

CMUG Deliverable

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Climate Modelling User Group

Deliverable 6.2

Promotion Package

Centres providing input: MOHC

Version	Date	Comment
2.0	26 May 2016	For ESA comment



Max-Planck-Institut
für Meteorologie



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CMUG Promotion Package

1 Introduction

CMUG's mission is to place a climate perspective at the centre of ESA's Climate Change Initiative (CCI). It is delivering benefits to climate research through the validation and verification of the CCI's Essential Climate Variable (ECV) datasets, by providing feedback to the ECV teams, and by demonstrating the added value of ECVs above currently available data sets. This outreach report provides an update on how CMUG is demonstrating its methods and results, and the benefits of using CCI data to the global climate modelling and research communities. This version covers the period from the previous promotion package (September 2015) until the end of Phase 2 in June 2017.

Under Phase 2, CMUG partners are updating their Phase 1 assessments of the CCI ECV datasets using climate models and reanalysis against a wide range of user requirements. The research techniques for this include model assimilation, model initialisation, reanalysis, direct comparison and model forcing, and are providing information on Earth system uncertainty, climate processes, and climate change trends. This CMUG work and its results are being communicated to the wider climate research community (CRC), including global and regional climate modellers, reanalysis researchers, climate change impact researchers and others (e.g. mitigation, adaptation research). In addition to this outreach, CMUG is engaging with the CRC to better understand their user requirements to feedback to the ECV teams, and to work with them in using CCI ECV datasets.

2 Strategic overview

Many international initiatives and research projects are using CCI datasets that have benefitted from CMUG validation. Under Phase 2 CMUG is continuing to liaise with key projects and programmes and to further develop these links to promote CCI datasets to their researchers.

CMUG's Phase 1 priority was in contacting key international scientific bodies including WCRP, GEWEX, WGCM, GCOS, WMO, CEOS, CLIVAR and IPCC to make them aware of the benefits of CCI data – and these contacts have been refreshed in Phase 2. CMUG also maintains contact with coordinating bodies such as the ESGF, Obs4MIPs, and CMIP because of their interest in global gridded climate observation datasets. Engaging with Obs4MIPs is of critical importance because of its support role for the modelling experiments (CMIP) in the IPCC assessment cycle. CMUG remains in contact with international climate research projects (e.g. MACC, CORDEX, SOOS) and EC funded research projects (e.g. IS-ENES2, GAIACLIM, PRIMAVERA, EUCLEIA, EUSTACE) to ensure they are kept informed of relevant progress in the CCI. CMUG engagement with the

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precursor research projects for COPERNICUS Climate Change Services (C3S) as well as the developing C3S itself is also a priority goal.

CMUG is maintaining contact with key individuals established in Phase 1 at national climate research institutes and national research projects, including national meteorological services, research institutes and university departments. In Phase 2 it is seen as important for CMUG outreach activities to broaden its engagement with this group of data users. Thirdly, CMUG is talking to the business community with interests in climate and earth system modelling to make them aware of CCI data products and their benefits. Most of this contact is through existing links in CMUG research partners to these groups.

These interactions with users allow CMUG to: demonstrate the value of CCI ECV datasets (including uncertainty and length of record); help understand the specific needs of each of these users; report the user requirements back to the ECV project teams; show users how their requirements are being met, both now and for the future and, to work with users (where possible) in developing research applications for the CCI data.

3 Plan overview

The CMUG partnership comprises ten European research institutes – the Met Office, ECMWF, Météo France, DLR, MPI-M, IPSL, BSC, VUB, ULB and SHMI. This helps ensure that information and research on CCI data products are made available to a large community of scientists, within Europe and also globally.

CMUG has been attending international and national conferences, symposia, project meetings, workshops and seminars to present CMUG results and discuss their application (taking into account the needs and size of the audience or user community). CMUG is actively contributing to new European and global climate science partnerships by offering in-house presentations and contributions to partner's meetings and newsletters. CMUG has organised an annual Integration meeting for the ECV projects to demonstrate their current datasets and supporting research to the CCI, CMUG and a select group of climate experts. The integration meetings also allow expert feedback to the CCI teams. CMUG attends the annual Colocation meetings with ESA and colleagues to agree scientific and technical direction of the CCI and CMUG. Other outreach activities include poster presentations, newsletters, flyers, articles (in other publications), web information, a blog, a forum for users, email bulletins, and webinars. CMUG's work and climate modelling with CCI data are appropriately represented to the C3S teams who are developing the service.

The outcome arising from this outreach and engagement plan is a robust and understandable knowledge of, and familiarity with, CCI datasets, how they are produced, their advantages and benefits, and the results of evaluation work carried out by CMUG regarding their quality and

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characteristics. CMUG is developing, assessing and then communicating in a targeted and responsive way the results of CMUG's scientific analyses to climate modellers, climate data users and the wider climate research community. This approach should ensure that the datasets are exploited fully and that benefits are maximised. This version of the outreach plan reviews and updates the earlier version 1 issued in September 2015 to ensure that the content and means of communication remains timely and effective and that the information needs of the primary target group are met.

4 Plan implementation

4.1 Outreach and Engagement

Appendix 1 describes the main outreach and engagement activities for CMUG over the period September 2015 to the end of June 2017. It names the event, planned type of outreach, steps taken to date, audience and timing for each activity.

4.2 Conferences and Seminars

CMUG has continued engaging with many international annual conferences and meetings on climate research (e.g. [EGU](#), [AGU](#), [Living Planet Symposium](#), [AMS](#)). CMUG is publicising its activities, research results and data products at climate conferences which are attended by a large cross section of the climate modelling and research community. CMUG has been regularly delivering presentations at conferences, for example the AGU conference in December and the AMS conferences in January 2016.

International coordinating bodies and programmes (WMO, WCRP, WOAP, EUMETSAT) hold regular meetings where CMUG scientists have presented programme information and results, either as members of these bodies, or by invitation as experts. CMUG activities were publicised in the UK Space conference in July 2015 and at the EUMETSAT conference in September 2015. Poster presentations were given at the ESMVal tool at the 14th Aerocom Workshop in Italy in October 2015, and at the Global Climate Observing System (GCOS) meeting in the Netherlands in March 2016 (Figure 1).



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CMUG will continue to engage with magazines and publications beyond the specialist climate science journals. For example CMUG was featured in the GERICS¹ (previously HZG) quarterly Climate Services Partnership (CSP) report in July 2015 (see Figure 2). CMUG will continue to seek publication opportunities in relevant publications.

CSP QUARTERLY July 2015

Australian Bureau of Meteorology detects 2015 El Niño
Australian Government Bureau of Meteorology
 The Australian Government Bureau of Meteorology (BOM) announced detection of the return of the El Niño in early June 2015. International climate models that were surveyed by BOM suggest that the tropical Pacific is likely to experience further warming. With this, temperatures of sea surfaces are forecasted to stay above El Niño thresholds for rest of the year.

Typical El Niño characteristics in Australia are associated with below-average winter and spring rainfall over eastern Australia, and above-average daytime temperatures over the southern half of the country. The El Niño's strength however does not directly relate to the strength of its effects on Australia's climate.

BOM explains that most current oceanic and atmospheric indicators are consistent with El Niño patterns. Trade winds have proved to be consistently weaker than average, while the Southern Oscillation Index (SOI) is currently rising, as a result of local weather, as opposed to climate factors.

The past three months have seen the SOI exceeding the El Niño thresholds, averaging at -9.7. The date line was also observed to see more cloudiness, which has seemed to ease towards more normal levels, however, this could be only a short-term development.

The Indian Ocean Dipole (IOD) - a coupled ocean and atmosphere phenomenon that affects the climate of Australia and of other countries surrounding the Indian Ocean basin - is currently neutral. Two out of five

international models on IOD outlooks suggest a positive IOD in late 2015. A positive IOD is usually characterized with both a reduced winter and spring rainfall over parts of southern and central Australia.

Climate Quality Data for Climate Services: ESA's CCI
European Space Agency
 The European Space Agency through its Climate Change Initiative (CCI) is using its extensive satellite observations to create climate quality datasets for use in climate services and climate research.

The CCI is developing 13 datasets for the following essential climate variables: land cover, burnt area, soil moisture (see screenshot below), glaciers and ice caps, ice sheets, sea ice, sea surface temperature, ocean color, sea surface height, greenhouse gases, ozone, aerosols, and clouds. The datasets are available as global, gridded products with uncertainty characterization, and with spans of up to 30 years.

All are freely available and in the future should be operationally supported and available in near real time. The datasets are currently being evaluated for climate quality by the Climate Modelling User Group (CMUG) of the CCI by application in reanalyses, climate modeling studies and model evaluation tools.

The CMUG can be contacted for information about the CCI in general or its potential input to European climate services by emailing Paul van der Linden at: paul.vanderlinden@metoffice.gov.uk or by going to www.esa-cmug-cci.org

Figure 2: CMUG article in GERICS's SCP journal, July 2015.

CMUG will continue to broaden CMUG's target audience by approaching other users of satellite data products to raise awareness and support science exploitation activities (refer to the Scientific Exploitation Report D6.1). These include businesses and consultancies working in the areas of climate risk and hazards, as well as international development agencies who are developing applications based on satellite data.

¹ the German Climate Service Center



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4.3 Newsletters

CMUG issues two newsletters per year aimed at a wide audience, including users of CCI data (see Figure 3). The Newsletter summarises recent developments, key events and project results, and publicises forthcoming CMUG events and outputs. CMUG has also issued a CCI overview newsletter and contributes articles to newsletters of other projects and initiatives, for example see the Climate Services Partnership Newsletter, (the January 2016 edition is available at: <http://www.climate-services.org/about-us/newsletters/>).

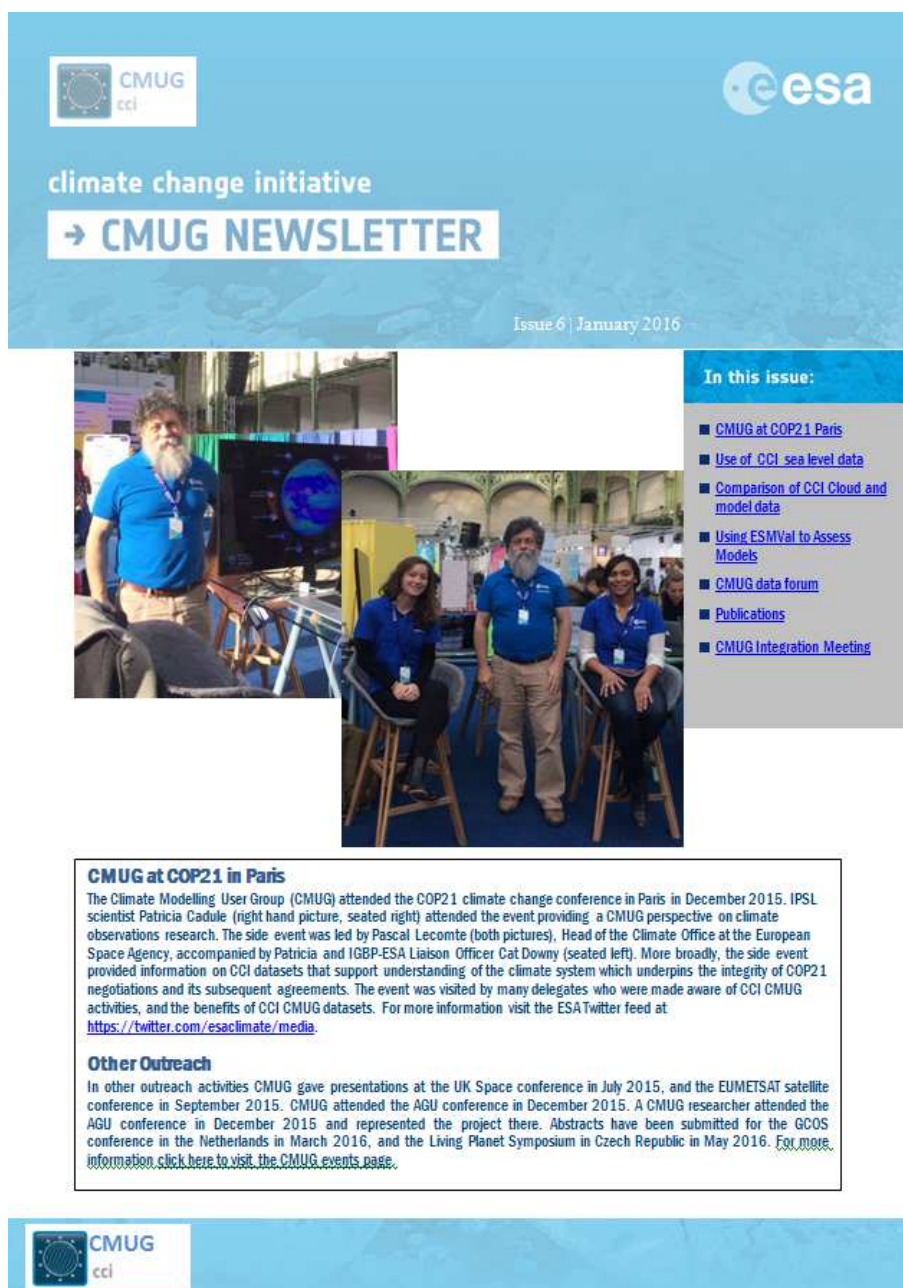


Figure 3: Front page of the January 2016 CMUG newsletter.

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4.4 Website

CMUG continues to maintain and update the main CMUG website with latest news, events, and project documentation: www.esa-cmug-cci.org. The front page draws attention to, and provides links to current CMUG news and events. It also links to dedicated pages for project deliverables, scientific exploitation, media output (newsletters and presentations) and events. The project page provides links to key project deliverables and documentation on, for example, requirements, scientific impacts and quality assessment. The data exploitation page describes the use by the climate modelling and reanalysis research community of the CMUG analysis of the ECV datasets. The Media Output page lists CMUG outreach activities including newsletters, presentations and flyers. The Events page lists details of past and forthcoming meetings and conferences together with CMUG's contribution to them, for example attending project and colocation meetings and giving presentations and poster presentations at conferences. The contact and team page provides information on the CMUG project team.

4.5 Data Forum Refreshed

The CMUG Data Forum was refreshed in January 2016 (www.esa-data-cci.org) with new content and a new design and layout. The Forum aims to be a source of information about the data, and to provide a platform for users to communicate experience and seek assistance from other users. This will distinguish it from the CCI Open Data Portal which will be the primary interface for CCI and other climate datasets when it is launched. It provides supporting information for users of CCI data, such as CMUG validation results of CCI ECV datasets as well as links to the data, and includes features (a blog, a video, showcase and community pages, and information on each ECV's data products) to encourage community participation (see Figure 4). The site also contains links to related sites for Earth observations and modelling data, for example the CEOS-CGMS-WMO ECV inventory and NASA's Earth Observations site.

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esa climate change initiative European Space Agency **Climate Data Forum**

CMUG

CMUG Data Forum

Welcome to the New Look Data Forum which has been relaunched to showcase the work varied out by the Climate Modelling User Group (CMUG) on the validation of ESA's Climate Change Initiative (CCI) datasets, and where the climate modelling community can share experience using CCI data sets. You'll see some fresh content including videos and blogs, and it will link to the CCI's new Data Portal which will go live soon.

New Features

Dr Rogers Saunders, Chief Scientist for CMUG, pictured right, has made a video outlining the benefits of the CMUG-CCI data sets for use in climate modelling, reanalysis, and other applications [here](#). Roger is Head of Satellite Imagery Applications Group at the UK Met Office, and has more than 25 years experience in processing satellite data for imagery, climate and NWP applications and has worked at ESOC, ECMWF and the Met Office on satellite related projects.

Dr Yoko Tsushima, also pictured right, a senior scientist at the Met Office, has written a [blog](#) on the use of the CMUG-CCI cloud satellite data sets for climate modelling. Yoko is working on understanding cloud-radiation fields and feedbacks using satellite observations and global circulation models (GCM), including the development of metrics to assess radiative feedbacks in climate models. She is working on a resolution hierarchy for clouds, precipitation, and radiation models, and is leading the development of a set of cloud metrics for the [EUCLIPSE](#) project.

CCI Data Portal

The refresh of this CMUG Data Forum is in parallel with the development of CCI's new Data Portal which is due to be launched soon.

Contribute

We welcome contributions from modellers, scientists, and others with ideas, suggestions and potential applications for the CMUG datasets. The forum is a good place to publicise your work and network with other climate modellers and scientists.

Get in Touch

Contact the CMUG project office at cmug@metoffice.gov.uk

This website has been tested in IE11, Firefox & Chrome version to follow

Met Office Hadley Centre METEO FRANCE Toujours un temps d'avance SMHI Max-Planck-Institut für Meteorologie Institut Pierre Simon Laplace ECMWF DLR

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Figure 4: CMUG data forum home page.

The forum will continue to be maintained and updated to the end of the project and will complement the new CCI Open Data Portal when it becomes available.

The purpose of the Forum is for sharing and communicating project information on, and applications of, CCI datasets. It includes the following pages:

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- The home page will continue to provide the latest information about the data, and will include links to a user forum and a weblog. Contributions will be requested from the CMUG science team, the CCI science teams, from data users, and applications developers. This is expected to help increase the community of CCI data users, add visibility to ways in which the data are being used, and encourage creativity and innovation for new data applications.
- The Blog is an easily accessible interface for scientists to share ideas in a conversational way without risk of censure.
- A Showcase page with examples of ways in which CCI data are being exploited.
- A Community page where the CMUG user community can share experience and publicise their work with CMUG-CCI data sets.
- An ECV page which will include information on all 13 ECVs on a single page with information on what types of data are available and links to the Data Portal, CMUG evaluation reports, scientific papers, and relevant scientific information.

The blog and video provide engaging and contemporary media to introduce scientists and developers to CCI and CMUG datasets. Subject to approval by ESA, there is potential to run a webinar on CCI and CMUG research, linked to over-arching scientific research topics (such as the Carbon cycle). It is envisaged that these will be hosted by up to three scientists outlining the benefits of using CCI data and developers explaining data applications followed by a question and answer session.

4.6 Data Visualisation Tool

The data visualisation tool developed by Planetary Visions for the CCI is being used to present the 13 CCI datasets in a range of spatial and temporal animations. Figure 5 shows a single day from an animation of modelled global of CO₂ air sea flux produced from the assimilation of CCI Ocean Colour data in to the Met Office's FOAM ocean model. This demonstrates one particular CCI data product used with a specific modelling technique (assimilation) to provide a model based representation of a component of the Earth climate system.

Planetary Visions has continued to work with CMUG to ensure that climate model output which uses CCI datasets (ozone, sea surface height and ocean colour) are included in Planetary Vision's data visualisation package.



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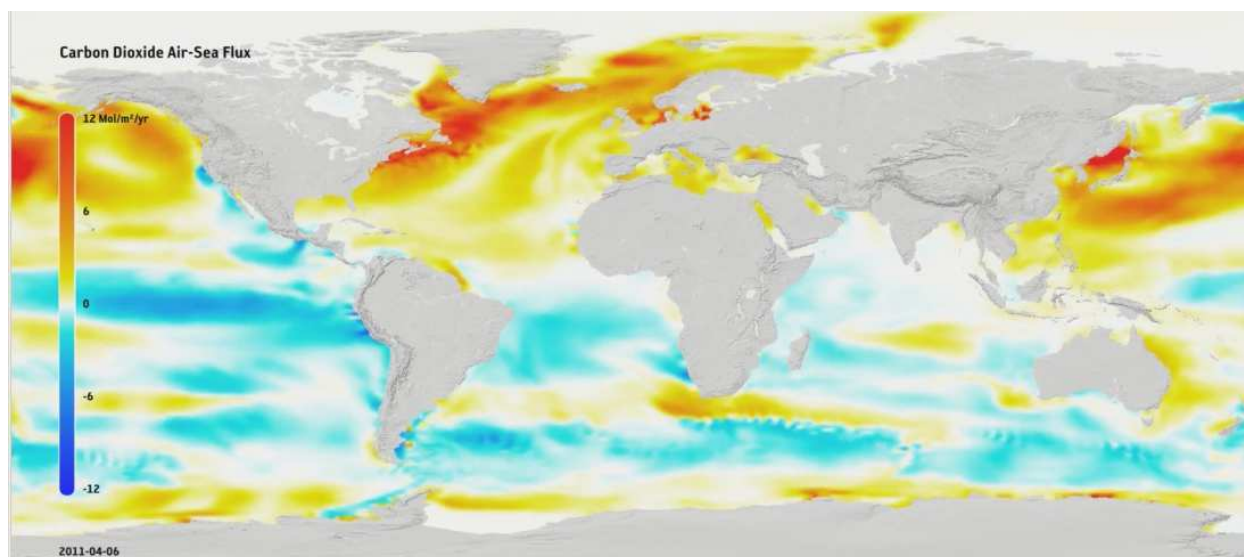


Figure 5: Visualisation of CO₂ Air-Sea Flux data modelled by the Met Office FOAM ocean model with assimilation of CCI OC data. This visualisation is a single day taken from an animation covering the period 1997 to 2012. This visualisation is included in the Planetary Visions visualisation tool as a CMUG product.

4.7 Publications and Papers

CMUG publishes papers on its verification and validation work and encourages others to publish the results of their research on CCI datasets. CMUG publications in Phase 2 so far include those on the length and utility of satellite data records^(1, 2, 3), assimilation into ocean colour and physical biogeochemistry models^(4, 5), and the evaluation of new soil moisture data products⁽⁶⁾. Recent publications include a summary of the development of ESMValTool, a community diagnostic and performance metrics tool for routine evaluation of Earth System Models in CMIP⁽⁷⁾, and assessing surface solar radiation fluxes in the CMIP ensembles⁽⁸⁾.

Future topics include coupled atmosphere and land surface models, sea ice models, and the use of CCI data for validating climate reanalysis. Two CMUG papers are currently in preparation, one is a comparative analysis of the assimilation of UV nadir-backscatter and infrared limb-emission ozone data, and one assesses ozone round-robin assimilation experiments in preparation for the ERA5 reanalysis.

1. Merchant, C. J., Embury, O., Rayner, N. A., Berry, D. I., Corlett, G. K., Lean, K., ... Saunders, R. (2012). A 20 year independent record of sea surface temperature for climate from Along-Track Scanning Radiometers. *Journal of Geophysical Research*, 117(C12), C12013. doi:10.1029/2012JC008400
2. Hollmann R., C.J. Merchant, R. Saunders, C. Downy, M. Buchwitz, A. Cazenave, E. Chuvieco, P. Defourny, G. de Leeuw, R. Forsberg, T. Holzer-Popp, F. Paul, S. Sandven, S. Sathyendranath, M. van Roozendael, W. Wagner: 2013: The ESA Climate Change Initiative: satellite data records for essential climate variables. *Bulletin of the American Meteorological Society*. doi: 10.1175/BAMS-D-11-00254.1

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3. Loew, A., 2013. *Terrestrial satellite records for climate studies: how long is long enough? A test case for the Sahel*. *Theor. Appl. Climatol.*, DOI 10.1007/s00704-013-0880-6.
4. Ford D. A., K. P. Edwards, D. Lea, R. M. Barciela, M. J. Martin, and J. Demaria *Ocean Sci. Discuss.*, 2012: *Assimilating GlobColour ocean colour data into a pre-operational physical-biogeochemical model*, 2012. *Ocean Sci. Discuss.*, 9, 687–744, 2012, www.ocean-sci-discuss.net/9/687/2012/ doi:10.5194/osd-9-687-2012.
5. Sevault E, Somot S, Alias A, Dubois C, Lebeaupin-Brossier C, Nabat P, Adloff F, De Que M & Decharme B, 2015, *A fully coupled Mediterranean regional climate system model: design and evaluation of the ocean component for the 1980-2012 period*, *Tellus A*, [S.I.], Nov. 2014. ISSN 1600-0870. doi:10.3402/tellusa.v66.23967
6. Loew, A., Stacke, T., Dorigo, W., de Jeu, R., & Hagemann, S. (2013). *Potential and limitations of multi-decadal satellite soil moisture observations for selected climate model evaluation studies*. *Hydrology and Earth System Sciences*, 17(9), 3523–3542. doi:10.5194/hess-17-3523-2013
7. Eyring, V., Righi, M., Evaldsson, M., Lauer, A., Wenzel, S., Jones, C., Anav, A., Andrews, O., Cionni, I., Davin, E. L., Deser, C., Ehbrecht, C., Friedlingstein, P., Gleckler, P., Gottschaldt, K.-D., Hagemann, S., Juckes, M., Kindermann, S., Krasting, J., Kunert, D., Levine, R., Loew, A., Mäkelä, J., Martin, G., Mason, E., Phillips, A., Read, S., Rio, C., Roehrig, R., Senftleben, D., Sterl, A., van Ulft, L. H., Walton, J., Wang, S., and Williams, K. D.: *ESMValTool (v1.0) - a community diagnostic and performance metrics tool for routine evaluation of Earth System Models in CMIP*, *Geosci. Model Dev. Discuss.*, 8, 7541-7661, doi:10.5194/gmdd-8-7541-2015, 2015. (Under Review).
8. Loew, A. et al., 2016: *Assessing surface solar radiation fluxes in the CMIP ensembles*. *Journal of Climate*, in press)

CMUG is contributing to the CCI overview paper and will also bring to the fore any research in CMUG papers that is relevant for the next IPCC assessment.

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5 Monitoring for effectiveness

To ensure that the CMUG outreach and engagement activities are focused on appropriate audiences and are reaching them effectively, monitoring and adjustment of the activities from feedback is carried out. Activities include: (1) informal interviews with scientists after CMUG presentations at conferences and workshops; (2) personal feedback through the blog and forum on the data website; (3) compilation of statistics on the web interactions and page hits; (4) numbers of researchers subscribed to the CMUG newsletter distribution group; (5) internal institutional reviews on programme effectiveness; (6) numbers of CCI datasets that are taken up in research projects or elsewhere following CMUG interactions; and (7) number of citations of CMUG peer-reviewed papers. These metrics have been discussed at CMUG management meetings and the most appropriate activities were selected. Updates to this report will incorporate the changes directed by the CMUG management team.

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**Appendix 1: CMUG proposed outreach activity 2015-17**

The table below describes outreach and engagement activities for CMUG (past and planned) from July 2015 to June 2017. It includes the event, timing, location, planned type of outreach, steps taken, and the audience for each outreach activity.

	Event	Date	Location	Activity	Progress	Audience
1.	UK Space Conference	3-15 Jul 2015	Liverpool, UK	Presentation of CCI and CMUG results	Completed	Remote sensing and Earth observations experts in UK
2.	Overview CMUG newsletter	July 2015	NA	Showcase CMUG research in newsletter	Completed	Ministers and science funders
3.	Monthly blog for data forum	August 2015	NA	Topic: uncertainty in the CCI	-	Climate modellers, reanalysis, climate researchers
4.	IPCC-Workshop "Regional Climate Projections and their Use in Impacts and Risk Analysis Studies"	15-18 Sept 2015	São José dos Campos, Brazil	Interaction	-	Regional climate modellers, and climate change impact modellers
5.	EUMETSAT Met Satellite Conference	21-25 Sept 2015	Toulouse, France	Presentation	CMUG participation	nowcasting and short-range NWP
6.	Restructure Data Forum to create three main pages.	Sept 2015	NA	Development	Completed	Climate Modelling Community
7.	Monthly blog for data forum	Sept 2015	NA	Topic: climate quality in the CCI	-	Climate modellers, reanalysis, climate researchers
8.	CCI Collocation meeting	29 Sept – 1 Oct 2015	ESRIN, Italy	Two CMUG presentations and interactions	Completed	CCI research teams
9.	GAIA CLIM Workshop	6 Oct 2015	Rome, Italy	CMUG Participation	Completed	H2020 project meeting on ECV gap analysis
10.	Develop CMUG Data Forum: forum and weblog	Oct 2015	NA	Launch forum and revised website	Completed in January 2016	Climate modellers, reanalysis, climate researchers
11.	Monthly blog for data forum	Oct 2015	NA	Topic: consistency	No blogger identified	Climate modellers, reanalysis, climate

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				in the CCI		researchers
12.	AeroCOM/CCMI/ AerChemMIP meeting	7-9 Oct 2015	Frascati, Italy	CMUG Participation	-	Aerosol observations and modellers
13.	WGCM meeting / CMIP Analysis Workshop	18-23 Oct 2015	Dubrovnik Croatia	CMUG Participation	-	Global climate modellers
14.	CRESCENDO- PRIMAVERA Kick-Off Meeting	23-27 Nov 2015	Exeter, UK	CMUG Participation	Completed	H2020 project High resolution modellers
15.	Invite users to contribute to the weblog, science videos and/or webinar.	Nov 2015 & ongoing	NA	CMUG Outreach	Completed	Scientists and Developers
16.	Monthly blog for data forum	Nov 2015	NA	Topic: long data series in the CCI	None identified	Climate modellers, reanalysis, climate researchers
17.	COP-21	30 Nov -11 Dec 2015	Paris, France	CMUG Participation	Attended ESA side event	Climate change policymakers
18.	AGU	14-18 Dec 2015	San Francisco, USA	CMUG Participation	-	Climate researchers
19.	Publicise and create new links to the CCI Data Portal when it becomes available.	Nov 2015	NA	CMUG Outreach	CCI Data Portal not available	Climate Modelling Community
20.	Plan webinar. Invite users to contribute to data forum and to share experience.	Dec 2015	NA	CMUG Outreach	Plans for webinar put on hold because lead scientist too busy.	Climate modelling community
21.	Monthly blog for data forum	Dec 2015	NA	Topic: using CCI data in models	Completed, went live in Jan 2016.	Climate modellers, reanalysis, climate researchers
22.	CMUG newsletter number 6	Dec 2015	NA	Showcase CMUG research in newsletter	Issue 6 released in Jan 2016	Climate research community
23.	American Meteorological Society	10-14 Jan	New Orleans,	CMUG	ECMWF attended	<i>Earth System Science</i>

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	(AMS)	2016	USA	Presentation	for CMUG	<i>in Service to Society</i>
24.	Publish contributions to weblog and/or videos. Publicise forthcoming webinar.	Jan 2016	NA	CMUG Outreach	Blog & video went live Jan 2016. Webinar put on hold because lead scientist too busy.	Climate modelling community
25.	Monthly blog for data forum	Jan 2016	NA	Topic: the CMF tool	Data Forum refreshed with blog and video in Jan 2016	Climate modellers, reanalysis, climate researchers
26.	Seek feedback from user community on Data Forum content and style changes.	Feb 2016	NA	CMUG Outreach	Feedback sought on website.	Climate modelling community
27.	Monthly blog for data forum	Feb 2016	NA	Topic: CMUG results	Planned (in March)	Climate modellers, reanalysis, climate researchers
28.	GCOS Conference	2-4 Mar 2016	Amsterdam, Netherlands	TBD	CMUG poster	Climate and ocean variability, predictability, and change
29.	Run first webinar on Data Forum.	Mar 2016	NA	CMUG Outreach	Postponed, lead scientist too busy	Climate modelling community
30.	CMUG Integration meeting	14-16 Mar	LMU, Munich, Germany	CMUG lead	In preparation	CCI research projects and key experts
31.	Monthly blog for data forum	March 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
32.	EGU meeting	17-22 April 2016	Vienna, Austria	CMUG Participation	Planned	Earth observations, climate change, climate modelling
33.	Monthly blog for data forum	April 2016	NA	Topic: The ESMVal tool	Planned	Climate modellers, reanalysis, climate researchers
34.	Living Planet Symposium	9-13 May	Prague, Czech	CMUG Participation	Planned	review of ESA's Earth observation work

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		2016	Republic			
35.	Monthly blog for data forum	May 2016	NA	Topic: using CCI data in reanalysis	Planned	Climate modellers, reanalysis, climate researchers
36.	CMUG newsletter number 7	June 2016	NA	Showcase CMUG research in newsletter	Planned	Climate research community
37.	Monthly blog for data forum	June 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
38.	Webinar	June 2016	NA	TBD	TBD	Climate modellers, reanalysis, climate researchers
39.	Monthly blog for data forum	July 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
40.	Survey businesses and consultancies regarding CCI data use	Aug 2016	NA	TBD	Planned	Businesses and consultancies
41.	Monthly blog for data forum	Aug 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
42.	Special Issue Journal Paper	Sep 2016		Topic TBD	Planned	Climate modellers, reanalysis, climate researchers
43.	Monthly blog for data forum	Sep 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
44.	EUMETSAT Met Satellite Conference	26-30 Sep 2016	Darmstadt, Germany	CMUG Participation	Planned	Climate modellers, reanalysis, climate researchers
45.	Monthly blog for data forum	Oct 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
46.	Monthly blog for data forum	Nov 2016	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
47.	AGU	12-16 Dec 2016	San Francisco, USA	CMUG Participation	TBD	Climate modellers, reanalysis, climate researchers
48.	Monthly blog for data	Dec	NA	Topic:	Planned	Climate modellers,

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	forum	2016		CMUG results		reanalysis, climate researchers
49.	Webinar	Jan 2016	NA	CMUG Outreach	Planned	Climate modelling community
50.	Monthly blog for data forum	Jan 2017	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
51.	AMS	22-26 Jan 2017	Seattle, USA	CMUG Participation	20 April closing date for proposals	Climate modellers, reanalysis, climate researchers
52.	Newsletter number 8	Jan 2017	NA	Showcase CMUG research in newsletter	Planned	Climate research community
53.	Scientific Exploitation Report v3	Feb 2017	NA	CMUG Outreach	Planned	Climate research community
54.	Monthly blog for data forum	Feb 2017	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
55.	CMUG Integration meeting	Mar 2017	TBD	CMUG lead	Planned	CCI research projects and key experts
56.	Monthly blog for data forum	Mar 2017	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
57.	Monthly blog for data forum	Apr 2017	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
58.	Living Planet Symposium	May 2017	TBD	CMUG Participation	Planned	Climate modellers, reanalysis, climate researchers
60.	Monthly blog for data forum	May 2017	NA	Topic: CMUG results	Planned	Climate modellers, reanalysis, climate researchers
61.	Newsletter number 9	June 2017	NA	Showcase CMUG research in newsletter	Planned	Climate modellers, reanalysis, climate researchers

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**Appendix 2: List of acronyms and names**

C3S	Copernicus Climate Change Services
CCI	Climate Change Initiative
CRC	Climate research community
CEOS	Climate and Earth Observation System
CGMS	Coordination Group for Meteorological Satellites
CLIPC	Climate Information Platform for Copernicus
CMIP	Coupled Model Intercomparison Project
CMUG	Climate Modelling User Group
CORE-CLIMAX	Coordinating Earth observation data validation for re-analysis for climate services
DLR	German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt)
ECMWF	European Centre for Medium-Range Weather Forecasts
ECV	Essential Climate Variable
ESA	European Space Agency
EUCLEIA	EUropean CLimate and weather Events: Interpretation and Attribution
GAIACLIM	Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring
GCOS	Global Climate Observing System
IPCC	Intergovernmental Panel on Climate Change
IS-ENES2	Infrastructure for the European Network of Earth System Modelling
MACC	Modelling Atmospheric Composition and Climate
MIP	Model Intercomparison Project
NCAR/UCAR	National Center (University Corporation) for Atmospheric Research
Obs4MIPs	Observations for Model Intercomparison Projects
PRIMAVERA	PR ocess-based climate sIM ulation: AdV ances in high-resolution modelling and EU ropean climate R isk A ssessment
QA4ECV	Quality Assurance for ECVs
SOOS	Southern Ocean Observing System
UERRA	Uncertainties in ensembles of regional reanalyses
WCRP	World Climate Research Program
WMO	World Meteorology Organisation