AOMSUC-10 Training Event Socrative Surveys result summary

Bodo Zeschke BMTC, Australian VLab Centre of Excellence, February 2020

1: Overview

The AOMSUC-10 Training Event was conducted on the Royal Melbourne Institute of Technology (RMIT) University Campus, Melbourne Victoria during the 2-3 December 2019. There were 45 attendees from 25 countries including Australia, China, Fiji, French Polynesia, India, Indonesia, Japan, Laos, Malaysia, Maldives, Myanmar, New Zealand, Philippines, Russia, Thailand, Tuvalu, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Switzerland, Timor Leste, Tonga and the USA as shown in Appendix 1.
This paper provides a summary of the feedback from questions posed to the attendees during ten of the sessions (Refer to Training Event schedule in Appendix 2). Questions covered topics pertaining to meteorological satellite data use and the effectiveness of the resources and the training delivered by the Australian VLab Centre of Excellence. The 41 questions included 34 multiple choice questions with 7 short answer questions. The Socrative cloud-based learner response system was utilised with attendees answering questions anonymously (Zeschke 2018).
Examination of the responses indicated that an average of 34 attendees participated with numbers ranging between 22 and 43. As the questionnaires were conducted anonymously the responses are very likely to be genuine. A summary of questions and responses are given in Appendices 2 to 9.

The questions and corresponding answers have been grouped into seven topics. These are summarised in sections 2 and 3. Topics included feedback regarding:

1. Participant's familiarity with the Socrative cloud based learner response system.
2. The profile of the participants with respect to their satellite meteorology work.
3. Satellite projects, satellite data and data viewers
4. The use and availability of RGB composites
5. The use of satellite data in detecting and monitoring convection
6. The use of data from multiple satellites
7. The activities of the Australian VLab Centre of Excellence.

2: Detailed analysis

2.1: Participants familiarity with the Socrative cloud based learner response system.
Almost half of the participants have used Socrative or similar to interact within the classroom. 6 attendees were interested to know more about Socrative (Refer to Appendix 3).
This familiarity with Socrative may be the result of attendance at previous Australian VLab Centre of Excellence Regional Focus Group meetings during which Socrative was used. Some of the respondents also attended AOMSUC-9, during which Socrative was used.

2.2: The employment profile of the participants.
A majority of respondents (21 of the 34) work as weather forecasters or are the managers of forecasters. Of the remainder 10 work in research or within the field of satellite systems (refer

to Appendix 4). From a training perspective it may be an advantage for a larger percentage of attendees to be operational staff or personnel who regularly interact with operational staff. These staff are most able to directly pass on the skills gained during the training event to relevant peers for maximum impact.

2.3: Feedback pertaining to satellite projects, satellite data and data viewers
The results are shown in Appendix 5. Relevant subtopics to these questions include:

2.3.1: WMO Space-based Weather and Climate Extremes Demonstration Project (Internet Reference 6)
22 out of the 30 attendees who responded had not heard of this Project (Results are shown in Figures 2 and 3 in Appendix 5). A majority of attendees wanted more information about this project. This indicates that the AOMSUC-10 Training Event was a suitable platform to advertise this. Certainly, this level of feedback would not have been possible if this presentation was given during the AOMSUC-10 Conference.

2.3.2: The use of the SLIDER GOES and Himawari-8 data viewer, accessible from the RAMMB / CIRA website (Internet Reference 5)
Results are shown in Figure 4 and Table 3 in Appendix 5. Feedback indicated that almost half of the attendees did not know about this data viewer, whilst a large percentage of the remainder did not use this regularly. Session 8 on the Monday and sessions 3-5 on the Tuesday included familiarisation and training in the use of SLIDER.
Valuable feedback was received from attendees regarding preferred satellite data viewer functionality as shown in Table 3. Important features included:

1. The preferred computer platform hosting the data viewer and its capabilities
2. The preferred display of the data e.g. projection, image subsets, animation modes
3. The data details to be displayed
4. The preferred data from other satellites
5. The ability to manipulate the data e.g. the creation of new composites
6. The multilayered display, including satellite and other observations, level 2 satellite products, NWP and predefined products

2.3.3: The use of GEO-KOMPSAT-2A data
A majority of the attendees who responded cannot obtain this new data. Many attendees want to know how to obtain this data. Most of the attendees are located within the area of coverage of GEO-KOMPSAT-2A. Results are shown in Figure 5 in Appendix 5.

2.3.4: The use of microwave data as pertaining to rainfall estimation products.
More than half of the attendees who responded used this data. Of the remainder a small minority preferred visible and infrared imagery for rainfall analysis. Results are shown in Figure 6 in Appendix 5. There is scope for further advertisement and training of operational Forecasters in the effective use of this useful microwave data.

2.3.5: The use of microwave scatterometer data such as ASCAT, SCATSAT, CFOSAT and HY-2B
Although most of the respondents had used the ASCAT data, a majority have not heard of additional data such as SCATSAT/CFOSAT/HY-2B. This data is likely to be used mostly by tropical cyclone forecasters and these are in the minority within our surveyed group as can

be seen from inspection of Figure 2 in Appendix 4. However, it is worth investigating the functionality of SCATSAT/CFOSAT/HY-2B and the potential use of these for use by meteorologists within the AOMSUC-10 domain. Results are shown in Figure 7 in Appendix 5.

2.4: Feedback regarding the use and availability of RGB composites

Examination of Figure 8a in Appendix 6 shows that AOMSUC-10 Training Event attendees voted the True Colour RGB composite as the most popular. The Night Microphysics, the Day Convection and the Airmass RGB are also popular. This result differs from the feedback obtained from 115 Australian Bureau of Meteorology (BOM) forecasters and reported in Zeschke et al. 2019a, b as shown in Figure 8b of Appendix 6. This indicates that although the True Colour RGB and the Day Convection RGB composites are important to both groups, the BOM forecasters voted the Night Microphysics RGB as having the biggest positive impact in their work. Also of interest is that the Airmass RGB composite is popular amongst the AOMSUC-10 attendees. This shows the value of this composite, incorporating water vapour bands in its recipe. Traditionally the water vapour bands have not been popular with Bureau forecasters, due to the difficulty in interpreting this imagery (Zeschke et. al 2019a, b)

Attendees were asked to examine the Ishihara Plate No 13 from Internet Reference 8 and anonymously provide feedback on their ability to detect the number displayed within this. Of the thirty nine attendees answering this question, four could not identify the number required for normal colour vision. This indicated that 10% of the attendees had some issues with colour perception necessary for utilising the RGB composites effectively. This compares to the 3% (3 out of 115) Bureau staff who had issues with colour perception as summarised in Zeschke et. al 2019a, b. It is possible that the lower statistics for the latter case may due to the fact that these staff were not tested, but instead chose to identify themselves.

AOMSUC-10 Training Event attendees were asked to share RGB composite resources with their colleagues, including relevant web links. This information is given in Table 4 of Appendix 6. It was noteworthy that there were 14 attendees who did not have access to RGB composite resources. Relevant feedback included "we would like to receive RGB composite resources from other agencies".

Finally, one of the attendees asked if hyperspectral sounder data could be used to generate RGB composite imagery.

2.5: Feedback regarding the use of satellite data in detecting and monitoring convection

Results are shown in Figure 9 in Appendix 7. For the detection and monitoring of storms using satellite data 20 attendees chose a single satellite product, 3 chose two products, 12 chose three products, 8 chose more than three products. Geostationary satellite data is seen as of primary importance when monitoring thunderstorm development and evolution. It is surprising to see that the Day Convection RGB composite was voted as more popular than the Sandwich Product during this survey and also from Bureau staff feedback (Zeschke et al. 2019a, b). That is because feedback provided to the author through discussion with Bureau operational forecasters indicated that the Sandwich Product was perceived to be more reliable. On the other hand, for the monitoring of storm-top development as shown in Figure 11 in Appendix 7 the Sandwich Product was clearly voted the most popular.

For monitoring the development of cumulonimbus cloud attendees generally used a wider range of meteorological data (satellite, RADAR, lightning) during the monitoring of the evolution of the mature cumulonimbus, compared to the earlier cumulus development stage.

Within the Bureau, forecasters prefer to examine high resolution visible satellite imagery as the primary source of evidence during the pre-thunderstorm cumulus development stage. Once a thunderstorm has formed, forecasters prefer to use RADAR and lightning data in combination with satellite data with a preference towards the first two (Zeschke et al. 2019a, b).
The aforementioned response by AOMSUC-10 Training Event attendees indicates that these could benefit from further training in the effective use of satellite data during these early stages of thunderstorm development.

2.6: Feedback regarding the use of data from multiple satellites
One of the potential areas of future development in satellite meteorology utilising multiple satellites is the development of 3 dimensional stereo satellite imagery for use by operational forecasters. Previous work on this topic has been conducted in the USA (Scott Lindstrom's postings in Internet Reference 7, Internet Reference 4) and at the Bureau (Zeschke 2019c)
During session 8 on day 2 of the Training Event attendees were asked about their use of this imagery. Figure 12 in Appendix 8 shows that a majority had not used this imagery. It is likely that many of those who had used this imagery gained their experience from attending relevant Australian VLab Centre of Excellence Regional Focus Group meetings.
Tests conducted using the "stereo pair cross-eyed" method and the anaglyph imagery indicated that the 3 dimensional effect was more readily viewed using the anaglyph imagery and glasses. Results are shown in Figure 13a of Appendix 8. This agrees with the findings of studies conducted with the students of the 2019 Bureau of Meteorology Training Centre's Graduate Diploma of Meteorology course as shown in Figure 13b.

2.7: Feedback pertaining to the activities of the Australian VLab Centre of Excellence.
Session 6 on day 2 of the AOMSUC-10 Training Event consisted of an Australian VLab Centre of Excellence Regional Focus Group meeting. The audience included remote attendees as well as those within the Training Event venue for a total of 64 participants. The Regional Focus Group meeting was followed by a chaired group discussion pertaining to these meetings. This session 7 on the Tuesday incorporated feedback from the Training Event attendees only. Socrative was used to enhance the interactivity during both sessions.

During the Regional Focus Group meeting the following questions were asked:

<u>2.7.1 Have you used Australian VLab Centre of Excellence resources in your work?</u>
26 respondents had used the resources of the Australian VLab Centre of Excellence at Internet Reference 2 in their work. As can be seen from examination of Figure 17 in Appendix 9 the resources have been used in the following ways:

1. To educate the attendee (18 responses)
2. To assist colleagues of the attendee (9 responses)
3. To develop teaching resources, as the attendee is a teacher (7 responses)

2 attendees chose all the above options, 3 attendees chose options 1 and 2, one attendee chose options 1 and 3. The remainder chose the single option only.

<u>2.7.2 Have you examined the archived recordings of the Regional Focus Group meetings?</u>
The recordings of the Australian VLab Centre of Excellence Regional Focus Group meetings are archived on Internet Reference 3. Over half of the attendees (20 out of 35) have examined the

recordings. Although this is a satisfactory result there is room for improvement in actively advertising the recordings and the potential use of these in order to reach the widest and relevant audience.

2.7.3 Do you think these VLab resources would be useful for you?

Inspection of Table 5 in Appendix 9 shows that the vast majority (35 out of 37 attendees) replied in the affirmative to this question. The following resources were seen to be particularly useful, listed in order of relevance below:

1. Availability of teaching/training material on the VLab web page (8 responses)
2. Useful case studies, specifically the importance of real time case studies (6 responses)
3. The available of refresher material that gives a different perspective on the use of satellite data within meteorology (4 responses)
4. The resources permit the passing on of technical expertise (3 responses)
5. It is possible to find information about particular weather events, especially pertaining to convective storm monitoring, turbulence and icing (2 responses)
6. The VLab resources are useful as support information (1 response)

Attendees made the following requests pertaining to the initiatives of the Australian VLab Centre of Excellence:

1. Advertising the VLab resources on the main WMO VLab website
2. Upload the RFG recordings onto YouTube so that there are transcripts.
3. Tagging the RFG recordings by topic or discipline for easy access.
4. Getting more aviation meteorologists engaged in producing the resources.
5. Scheduling the RFG meetings at different times i.e. 03-10UTC.
6. A request for more VLab participation across the Pacific Islands

During the chaired post Regional Focus Group discussion the following questions were asked:

2.7.4: Have you attended Australian VLab CoE Regional Focus Group meetings previously?

According to Figure 14 in Appendix 9 over half of the participants had not previously attended such a meeting so this was a good introduction for many of the attendees.

2.7.5: How easy is it for you to attend the Regional Focus Group meetings using GoToWebinar?

Most attendees who had previously attended these meetings mentioned that the GoToWebinar remote conferencing software worked well and this can be seen by inspection of Figure 15 in Appendix 9. Some responders commented on issues pertaining to the audio transmission, a smaller number about issues with the transmission of the imagery during the sessions.

Examination of the feedback to questions 2.7.4 and 2.7.5 above indicated an inconsistency in response by attendees. Whereas 28 attendees had answered both questions, 4 had answered only the first (2.7.4) and 2 had answered only the second (2.7.5). 4 participants gave feedback pertaining to GoToWebinar solely based on their experience at the AOMSUC-10 event.

2.7.6: What additional topics would you like discussed at future Regional Focus Group meetings?

This question was styled upon the information obtained from a survey conducted during the Regional Focus Group meeting of the 7th July 2016 as archived at Internet Reference 3. Attendees seated around each table were asked to study the topics of interest from the previous survey amongst themselves. On the basis of this peer discussion they were invited to suggest topics of interest to be presented at future Regional Focus Group meetings, including additional topics not on the list. The responses are listed in order of relevance below:

1. Future topics pertaining to NWP models and derived products (9 attendees)
2. Case studies, including those based on hazardous and extreme events (7 attendees)
3. Satellite data as used in the forecasting process (6 attendees)
4. Presentations pertaining to intraseasonal events (e.g. MJO, Tropical Waves, monsoon etc.) (6 attendees)
5. Weather and forecast discussions, including contributions by Australian and international experts (5 attendees)
6. Presentations pertaining to synoptic / mesoscale events (e.g. thunderstorms, MCS's etc.) (5 attendees)
7. Presentations pertaining to Polar Orbiting satellites (4 attendees)
8. Presentations pertaining to Climate topics (4 attendees)
9. Presentations pertaining to synoptic events (e.g. Tropical Cyclones, Cyclogenesis etc.) (3 attendees)
10. Presentations pertaining to aviation forecasting (2 attendees)
11. Presentations pertaining to interseasonal events (ENSO) (2 attendees)
12. Himawari-8 data and data products (1 attendee)
13. Developing training resources (1 attendee)
14. A broad range of topics, not confined to satellite meteorology (1 attendee)

More particular topics of interest include:

1. Introduction on methods/techniques useful for comprehensive analysis of multiple satellite data with varying temporal/spatial resolution.
2. Cloud type classification using satellite images.
3. Development of cloud climatologies under different wind flow regimes and their use in nowcasting.
4. Use of cloud relative motion to diagnose varying phenomena, e.g. thunderstorms, jet streaks, tropical systems, etc.
5. Characteristics of tropical waves.
6. How can we do real-time analysis of Sea Surface Temperature and in what situations does it have diurnal signal variability? i.e. calm versus stormy seas.
7. Cumulus development into thunderstorms and their decay.
8. Use of geostationary lightning mapper data.
9. Coastal land/sea breeze induced convective systems
10. Mountain area snow analysis
11. Space based drought monitoring
12. Fire weather predecessor conditions (NDVI, Land Surface Temperature)
13. Is machine learning or deep learning technology really helpful for weather forecasting?

3: Summary of meeting outcomes and next steps

During the AOMSUC-10 Training Event the Socrative cloud based learner response system was successfully used to obtain participants anonymous feedback on a number of issues pertaining to satellite data use and requirements, as well as the effectiveness of the resources and training delivered by the Australian VLab Centre of Excellence.

The job profile of the attendees showed a majority of operational forecasters. However, in terms of the effectiveness of these Training Events in the future it may be an advantage to have in attendance a larger percentage of operational staff as well as personnel who regularly interact with operational staff. These staff will be in the best position to directly pass on the skills gained during the training event to their peers.

Sections 2.3 and 2.4 summarised insights into the use and requirements of satellite data. This includes the desired display of the data, data use from the new GEO-KOMPSAT-2A satellite and from microwave sensing polar orbiting satellites. More particularly, the use of particular satellite bands and associated RGB composites featured in the feedback, with a focus on monitoring thunderstorm formation and development. All this feedback clearly highlighted topics that need to be advertised and that required further training within the Asia Pacific region. The group provided useful RGB composite resources available on the Internet and these are summarised in Table 4 of Appendix 6.

Looking towards the future, feedback regarding the use of data from multiple satellites, particularly in the form of 3 dimensional stereo imagery, proved useful. This included an assessment of the effectiveness of two types of stereo image rendering, as summarised in section 2.6.

The resources on the Australian VLab Centre of Excellence web pages were seen to be useful in the work performed by a vast majority of respondents, and the reasons for this are given in sections 2.7.1 and 2.7.3. Attendee's requests pertaining to the initiatives of the Australian VLab Centre of Excellence are presented in section 2.7.3.

Although many of the participants had examined the recording of the Australian VLab Centre of Excellence Regional Focus Group meetings, there is room for improvement in actively advertising the recordings and the potential use of these in order to reach the widest and relevant audience. Attendees to Regional Focus Group meetings mentioned that the GoToWebinar online conferencing worked well as shown in section 2.7.5.

In summary, the findings and recommendations of this report will be used to further improve the content and organisation of future AOMSUC Training Events. In addition the report presents valuable suggestions for further improvement in the presentation, content and advertisement of the Australian VLab Centre of Excellence Regional Focus Group meetings. In the light of this it is recommended that future AOMSUC Training Events also utilise Socrative or similar cloud based learner response systems. This in order to improve participants interaction and to provide valuable feedback such as is summarised here.

Appendices

Appendix 1: The attendees to the 10th Asia Oceania Meteorological Satellite Users Conference Training Event on the RMIT Campus

(image courtesy Stephen Gillespie)

Appendix 2: The AOMSUC-10 Training Event sessions

Local time /session	Monday, 2nd December 2019	Tuesday, 3rd December 2019
0830 (session 1)	Welcome session	A panel led discussion pertaining to how and where to access the satellite data
0915 (session 2)	Spectral bands and their uses	Introduction to the WMO Space-Based Weather and Climate Extremes Monitoring Demonstration Project
1000	Morning tea /Photo	Morning tea
1030 (session 3)	Application of the spectral bands to RGB composites	Group discussions that consolidate the content of the previous sessions. Experts to mentor the groups.
1115 (session 4)	Introduction to now-casting using satellite data and products: Tropical storm and Typhoon examples	
1200 (session 5)	Introduction to now-casting using satellite data and products: Thunderstorm examples	
1245	Lunch	Lunch
1400 (session 6)	Introduction to now-casting using satellite data and products: Precipitation examples.	13:30 to 14:30 LST. VLab Regional Focus Group (RFG) Weather presentation.
1445 (session 7)	Nowcasting applications using GEO-KOMPSAT-2A data and RGB products	A chaired post RFG discussion.
1530	Afternoon break	Afternoon break
1600 (session 8)	Spectral band / now-casting exercise with a short example or two using RAMMB/CIRA SLIDER	Future developments: utilizing data from multiple satellite platforms.
1645 (session 9)	Spectral band / now-casting exercise with examples using SATAID	Summary session including evaluation and review of the Training Event.
1730	Finish	Finish

Table 1: the sessions of the 10th Asia Oceania Meteorological Satellite Users Conference (AOMSUC-10) Training Event, showing sessions during which the Socrative cloud-based learner response system were used annotated in yellow. (see also Internet Reference 1).

Appendix 3: The participants familiarity with the Socrative cloud-based learner response system

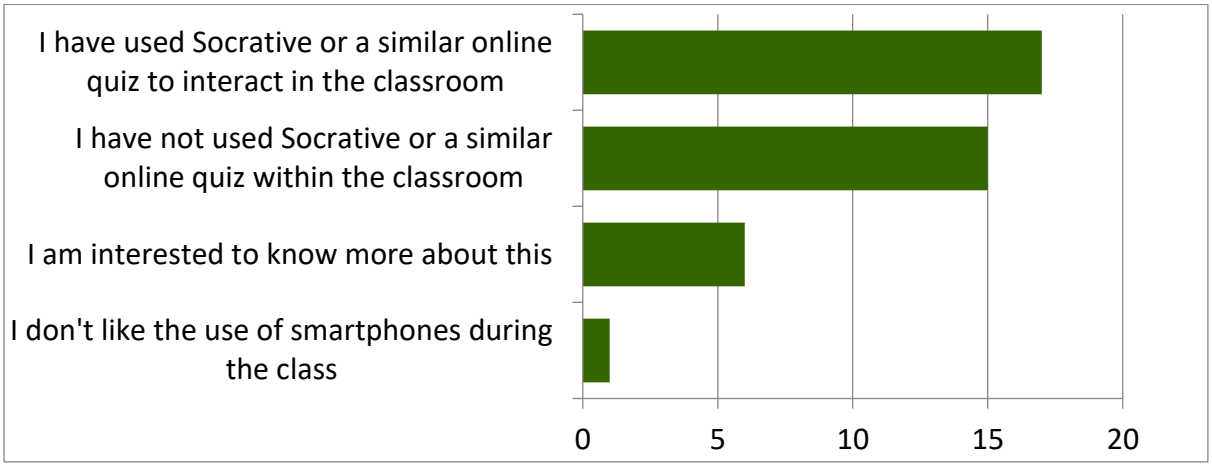

Figure 1: Answers to the question "Have you used Socrative or a similar cloud based learner response system?" as posed to AOMSUC-10 Training Event attendees during session 3 on Monday.

Appendix 4: Participants background

Which of the below options best describe the work you do	Number of responses
Manager of Forecasters	8
Tropical Cyclone Forecaster	4
Other Forecaster	9
Satellite Systems	6
Researcher	4
Other	3

Table 2: Answers to the question "Which of these options best describe the work you do?" as posed to AOMSUC-10 Training Event attendees during session 4 on Monday.

Appendix 5: Attendee feedback pertaining to satellite projects, satellite data and data viewers

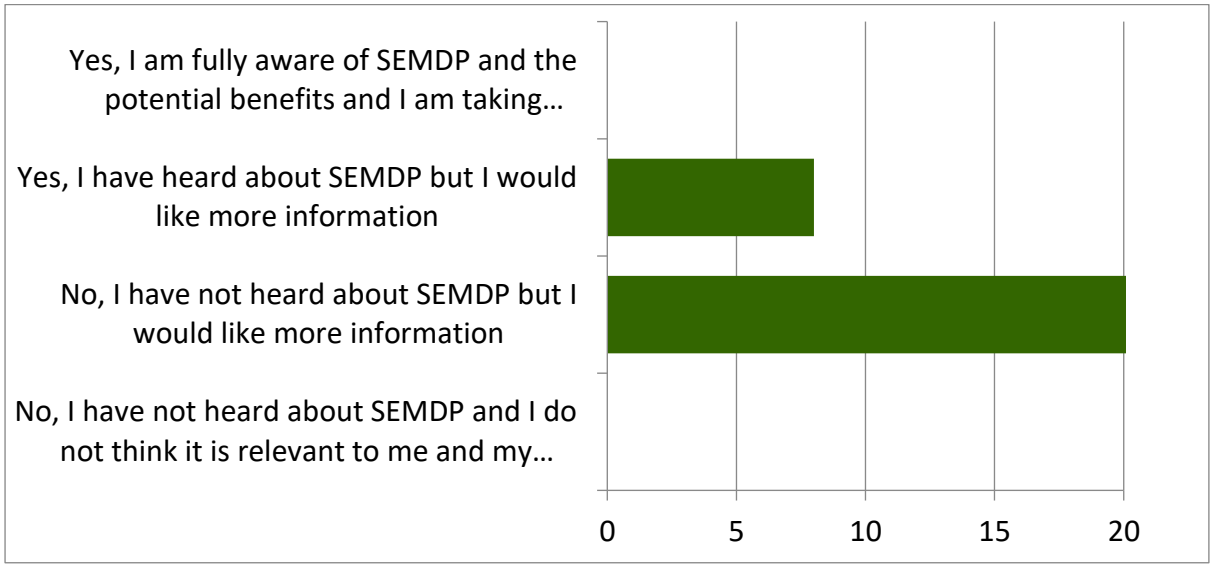

Figure 2: Answers to the question "Have you heard about the WMO Space-based Weather and Climate Extremes Demonstration Project?" as posed to AOMSUC-10 Training Event attendees during session 2 on Tuesday.

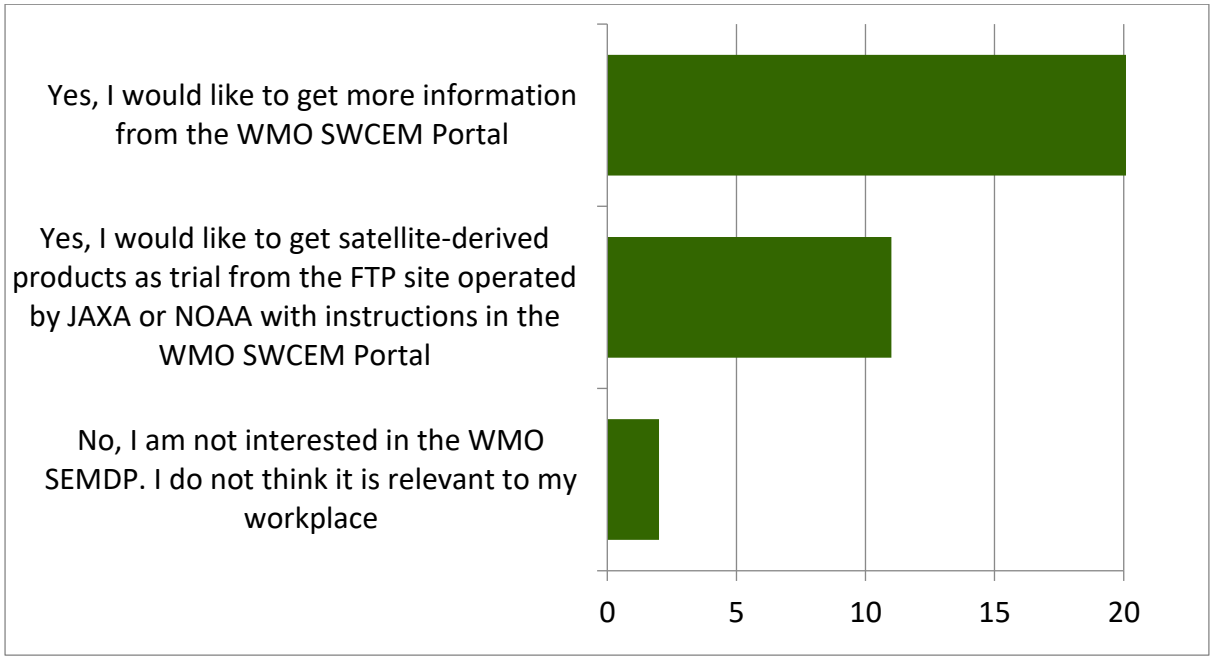

Figure 3: Answers to the question "How would you like to obtain additional information about the WMO SWCEM after the conclusion of AOMSUC-10?" as posed to AOMSUC-10 Training Event attendees during session 2 on Tuesday.

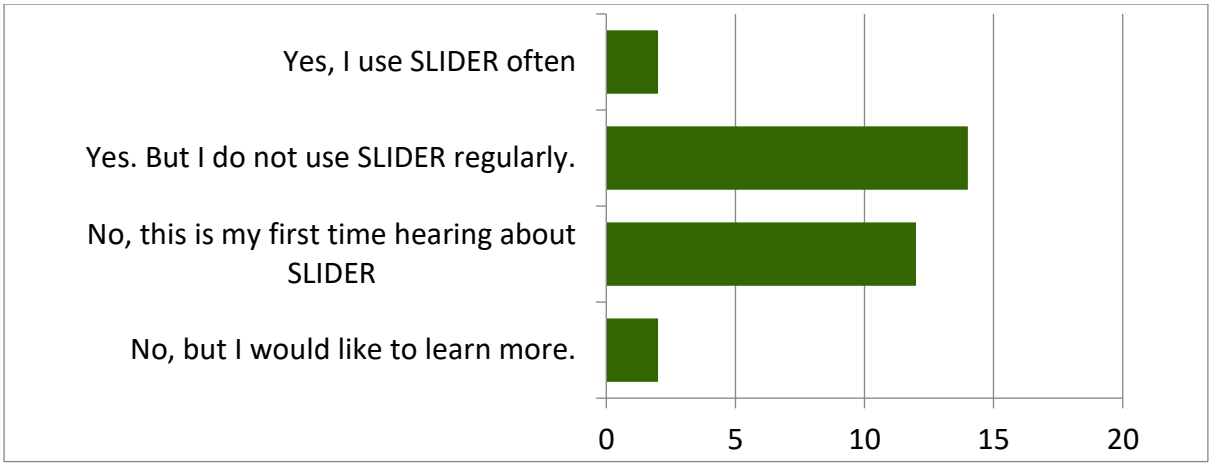

Figure 4: Answers to the question "Have you used the SLIDER satellite viewer (Internet Reference 5) before?" as posed to AOMSUC-10 Training Event attendees during session 8 on Monday.

Related to the computer platform and its capabilities 1. It should be on a GIS platform 2. Ability to load satellite, observational data such as weather RADAR and NWP from the local PC. 3. Job scheduler with automatic download to specific official organization website. 4. Should be able to download the data into geoTIFF format. 5. An easily accessible archive of past data
Display of the data 1. The ability to change the projections of the imagery 2. Ability to rotate the earth within the display window 3. Ability to choose (zoom into) a specific subsector in the display such as a region or a country. 4. Ability to permit "limb viewing" of the atmosphere at the edge of the full disk earth image for satellites other than Himawari-8 5. Rocking animation 6. The slider function that permits side by side comparison of different display layers. See also https://rammb-slider.cira.colostate.edu/ , specifically the Slider option.
Data details revealed 1. Information such as latitude and longitude and the value of the parameters of the display layers to be available whilst scrolling the mouse over the image display. 2. For the "Follow Feature" function on the web site https://rammb-slider.cira.colostate.edu/ one attendee would like to see the latitude and longitude information so that the monitoring of storm and Tropical Cyclone movement can be more accurate.
Data from other satellites 1. Attendees would like to see a display that includes a wide range of satellite data, including GEO-KOMPSAT-2A, Fengyun-4A, the INSAT and polar orbiting satellites.

Creating new composites / manipulating existing composites 1. Ability to create RGB composites using selected bands, image differences and gamma corrections
Multilayered data 1. Weather RADAR overlay 2. Other observational data overlay 3. Cloud drift winds 4. Lightning data that can be superimposed onto visible and infrared data. Lightning data from the GOES satellite. Lightning data over the Indian Ocean 5. Scatterometer (ASCAT) data processed in near real time. 6. Other microwave sensors 7. Addition of Level 2 satellite products (Geophysical quantity retrieved from single instrument data in original instrument projection Note: For example, temperature, humidity, radiative flux see http://www.wmo.int/pages/prog/sat/dataandproducts_en.php) 8. Quantitative Precipitation Estimate (QPE) data 9. Overlaying with NWP model outputs 10. Predefined products (what is meant by this)

Table 3: Answers to the question "What functionality would you most like to see on SLIDER?" as posed to AOMSUC-10 Training Event attendees during session 8 on Monday.

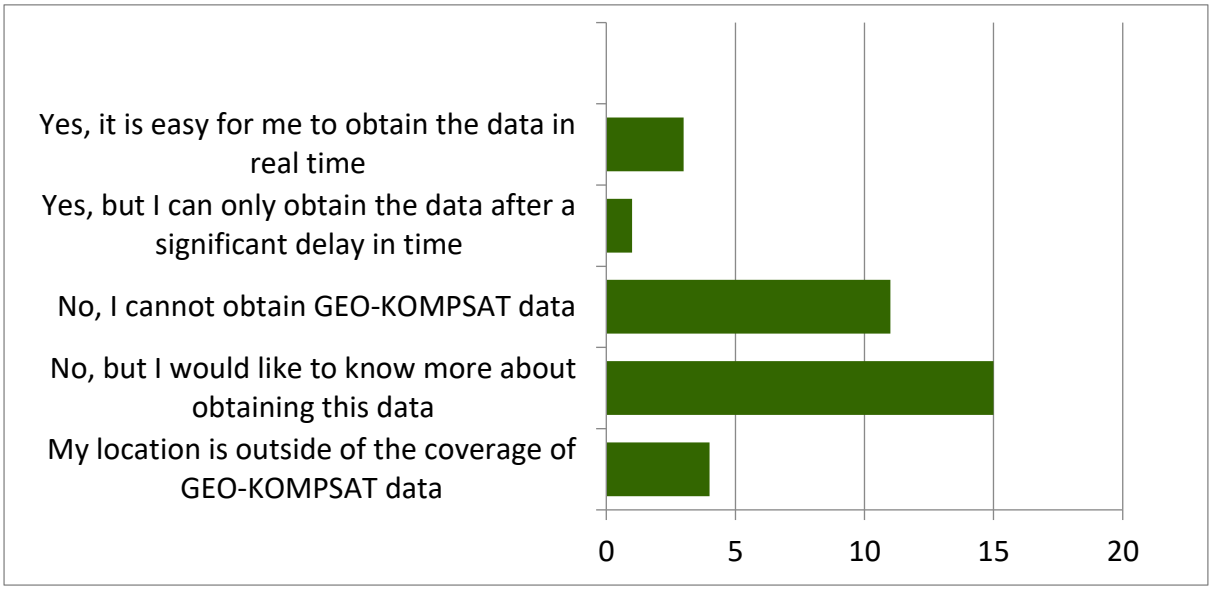

Figure 5: Answers to the question "Have you used GEO-KOMPSAT-2A satellite data?" as posed to AOMSUC-10 Training Event attendees during session 7 on Monday.

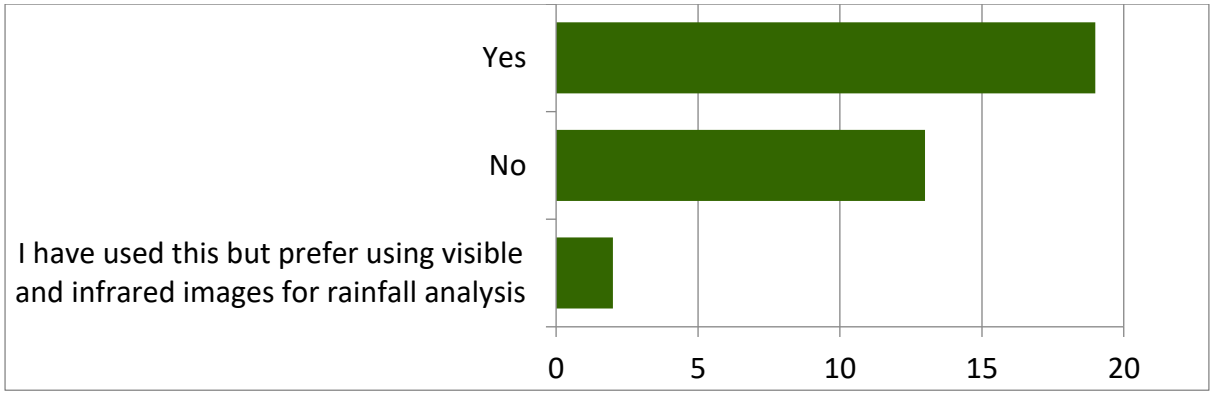

Figure 6: Answers to the question "Have you used rainfall estimation products derived from microwave satellite data?" as posed to AOMSUC-10 Training Event attendees during session 6 on Monday.

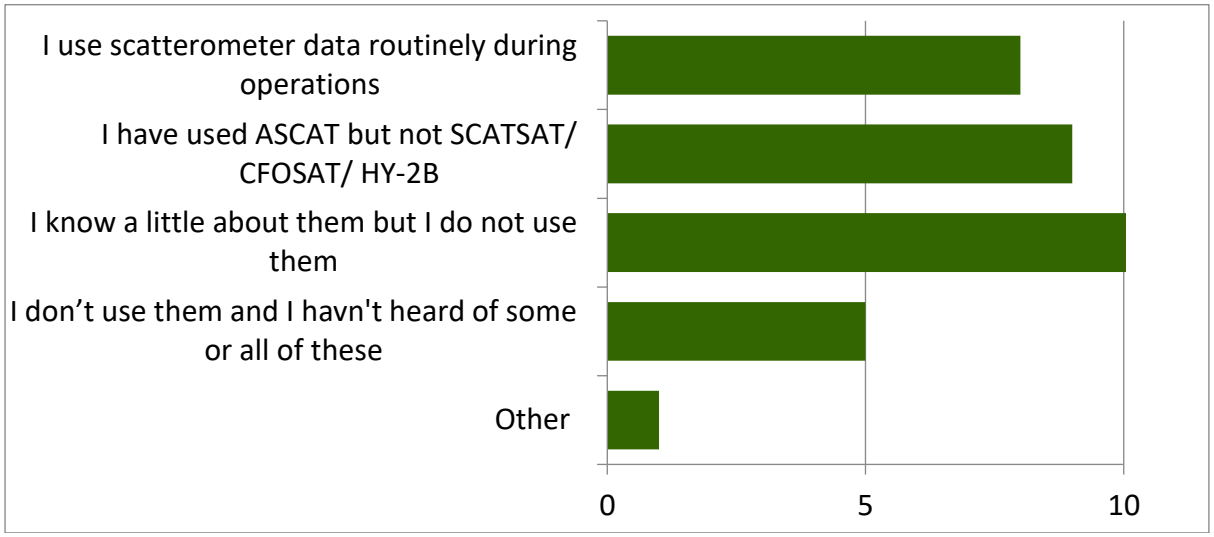

Figure 7: Answers to the question "Which of these statements reflects your understanding and use of scatterometers in your job?" as posed to AOMSUC-10 Training Event attendees during session 4 on Monday.

Appendix 6: attendee feedback regarding the use and availability of RGB composites

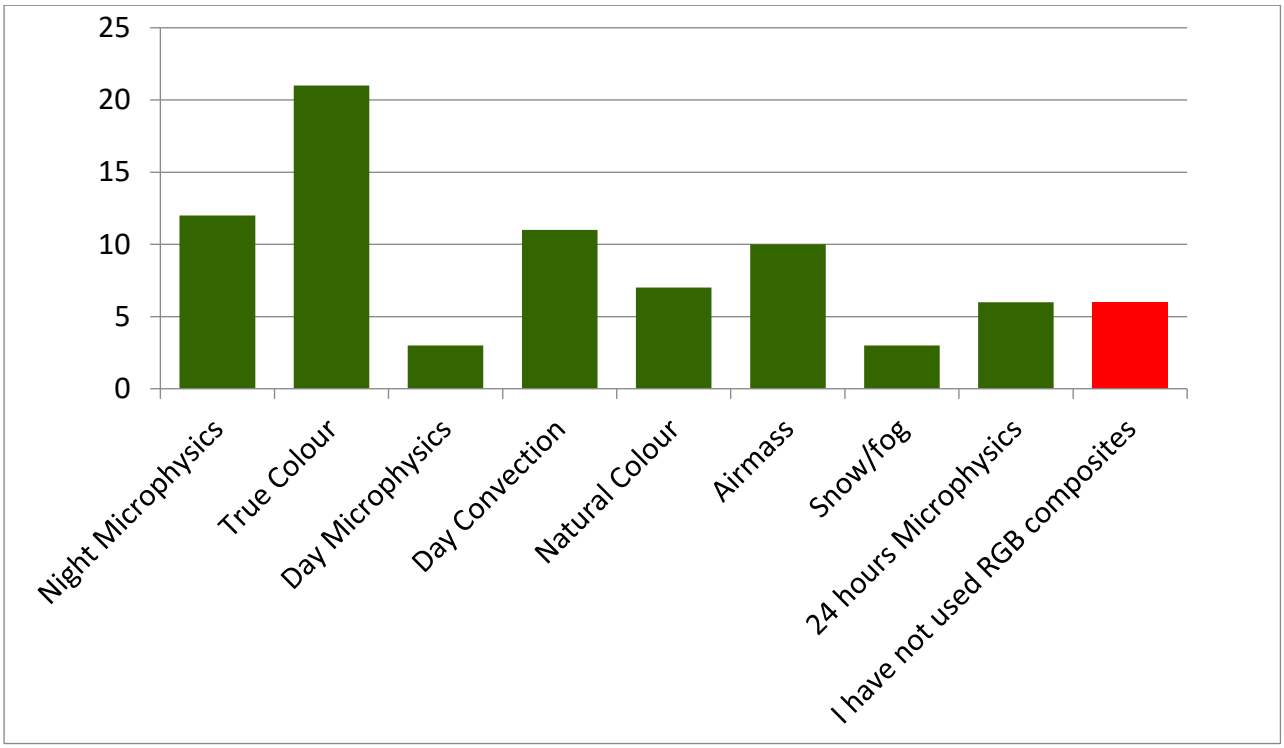

Figure 8a: Answers to the question "Which Red-Green-Blue (RGB) Composites do you use most during your work?" as posed to AOMSUC-10 Training Event attendees during session 3 on Monday.

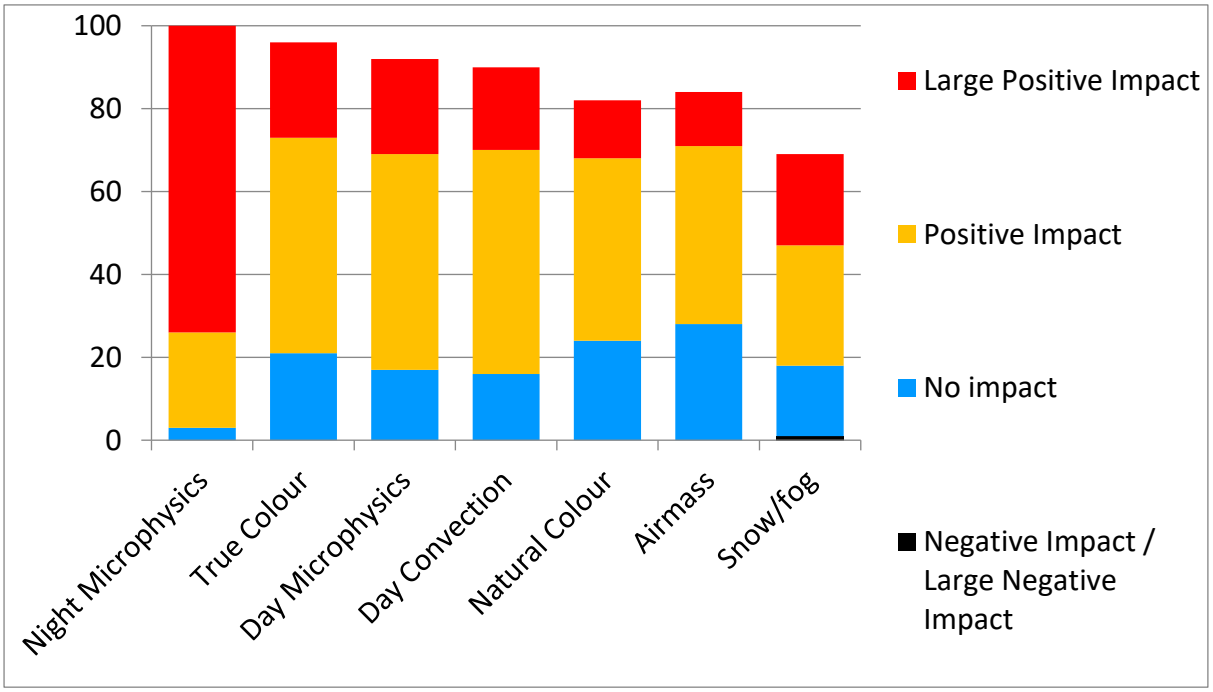

Figure 8b: Question posed to the 115 BOM forecasters in Zeschke et.al 2019a, b: "Evaluate the positive or negative impact of the following Himawari-8 RGB data products on your work at the Bureau"

Resources	Websites
Australian Bureau of Meteorology website	Australian VLab Centre of Excellence National Himawari-8 Training Campaign http://www.virtuallab.bom.gov.au/training/hw-8-training/
BMKG Indonesia website	BMKG Indonesia Satellite Images at https://www.bmkg.go.id/satelit/?lang=EN
China Meteorological Administration website	CMA Fengyun 4A image website at http://rsapp.nsmc.org.cn/geofy/en
EUMETSAT websites	EUMETRAIN website at www.eumetrain.org EUMETRAIN website at http://www.eumetrain.org/RGBguide/rgbs.html EUMETRAIN website at https://eumetview.eumetsat.int/mapviewer/?product=EO:EUM:DAT:MSG:CLM-IODC For METEOSAT 41.5 degrees, METEOSAT 0 degrees and Copernicus Sentinel-3 satellite data
India Meteorology Department website	RGB products over the Indian region at http://foreignsat.imd.gov.in/ (this requires a username and password. In particular it is required that NWFC/IMD be contacted to obtain a username and password to access this site.
Japan Meteorological Agency website	JMA Himawari RGB Training Library at http://www.data.jma.go.jp/mscweb/en/VRL/VLab_RGB/RGBimage.html
United States of America websites	CIRA VISIT website at http://rammb.cira.colostate.edu/training/visit/ CIRA Quick Guides and Quick Briefs http://rammb.cira.colostate.edu/training/visit/quick_reference.asp CIRA Quick Guides http://rammb.cira.colostate.edu/training/visit/quick_guides/ The Satellite Information Familiarization Tool (SIFT) at https://sift.ssec.wisc.edu was recommended to create a new RGB composite or to alter an existing RGB composite. This requires access to GOES-R data or to Himawari HSD or GK2A NetCDF files.

Table 4: Answers to the question "Do you have any RGB composite resources that you would like to advertise to your colleagues?" as posed to AOMSUC-10 Training Event attendees during session 3 on Monday.

Appendix 7: Attendee feedback regarding the use of satellite products in detecting and monitoring severe weather

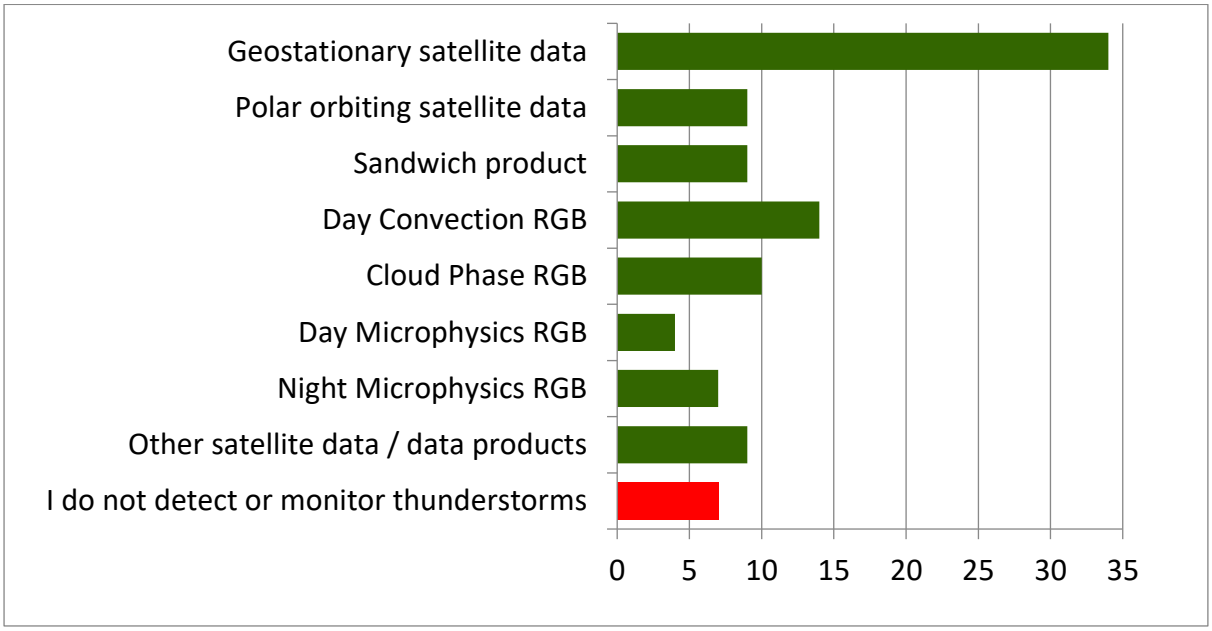

Figure 9: Answers to the question "What satellite data do you use when detecting and monitoring storms? You can choose more than one" as posed to AOMSUC-10 Training Event attendees during session 5 on Monday.

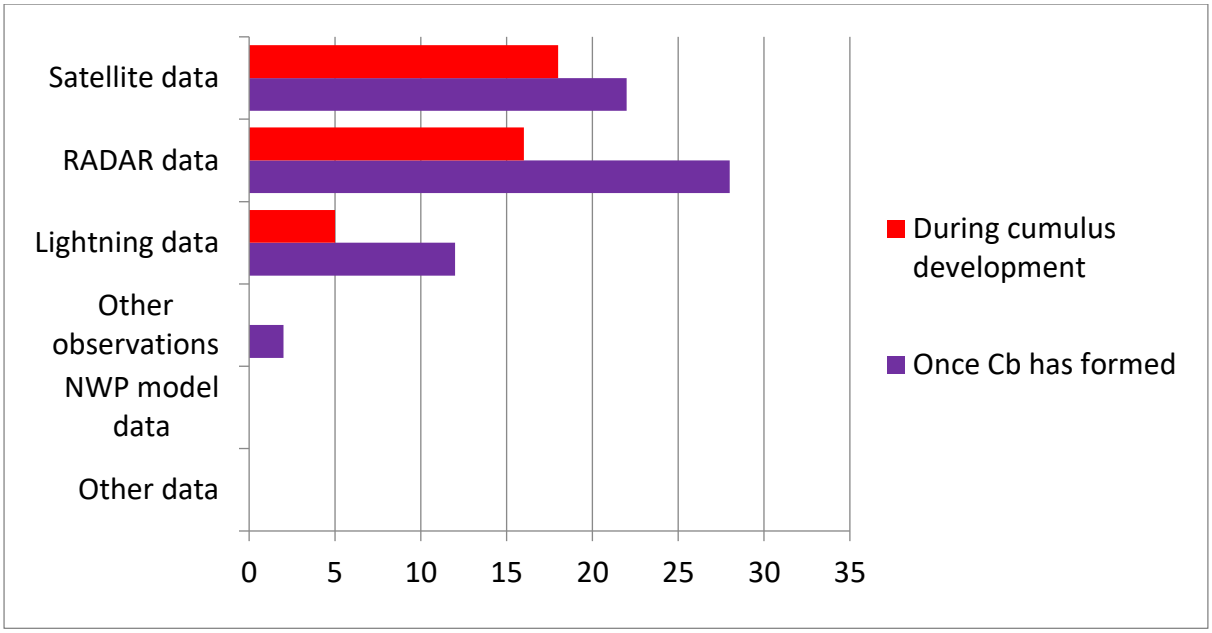

Figure 10: Answers to the questions "What data is most important when you are monitoring the development of cumulus into thunderstorms? You can choose more than one" and "What data is most important when you are monitoring mature thunderstorm? You can choose more than one" as posed to AOMSUC-10 Training Event attendees during session 5 on Monday.

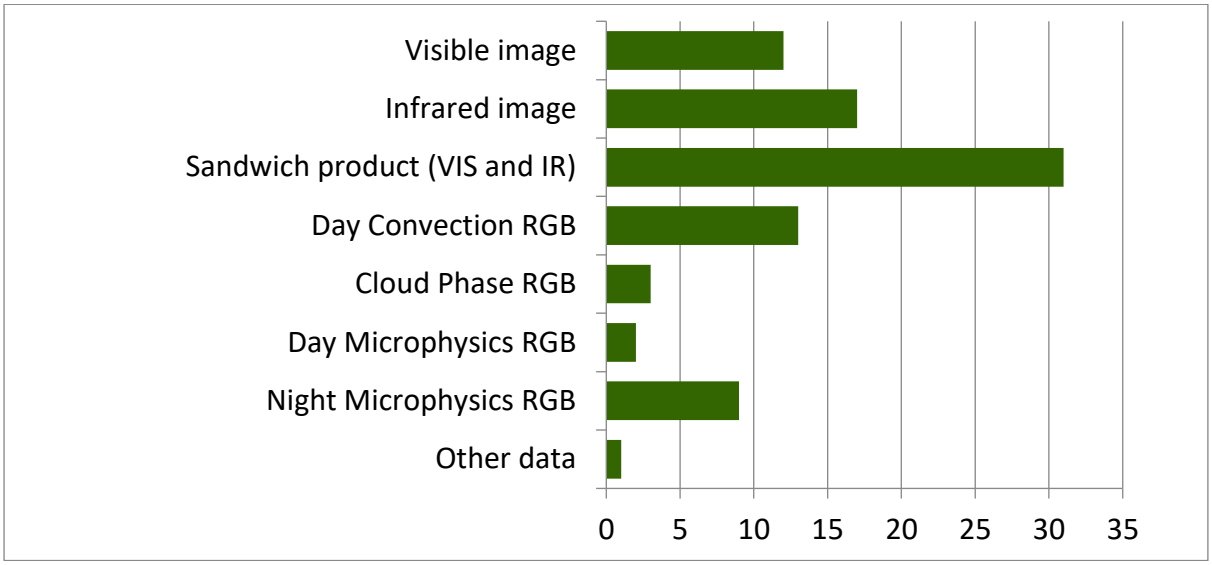

Figure 11: Answers to the question "What satellite imagery do you prefer for monitoring stormtop development of thunderstorms? You can choose more than one" as posed to AOMSUC-10 Training Event attendees during session 5 on Monday.

Appendix 8: Attendee feedback regarding the use of data from multiple satellites

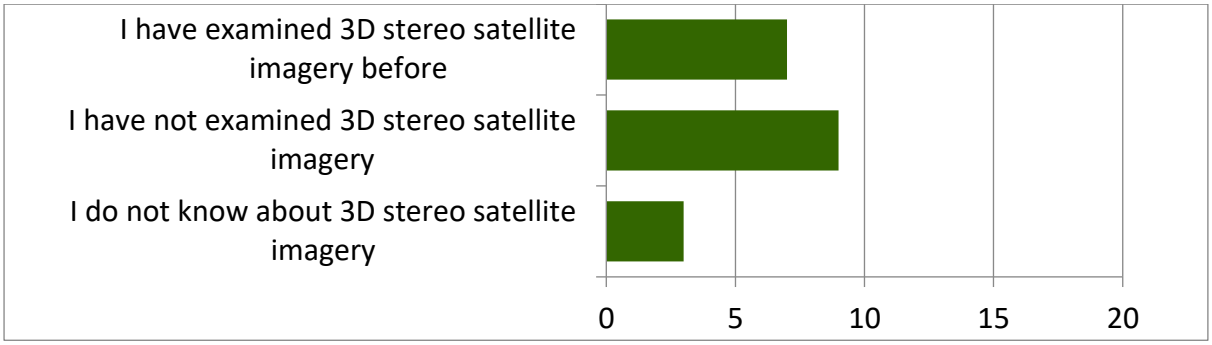

Figure 12: Answers to the question "In terms of the use of data from multiple satellite platforms, which of the categories apply to you" as posed to AOMSUC-10 Training Event attendees during session 8 on Tuesday.

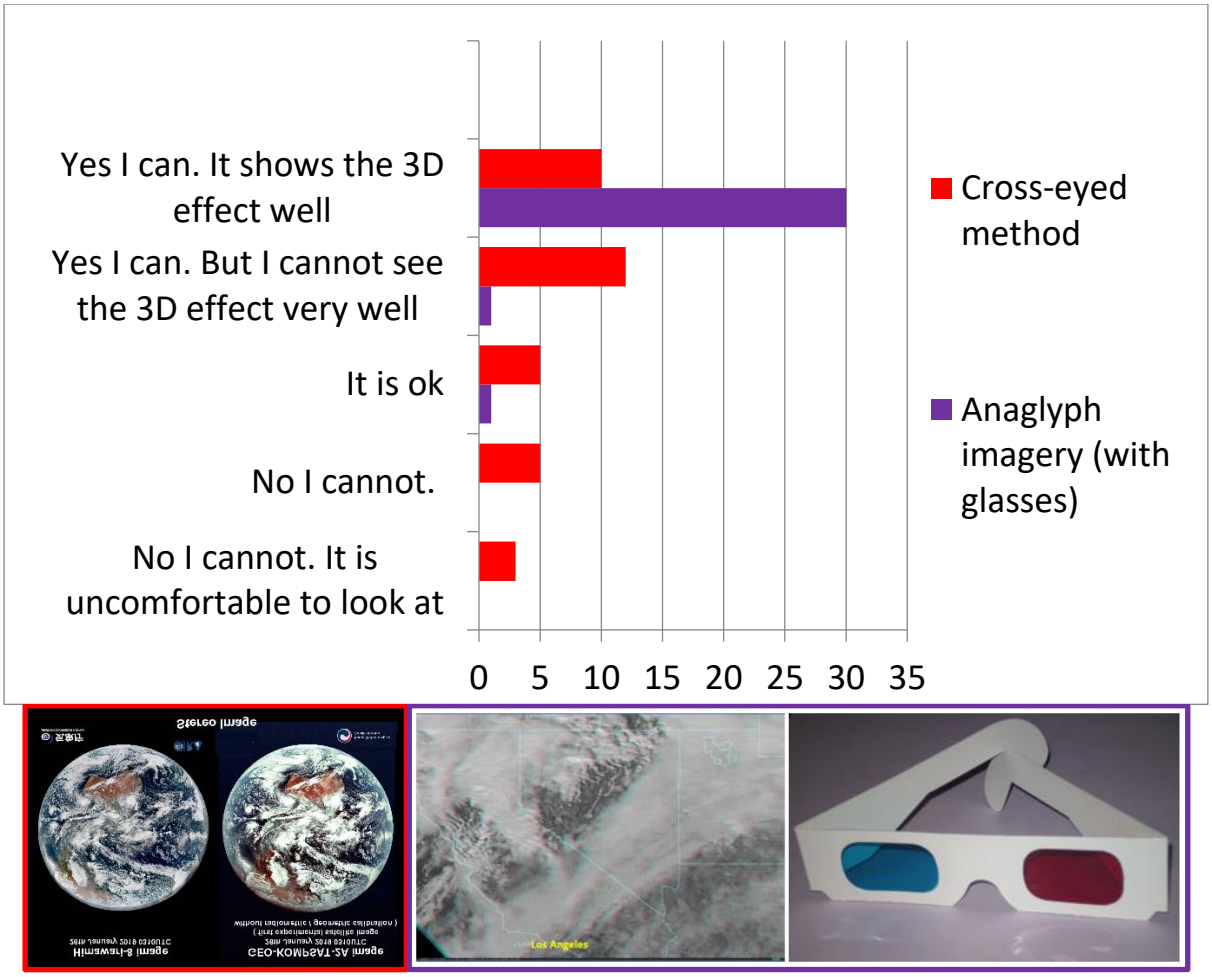

Figure 13a: Answers to the questions "Can you see the 3D rendering of the earth using the cross eyed method?" and "Can you see the 3D rendering of the earth using the anaglyph method?" as posed to AOMSUC-10 Training Event attendees during session 8 on Tuesday. The examples of the 3D rendering of the imagery using the two methods are given in the insets below.

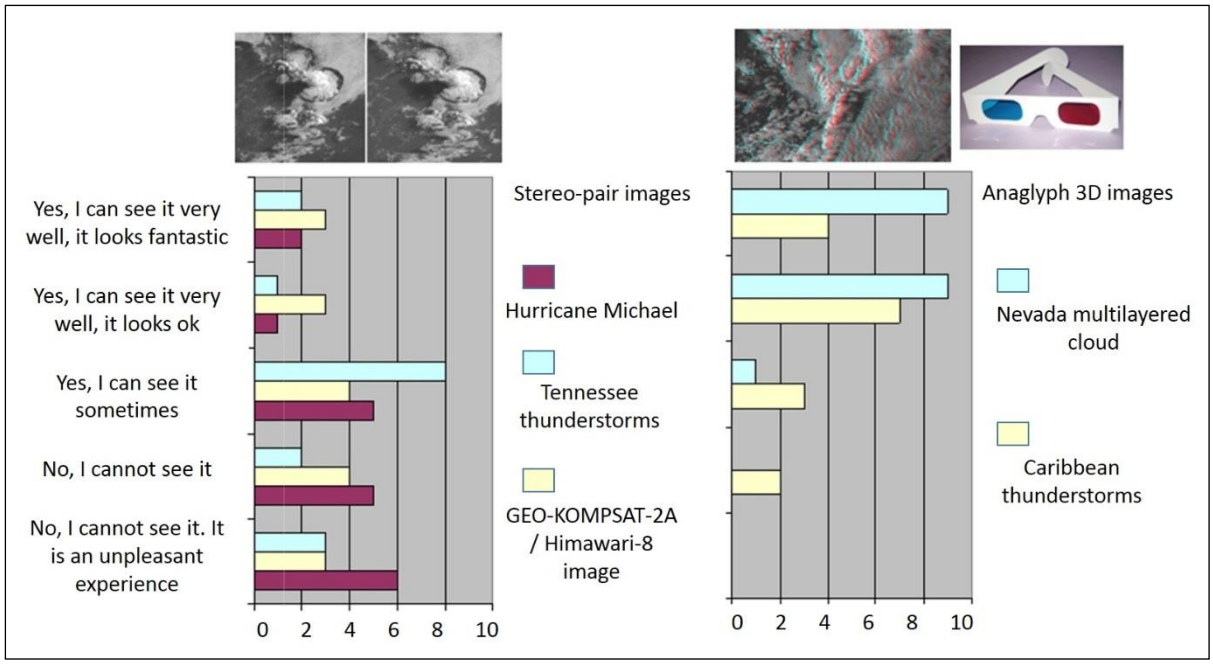

Figure 13b: Participant response to the 3D stereo image exercises, comparing the three stereo-pair (cross eyed viewing method) animation case studies (left) with the two anaglyph 3D case studies (right). Image taken from Figure 8 in Zeschke 2019c.

Appendix 9: Questions pertaining to the activities of the Australian VLab Centre of Excellence, including the Regional Focus Group meetings

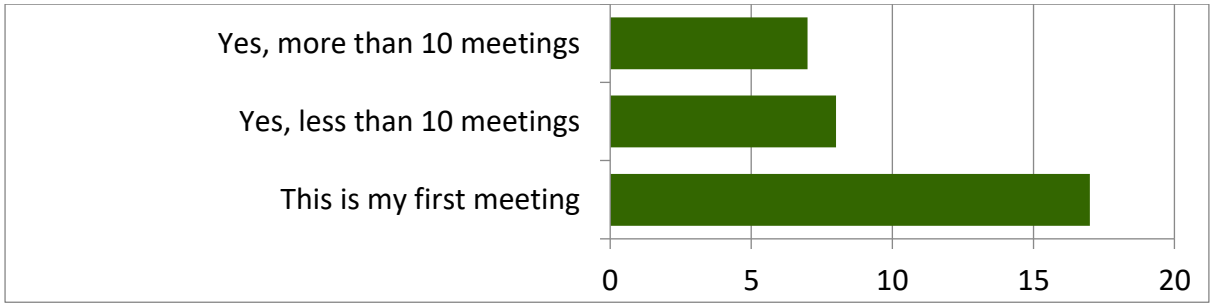

Figure 14: Answers to the question "Have you attended Australian VLab CoE Regional Focus Group meetings previously?" as posed to AOMSUC-10 Training Event attendees during session 7 on Tuesday.

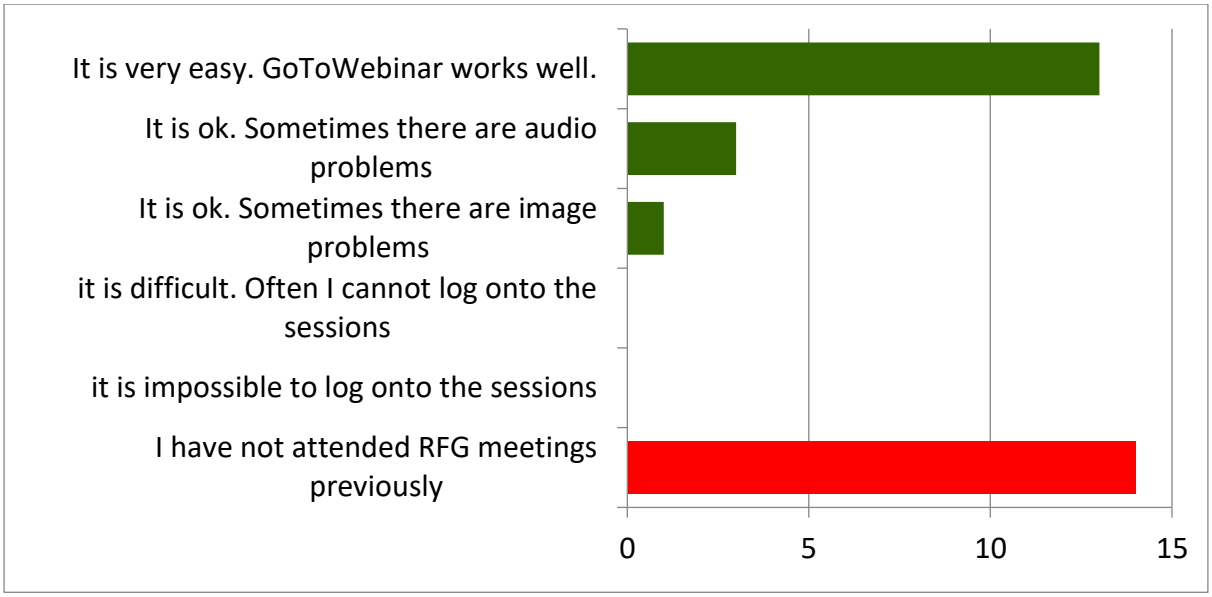

Figure 15: Answers to the question "How easy is it for you to attend Australian VLab CoE Regional Focus Group meetings using GoToWebinar?" as posed to AOMSUC-10 Training Event attendees during session 7 on Tuesday.

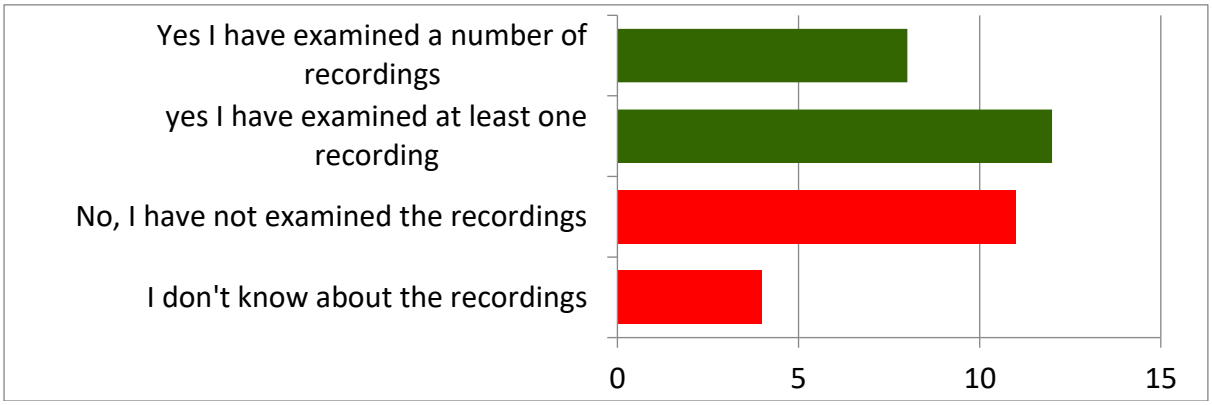

Figure 16: Answers to the question "Have you examined the archived recordings of the Regional Focus Group meetings?" as posed to AOMSUC-10 Training Event attendees during session 6 on Tuesday.

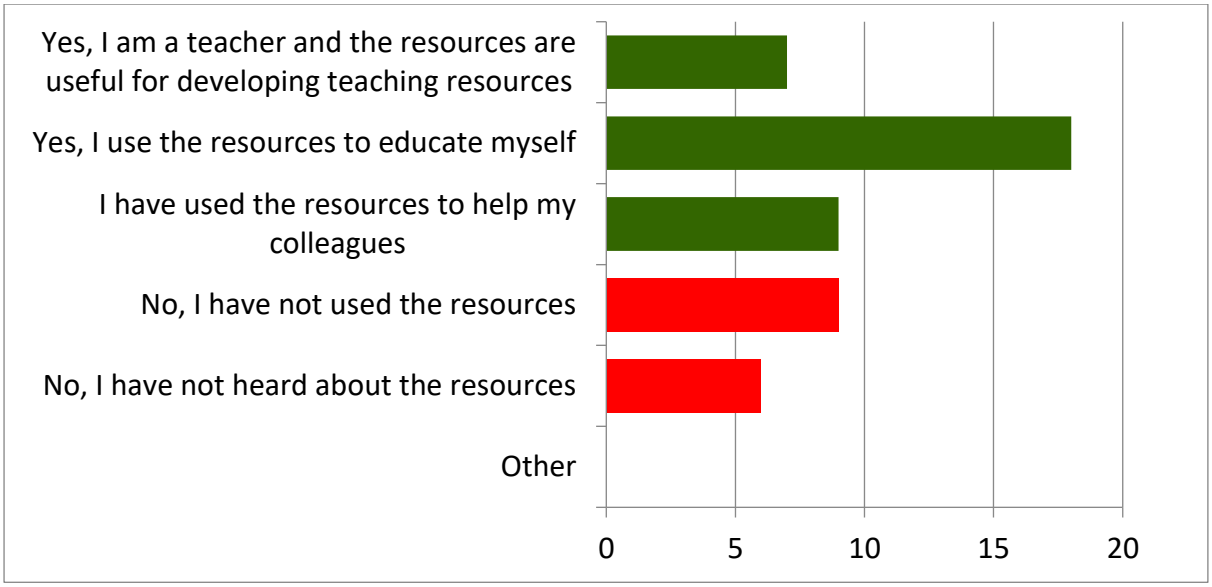

Figure 17: Answers to the question "Have you used Australian VLab Centre of Excellence resources in your work?" as posed to AOMSUC-10 Training Event attendees during session 6 on Tuesday.

Do you think the VLab resources would be useful to you?	Number of attendees responding
Yes	29
Very useful	5
A positive response pertaining to the VLab	1
Neutral	1
No	1 (not in my region)

Table 5: Answers to the question "Do you think the VLab resources would be useful to you?" as posed to AOMSUC-10 Training Event attendees during session 6 on Tuesday.

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Internet Reference 2: Australian VLab Centre of Excellence homepage. [Internet reference http://www.virtuallab.bom.gov.au/]

Internet Reference 3: Australian VLab Centre of Excellence Regional Focus Group Discussion Recordings. [Internet reference http://www.virtuallab.bom.gov.au/archive/regional-focus-group-recordings/]

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