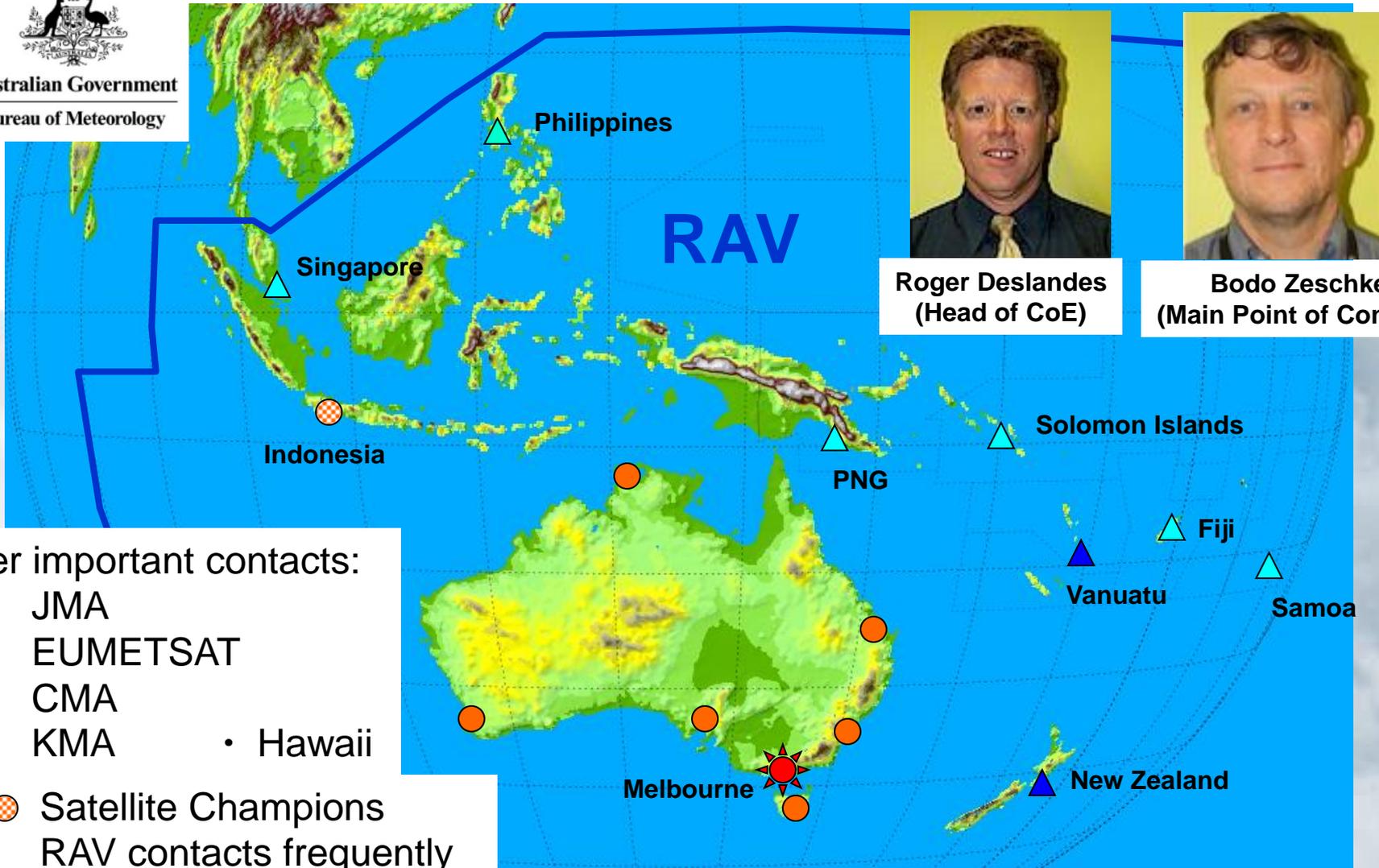
Content

- Introducing the Australian Vlab Centre of Excellence
- Collaboration with EUMETSAT, JMA and other experts to gain familiarization with the new data (pre-Himawari-8 data availability).
- Designing training resources and conducting training to ensure the effective use of the new satellite data by stakeholders (pre and post-Himawari-8 data availability).
- Developing Himawari-8 data products to suit local conditions
- Ongoing liaison and collaboration once the data is operationally available.
- Some of our latest work and plans for the future

Australian VLab Centre of Excellence and RAV contacts



Australian Government
Bureau of Meteorology



Other important contacts:

- JMA
- EUMETSAT
- CMA
- KMA
- Hawaii

- ● Satellite Champions
- ▲ RAV contacts frequently attending our training
- ▲ Other RAV contacts

web page at <http://www.virtuallab.bom.gov.au/>

Collaboration with EUMETSAT, JMA and other experts to gain familiarization with the new data.

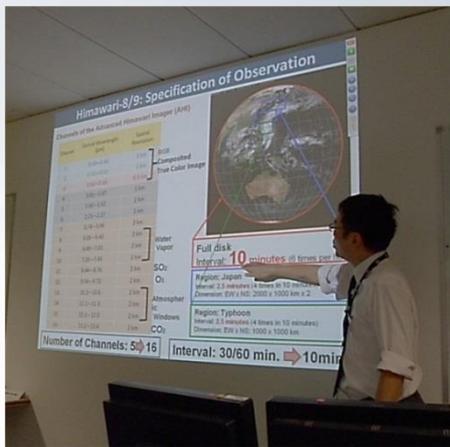
1: Initial Online Training (2009)



2: Adaptation of RGB product (2010-12)



3: WMO/EUMETSAT Workshop (2012)



5: JMA and WMO experts, AOMSUC-4 (2013)



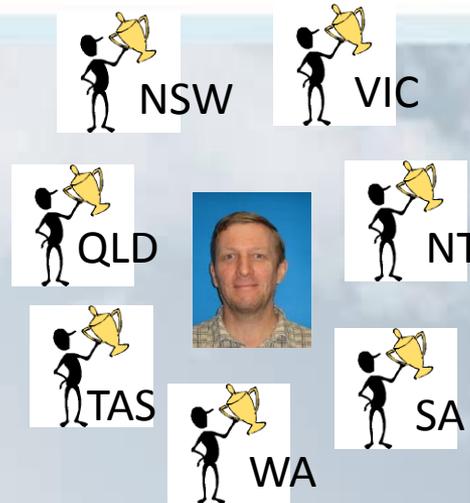
4: Rapid Scan Case studies DVD (2012)

Collaboration with EUMETSAT, JMA and other experts to gain familiarization with the new data.

1: Initial Online Training (2009)



6: Satellite Champions and other stakeholders (from late 2013)

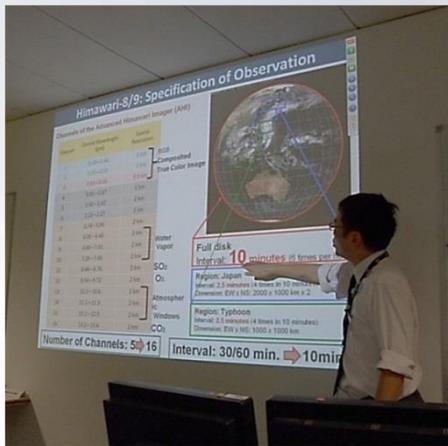


3: WMO/EUMETSAT Workshop (2012)

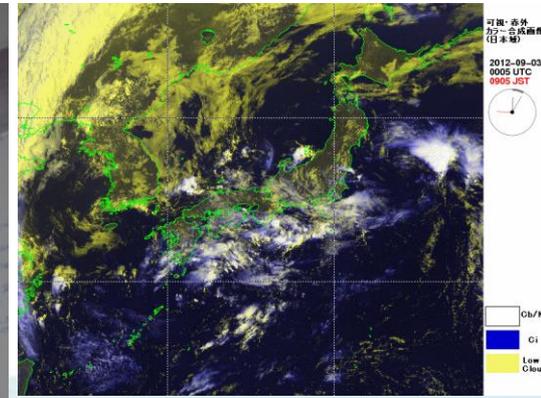


4: Rapid Scan Case studies DVD (2012)

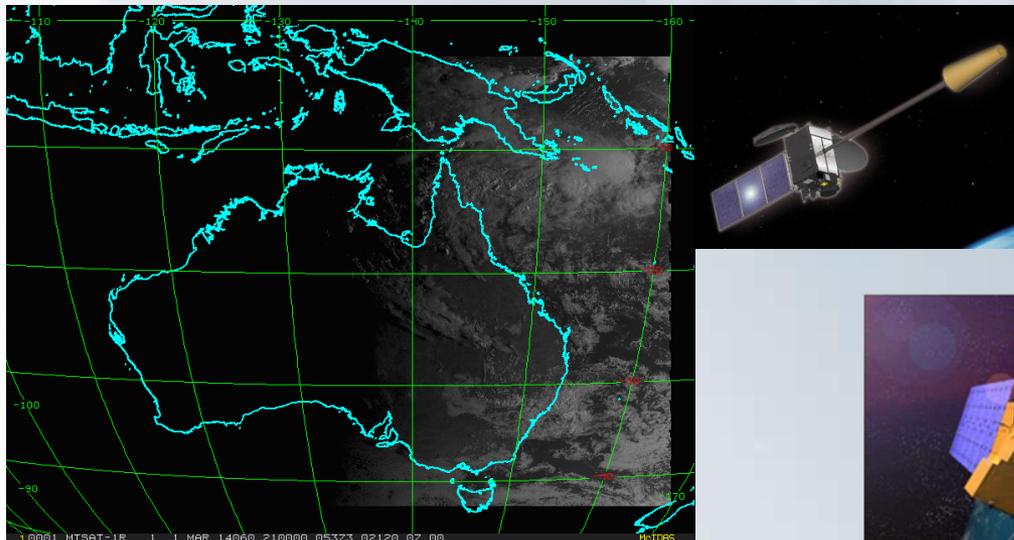
5: JMA and WMO experts, AOMSUC-4 (2013)



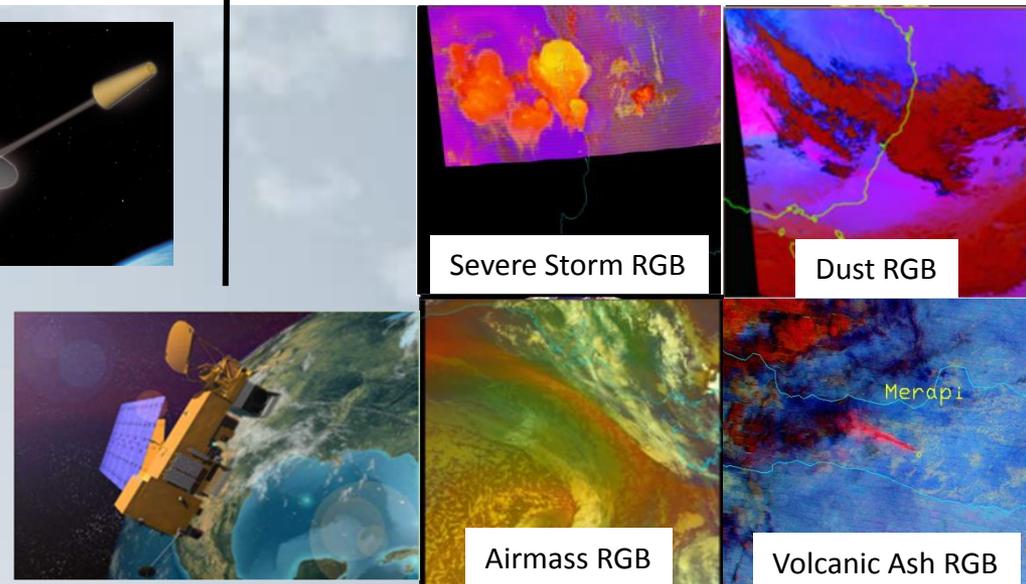
Designing training resources and conducting training to ensure the effective use of the new satellite data by stakeholders.



2a: MTSAT-1R Rapid Scan (HIWC Experiment)

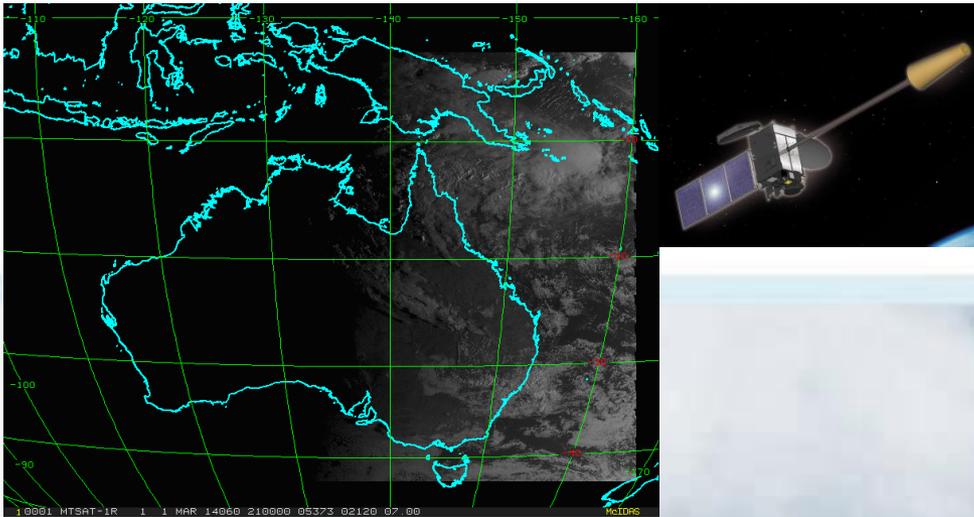


2b: RGB products from MODIS data

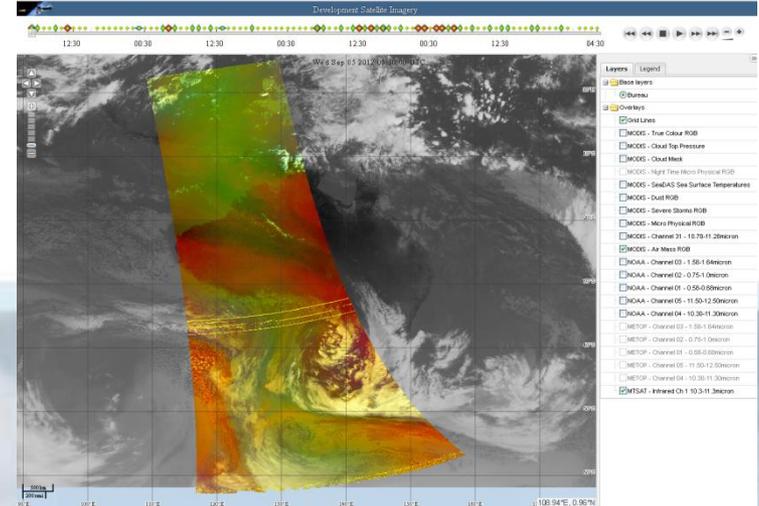


Designing training resources and conducting training to ensure the effective use of the new satellite data by stakeholders.

2a: MTSAT-1R Rapid Scan (HIWC Experiment)

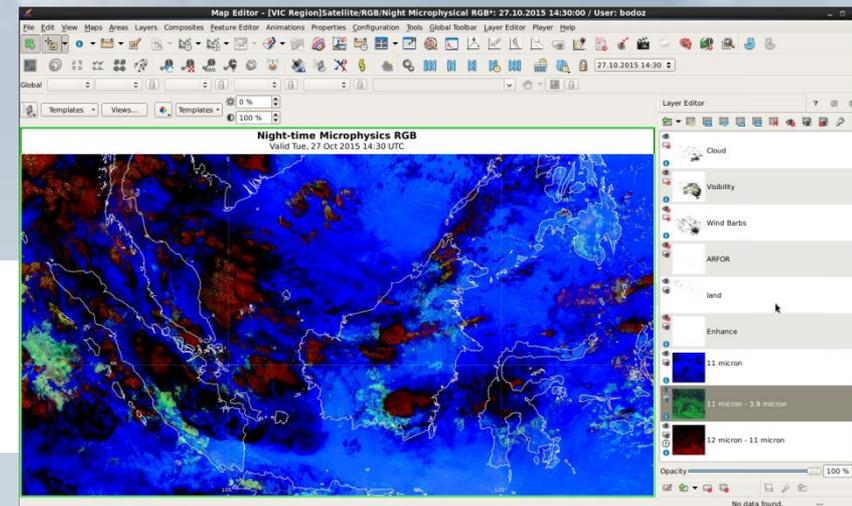


2b: MODIS data onto MTSAT-2 (from 2012)

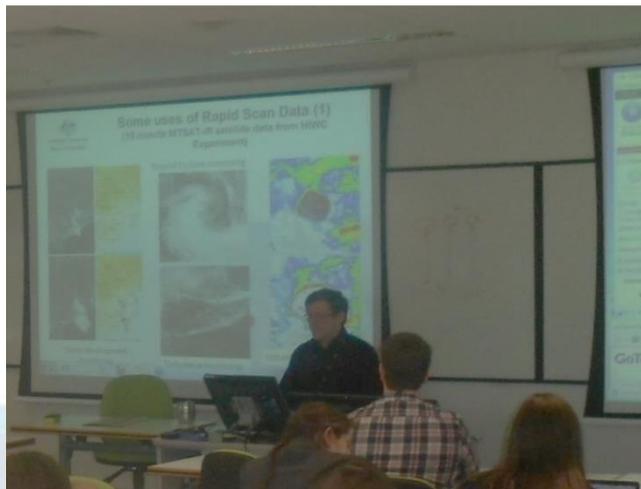


3a: JMA web page (2015)

3b: Within Visual Weather (BOM) from mid 2015

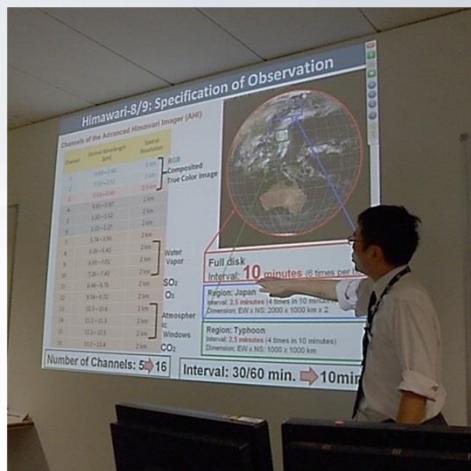


Designing training resources and **conducting training** to ensure the effective use of the new satellite data by stakeholders.



1: Science Week (from 2012)

2b: Monthly Regional Focus Group Meetings (since 2013)



2a: AOMSUC-4 Training Event (2013)

Australian VLab Centre of Excellence
National Himawari-8 Training Campaign

3: National Himawari-8 Training Campaign – from January 2015

 Phase 2: Case Studies	 Instructions and Timeline	 Phase 2: Latest Himawari-8 related information
 Tutorial Sessions and Feedback (Phase 2)	 Objectives	 Tutorial Sessions and Feedback (Phase 1)

Designing training resources and **conducting training** to ensure the effective use of the new satellite data by stakeholders.

<http://www.virtuallab.bom.gov.au/training/hw-8-training/>

Australian VLab Centre of Excellence
National Himawari-8
Training Campaign

The Campaign will assist Australian Bureau of Meteorology, WMO Region V and other stakeholders in preparing for the effective use of Himawari-8 data prior to its availability using existing satellite resources. Ongoing liaison and training to stakeholders will be given once the Himawari-8 data becomes available.

Phase 1: Familiarisation Resources (rapid scan)	Learning Outcomes	Phase 1: Familiarisation Resources (RGB products)
Phase 2: Introduction, Resources and Case Studies	Instructions and Timeline	Phase 2: Himawari-8 and related satellite Blogs
Phase 2: Tutorial Sessions and Feedback	Objectives	Phase 1: Tutorial Sessions and Feedback

Melbourne VLab Centre Of Excellence

Australian VLab Centre of Excellence Blog

(with an emphasis on Himawari-8 related data developments)

Other Blogs

- CMSS Blog
- CMSS - Himawari-8 Blog

Link to the useful CMSS Himawari-8 Blog web page

Links to Blog page

Australian VLab Centre of Excellence
National Himawari-8
Training Campaign

Melbourne VLab Centre Of Excellence

Should you use these resources please acknowledge the Australian VLab Centre of Excellence. In addition, you need to retain acknowledgement in the PowerPoint slides of EUMETSAT, the Japan Meteorological Agency, the Bureau of Meteorology and any other sources of information.

National Himawari-8 Training Campaign
Tutorial Session 13
22 April 2015

Bodo Zeschke Australian VLab Centre of Excellence Point of Contact

Feedback

To send feedback regarding the National Himawari-8 Training Campaign, click to proceed to the Contact Us page.

Tutorial Sessions

The First Phase of the National Himawari-8 Training Campaign. During these Tutorial Sessions Resources were discussed in greater detail. Resources are given below. Before access **How best to access the resources**

How best to access the resources

Summary of Tutorial Session 13

Please submit questions, feedback or comments to the Point of Contact.

Tutorial

Topics discussed include

Summary of Tutorial Session 13

Introducing the Night Microphysics

Resources and Summary

Tutorials and Feedback

Melbourne VLab Centre Of Excellence

Australian VLab Centre of Excellence
National Himawari-8
Training Campaign

Training Campaign Phase 2: Introduction, Resources and Case Studies

Introduction and Instructions

This Phase 2 of the Campaign will involve:

- Easily accessible resources for Stakeholder familiarisation with the new data from Himawari-8 and how it may be best used.
- A Blog page for ongoing discussion of case studies using Himawari-8 data. Blog resources from other organisations (eg. CMSS) also.
- Weekly tutorial sessions to consolidate the learning
- Assessment resources on the BMTC Moodle web page.

How Forecasters can use the new Himawari-8 data effectively

Click on the links below to see how Forecasters can use the new Himawari-8 data effectively for the nowcasting and forecasting of the respective meteorological phenomena. Note that this is an evolving resource and your feedback and additional material is welcome:

General Comments	Broadscale / Synoptic Scale	Tropical Cyclones	Thunderstorms
Fog / Low Cloud	Fire and Smoke	Volcanic Ash	Dust
Turbulence	Other Features (to be added)	Other Features (to be added)	Other Features (to be added)

The summary table "How Forecasters can use the new Himawari-8 data effectively" is here.

Red-Green-Blue (RGB) Product reference information.

In response to the stakeholder feedback during Phase 1 of the Campaign, below are easy-to-use resources pertaining to the RGB products. These PDF files include:

- How the RGB products are constructed
- Uses and limitations of the products
- EUMETSAT e-Port exercises for you to try in order to gain familiarisation with the products.

Dust RGB	Ash RGB	Airmass RGB	Day Microphysics RGB
Additional RGB (to be added)	Night Microphysics RGB	Day Convection RGB	Additional RGB (to be added)

Useful additional Himawari-8 channels

(to be added at a future date)

Derived Products

(to be added at a future date)

Case Studies

(to be added at a future date)

Return to main webpage

Date created: Fri, 29 May 2015
Last modified: Sun, 31 May 2015 23:28:14 +0000
Page code: 000070

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Accessing RGB resources

Australian VLab Centre of Excellence web page

<http://www.virtuallab.bom.gov.au/training/hw-8-training/introduction-resources-and-case-studies/>

Meteorological Satellite Center (MSC) of JMA

Home | VL | Products | Operations | Supports

Current position: Home > Virtual Laboratory > RGB Training Library

Himawari RGB Training Library

RGB Composite Imagery

Satellite imagery contains much of the physical information needed for nephelometry. However, such analysis requires skills and experience to enable interpretation and extraction of the necessary information from imagery. Red-green-blue (RGB) composite imagery can be easily created by overlapping and displaying color satellite images to present information from several satellite channels.

Note: As work on color interpretation for Himawari-8 remains ongoing, the content of this site may change in the future.

RGB Training Materials

RGB Outline

- Outline of RGB Composite Imagery (PDF version) [approx. 13MB]

WMO recommended schemes

- Natural Color RGB - Detection of snowice, vegetation and clouds
 - PowerPoint version [pptx zipped, approx. 16MB]
 - PDF version [approx. 3MB]

JMA User's Guide to RGB composite imagery (Himawari RGB Training Library)

http://www.data.jma.go.jp/mscweb/en/VL/VLab_RGB/RGBimage.html

Australian VLab Centre of Excellence
National Himawari-8 Training Campaign

The Day Convection RGB product

Should you use these resources please acknowledge the Australian VLab Centre of Excellence. In addition, you need to retain acknowledgement in the PowerPoint slides of EUMETSAT, the Japan Meteorological Agency, the Bureau of Meteorology and any other sources of information.

Compiled by Bodo Zeschke, BMTC, Australian Bureau of Meteorology, using information from various sources, May 2015

Contents

- Introduction
- The many channels of Himawari-8
- The seven WMO endorsed RGB products
- Familiarisation with the RGB product
 - Colour blindness test
- How the RGB product is created (channel combination recipe, beams explained)
- Identifying features in the RGB product and relating this to the palette
- Complications in the imagery
- Case Study
- Displaying the data (EUMETSAT ePort)
- Comparing the RGB product with single channel data, overlaying model fields, Derived Products etc.
- Examining the RGB product in animation
- Summary and Appendix - useful reference material

The Japanese Geostationary Satellites Himawari 8/9

Band	Central Wavelength (µm)	Spatial Resolution
1	3.43 - 0.48	10km
2	0.50 - 0.62	10km
3	0.63 - 0.66	0.5km
4	0.66 - 0.87	10km
5	1.63 - 1.62	2km
6	2.28 - 2.17	2km
7	3.74 - 3.96	2km
8	6.06 - 6.43	2km
9	8.99 - 7.01	2km
10	7.28 - 7.49	2km
11	8.44 - 8.76	2km
12	9.54 - 9.72	2km
13	10.3 - 10.6	2km
14	11.1 - 11.3	2km
15	12.2 - 12.6	2km
16	13.2 - 13.4	2km

Full Disk Image every 10min

気象庁
Japan Meteorological Agency

NASA Short-term Prediction Research and Transition Center (SPORT) Training

<http://weather.msfc.nasa.gov/sport/training>

SPORT Short-term Prediction Research and Transition Center

SPORT is a NASA project to transition unique observations and research capabilities to the operational weather community to improve short-term forecasts on a regional scale.

Real-Time Data | Core Projects | GOES-R PG | JPSS PG | Transitions | Library | Organization

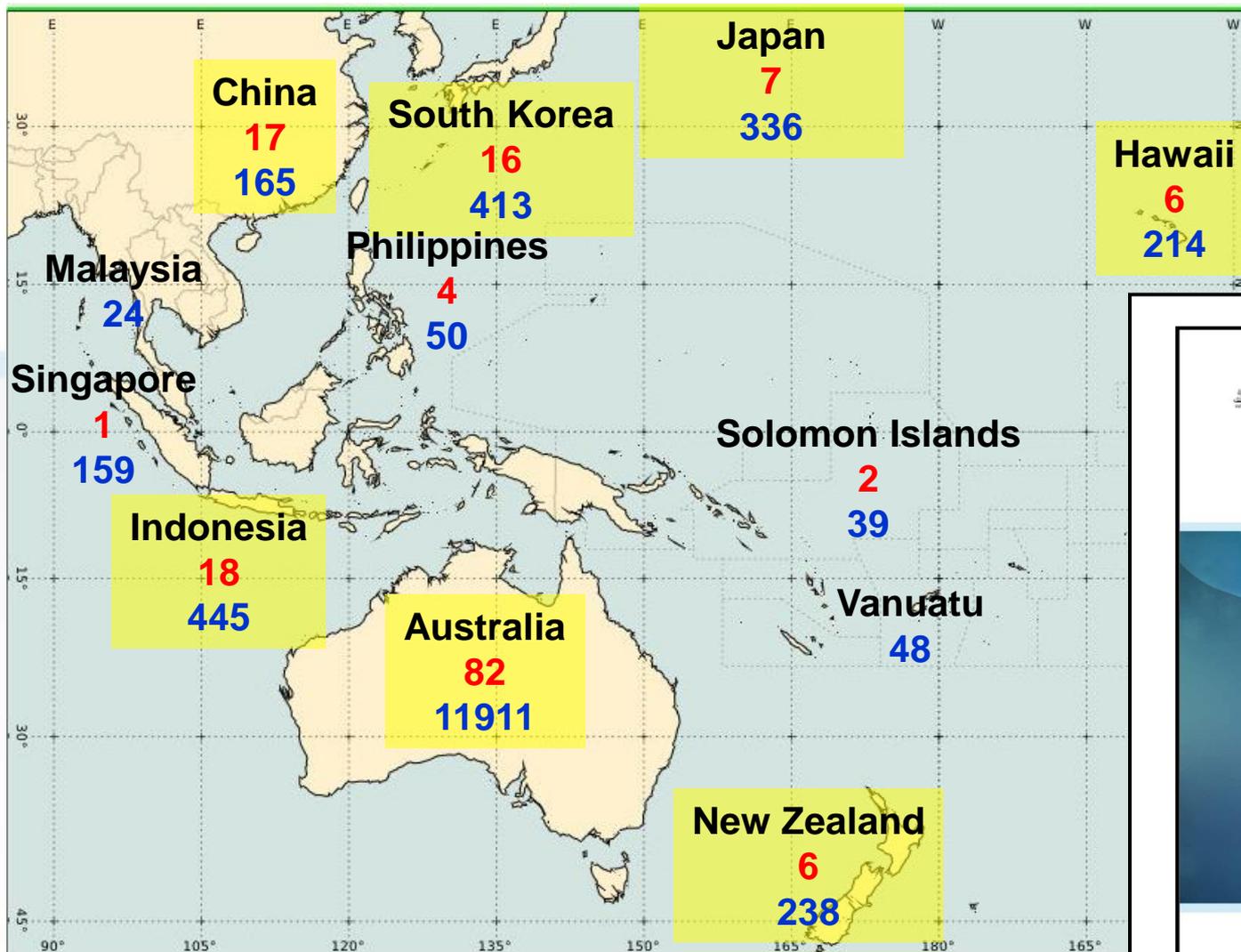
Product Training Modules

Training is a major component of SPORT's philosophy of not "throwing data over the fence." SPORT works closely with our collaborative partners to determine the effectiveness of transitioned products. Below are the web-based training modules produced by SPORT to allow forecasters to review training at their leisure. Training with audio uses a large amount of bandwidth and it is recommended that users with lower bandwidth ratings use the "Download" feature, when available, instead of streaming the training online. For more information, see the [Training Program Overview](#) at the bottom of this page.

- UAH GOES-R CI Module (For NWS users; 5 MB)**
Launch module in browser (user guide)
Quick Guide
This 12 minute module briefly describes the latest operational version of UAH GOES-R CI, a 0-2 convective initiation satellite nowcasting product developed at UAHuntsville and transitioned by NASA-SPORT. GOES-R CI uses a number of algorithms to track cloud objects, identify cloud properties like growth and glaciation (and rates of change in these cloud properties), and incorporates environmental data from the RAP model to produce a likelihood, or probability, of convection for identified cloud objects. This product is available for both the GOES-East and GOES-West domains. (April 2015)
- 24-Hour Microphysics RGB**
Quick Guide: Alaska
A 2-page reference document describes the fundamental aspects of the 24-Hour Microphysics RGB imagery. Taken from EUMETSAT work with the SEVIRI instrument, this imagery can be used to analyze cloud features similar to the Nighttime Microphysics RGB, but the advantage is its use both day and night and better utility in very cold regimes. (January 2015)
- NESDIS Snowfall Rate Product: CONUS**
Transition Slides
Quick Guide
This 11-slide presentation and 2-page quick guide reference describe applications related to the NESDIS Snowfall Rate (SFR) Product. It demonstrates the utility in the product for tracking snow features in geostationary satellite imagery and in data void regions and in determining the edge and maxima of the snowfall in a large precipitation system. (October 2014)
- NESDIS Snowfall Rate Product: Alaska**
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Total Lightning Operation Hours

National Himawari-8 Training Campaign summary (January to October 2015)

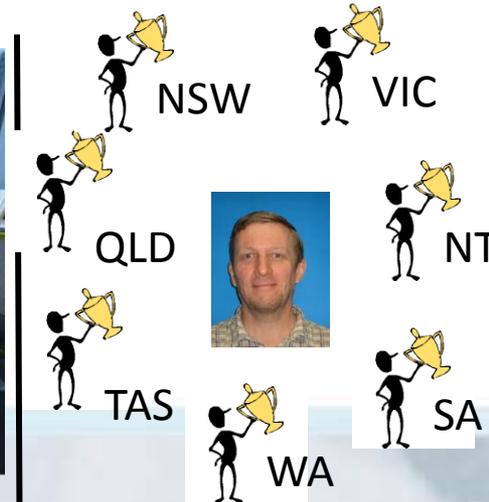


- Attendees to the 15 Tutorial Sessions
- Hits on the National Himawari-8 Training Campaign web page

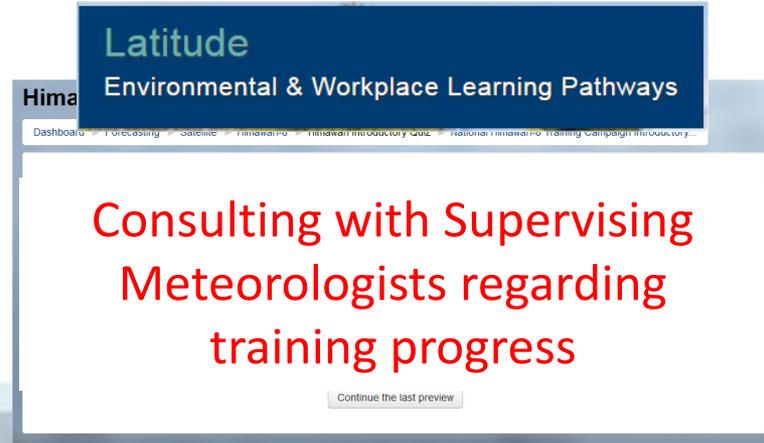
Ongoing liaison and collaboration once the data is operationally available.



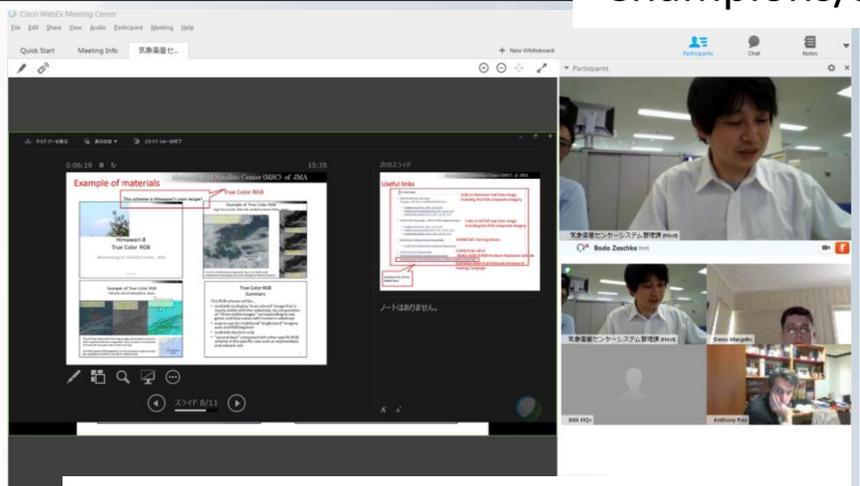
2: Talking to Forecasters



1: Communication with Champions/stakeholders



6: Internal Bureau Quiz



3: Collaboration with principal Satellite Operator (JMA)



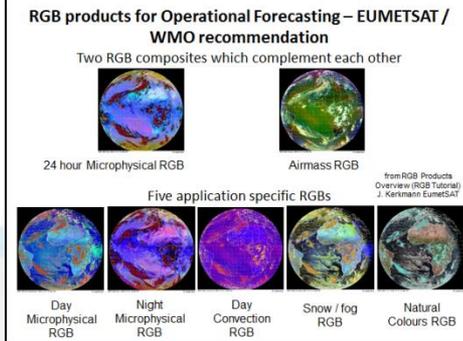
4: Regional Focus Group meetings



5: Himawari-8 presentations by stakeholders

Developing Himawari-8 data products to suit local conditions

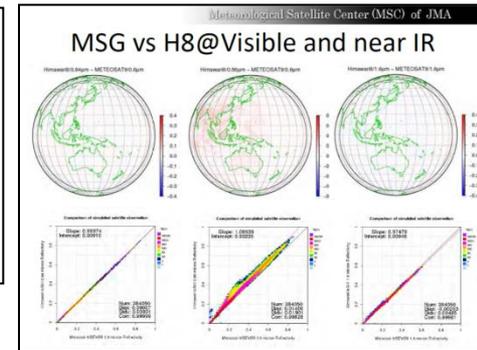
1: The WMO/EUMETSAT endorsed 7 RGB products and their recipes



Liaison with:

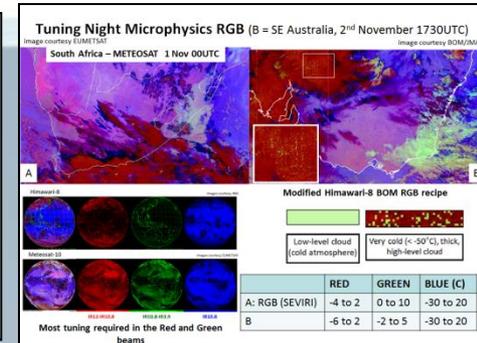
- Principal Sponsoring Satellite Operator
- VLab Contacts
- EUMETSAT experts
- Researchers (CAWCR etc.)
- Other stakeholders

2: Tuning the original RGB products for Himawari-8 data using the JMA correlation / regression analysis (MSG vs H8) as guide.



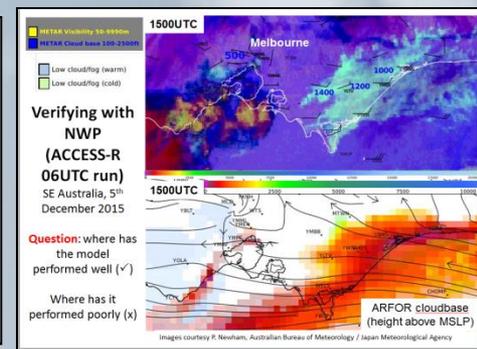
3: Development of RGB products by Forecasters and stakeholders to suit local conditions:

- Using the new channels of Himawari-8
- Creation of new RGB products



4: Creation of RGB case studies

- Summer / winter, tropical / mid latitude.
- Using other observations, NWP to verify the tuned RGB product



Plans for the future

Ongoing stakeholder liaison in optimising Himawari-8 product use and development

Collaboration with JMA, EUMETSAT etc. and other NMHS in order to tune the Himawari-8 data for Australasian-Pacific region

Attendance at conferences such as AOMSUC-6 useful for collaboration

Engage more SW Pacific Island stakeholders

Closer liaison with other developers (GOES-R Development Team, CMA, KMA)

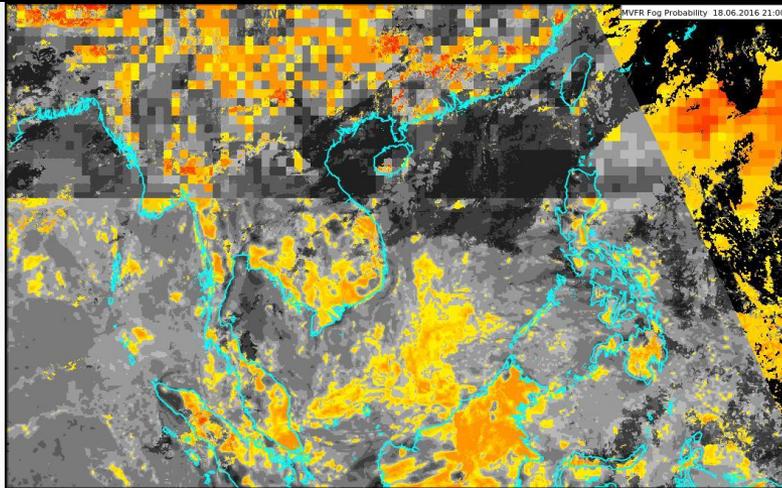
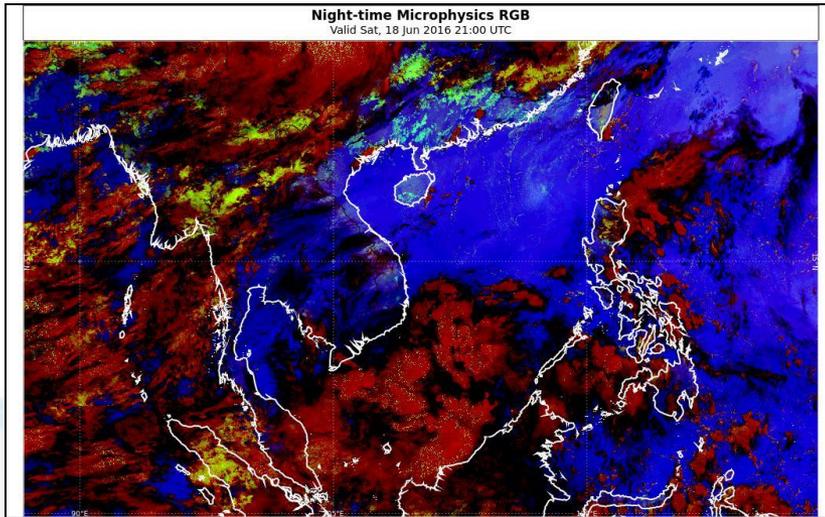
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- Hits on the National Himawari-8 Training Campaign web page



National Himawari-8 Training Campaign Report

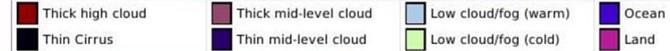
By Bodo Zeschke, Point of Contact, Australian VLab Centre of Excellence, 7 April 2015

Some of our latest work ...



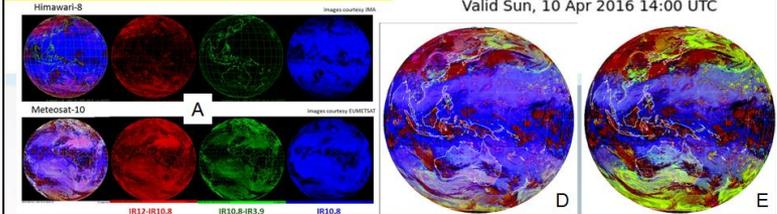
Adapting the GEOCAT GOES-R fog/low cloud product to Australasian-Pacific region

Tuning the Night Microphysics RGB products by Forecasters and stakeholders to suit local conditions



Most tuning required in the Red and Green beams

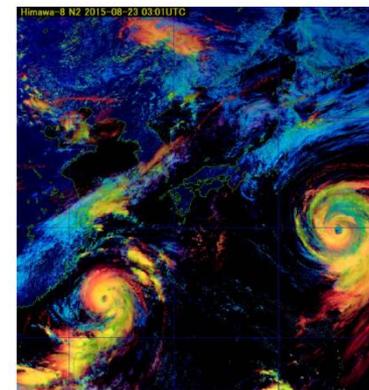
Night-time Microphysics RGB
Valid Sun, 10 Apr 2016 14:00 UTC



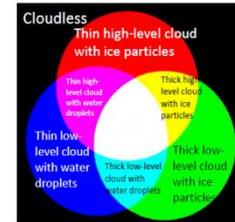
	RED (IR12.0-IR10.4)	GREEN (IR10.4-NIR3.9)	BLUE (C) (IR10.4)
A: SEVIRI RECIPE	-4 to 2	0 to 10	-30 to 20
B: NCMP-TROP	-4 to 2	0 to 5	0 to 27
C: JMA version 1	-6.7 to 2.6	-3.5 to 6.9 (11.2 micron used)	-29.4 to 19.4
D: JMA version 2	-6.7 to 2.6	-3.1 to 5.2	-29.4 to 19.4
E: TROP Hybrid (scaled)	-6.7 to 2.6	-3.1 to 2.6	0.6 to 26.4

Ongoing testing and tuning of existing EUMETSAT RGB products

Cloud Phase Distinction



Application:
Analysis cloud thickness, height of cloud top and cloud phase at one time.



Interpretation
(under investigation)

	Band	Gamma	TBB/Reflectivity range	
R	B13(IR10.4)	1.0	219.619~280.6707[K]	→ Cloud height
G	B03(VS0.64)	1.0	-0.0346~0.7792	→ Cloud thickness
B	B05(NIR1.6)	1.0	0.0119~0.5932	→ Cloud phase distinction

Testing new products in collaboration with our stakeholders



Australian Government

Bureau of Meteorology

Thank you...

The screenshot shows the homepage of the Melbourne VLab Centre of Excellence. The header includes the Australian Government Bureau of Meteorology logo and the title 'Melbourne VLab Centre Of Excellence'. A navigation menu contains links for Home, Satellite Products, Events, Training, Blog, News, Archive, Links, and Contact Us. The main content area is divided into several sections: 'Melbourne VLab Centre of Excellence' with a photo of the building; 'Sponsoring Satellite Operator' listing JMA/MSC, JMA Virtual Laboratory, and Himawari 8/9 sample data; 'News' with articles on Science Week, MTSAT-1R imagery, and the Himawari-8 training campaign; 'Resources Library' listing various training and observation resources; and 'Quick Links' with shortcuts to upcoming events, the WMO VLab homepage, and login pages. A footer contains copyright information and accessibility icons.

Australian VLab Centre of Excellence web page at <http://www.virtuallab.bom.gov.au/>