



Notre réf.: 02573/2023/S/CS

21 février 2023

Annexes: 4 (disponibles en anglais uniquement)

Objet: Document de réflexion sur la mise en place d'un centre climatique régional pour le sud-ouest de l'océan Indien

Suite à donner: Donner son avis sur le document de réflexion mentionné en objet et remplir les tableaux des annexes 2 et 3, de préférence d'ici le **28 février 2023**.

Madame, Monsieur,

L'Organisation météorologique mondiale (OMM) encourage la conception et la mise en place, dans le monde entier, de centres climatologiques régionaux (CCR) et de CCR en réseau. Ces établissements sont des centres d'excellence qui créent des produits à vocation régionale, notamment des prévisions à longue échéance, des données de surveillance du climat et des données climatologiques à l'appui des activités menées dans ce domaine au plan régional et national. Ils renforcent ainsi la capacité des Membres de l'OMM de fournir de meilleurs services climatologiques aux utilisateurs nationaux. Par ailleurs, les CCR en réseau de l'OMM jouent un rôle fondamental dans la mise en œuvre du Système d'information sur les services climatologiques (SISC) au niveau régional.

Lors de sa dix-septième session, le Conseil régional I a adopté la [résolution 6 \(RA I-17\)](#) – Mise en œuvre du Système d'information sur les services climatologiques à l'échelle régionale, et, partant, une approche régionale pour le SISC, articulée autour de sept domaines géographiques, dont le sud-ouest de l'océan Indien. Une telle approche offrira d'excellentes possibilités de constitution de réseaux et de mise en commun des capacités des Services météorologiques et hydrologiques nationaux et permettra ainsi à ces derniers de fournir tous les services climatologiques requis pour répondre aux besoins nationaux.

Par conséquent, l'OMM a engagé des démarches en vue de la création d'un CCR pour le sud-ouest de l'océan Indien. À cette fin, en 2022, le Secrétariat de l'OMM a mené une enquête auprès des Membres de cette région afin d'évaluer leur intérêt à participer à un tel CCR et leurs capacités d'y contribuer. Il a ensuite organisé un atelier de cadrage en ligne sur la mise en place d'un CCR en réseau pour le sud-ouest de l'océan Indien, avec le soutien de l'Équipe d'experts pour l'exploitation du Système d'information sur les services climatologiques (ET-CSISO) relevant de la Commission des services et applications se rapportant au temps, au climat, à l'eau et à l'environnement (SERCOM). Un document de réflexion sur la mise en place d'un CCR dans la région a été élaboré sur la base des résultats de l'enquête et de l'atelier de cadrage. La proposition de CCR en réseau qui y figure repose sur des responsabilités fonctionnelles ainsi que sur l'intérêt des Membres pour chacune des fonctions obligatoires des CCR et sur leurs capacités d'y contribuer.

Aux: Représentants permanents des Membres de l'OMM suivants (distribution limitée):
Afrique du Sud, Comores, France, Madagascar, Malawi, Maurice, Mozambique, République-Unie de Tanzanie, Seychelles

cc: Conseillers en hydrologie

J'ai le plaisir de vous communiquer par la présente lettre le document de réflexion susmentionné (voir l'[annexe 1](#)) et je vous saurais gré de bien vouloir me faire part de votre avis sur son contenu. Vous voudrez bien remplir également les tableaux des [annexes 2](#) et [3](#) afin de rendre compte de la contribution que votre Service pourrait apporter aux fonctions spécifiques du CCR en réseau pour le sud-ouest de l'océan Indien. Je vous serais reconnaissante de bien vouloir transmettre les informations demandées à M. Wilfran Moufouma Okia (wmokia@wmo.int) et à Mme Anahit Hovsepyan (ahovsepyan@wmo.int), de la Division des services régionaux de prévision du climat, dans les meilleurs délais, et de préférence d'ici le **28 février 2023**.

En vous remerciant de votre soutien et de votre participation aux activités de l'OMM, je vous prie d'agréer, Madame, Monsieur, l'expression de ma considération distinguée.



Elena Manaenkova
pour le Secrétaire général

IMPLEMENTATION OF A REGIONAL CLIMATE CENTRE IN THE SOUTH-WEST INDIAN OCEAN REGION

Concept paper (draft)

Ref.: 02573/2023-1.5 S/CS

1. Background

In the light of the enormous challenges posed by climate variability and climate change to societies, there is an urgent need to enable WMO Members to provide the best possible climate services in support of climate risk management and adaptation. Climate relevant processes have strong interscale linkages going beyond borders of individual countries. As global-scale information provided by Global Producing Centres (GPCs) is relatively coarse in terms of spatial resolution and reflected features and is not sufficient for producing national-scale products and services, the concept of WMO Regional Climate Centres (RCCs) was developed to bridge the gap between information at the global and national scales. Moreover, up-to-date climate services require, inter alia, a mechanism through which information about climate – past, present and future – is routinely archived, analysed, modelled, exchanged and processed, as well as standardized data exchange protocol, appropriate computer power, modelling capacities and special expertise, which not all WMO Members currently have adequate access to. In this respect, WMO RCCs offer excellent opportunities to create regionally oriented climate products with adherence to standards and criteria that will ensure the highest quality products, to foster networking and pooling the capacities of National Meteorological and Hydrological Services (NMHSs), and thereby strengthen the capacity of WMO Members in the delivery of climate services to meet national needs.

Countries of the South-West Indian Ocean (SWIO) region have many common features, both geographically and climatically: they are tropical islands with a marked topography, maritime influences, and extreme weather events such as intense precipitation and tropical cyclones. Most hazards faced by the islands of this region are also impacting the countries of the eastern coast of Africa (south to the equator). The states of the SWIO region and countries of the eastern coast of Africa share a quite similar vulnerability to natural climate variability and climate change. Improved understanding of regional and local climates and their relationship to larger-scale climate variability, predictability at seasonal timescales, and the provision of tailored climate products and their use are among key challenges that the region needs to address (ACClimate project under the responsibility of the Indian Ocean Commission (IOC)).

The proposal for establishing a WMO Regional Climate Outlook Forum (RCOF) on seasonal forecasting for the countries of the South-West Indian Ocean region was raised during regional workshops under the project ACClimate on adaptation of IOC countries to climate change. A special session was also held in Mauritius, in March 2011, at the Western Indian Ocean Marine Science Association (WIOMSA) conference, where all countries unanimously expressed interest in setting up an RCOF. It was also noted that several countries of the SWIO region already involved in other RCOFs, such as the South African Regional Climate Outlook Forum (SARCOF) and the Greater Horn of Africa Climate Outlook Forum (GHACOF), rather dedicated to continental Africa, do not respond adequately to SWIO expectations. Therefore, a SWIO Climate Outlook Forum (SWIOCOF) was established in September 2012 and was convened annually to produce a regional seasonal outlook.

There has been a strong interest within the SWIO region to work together and help users to benefit from the climate science and the products tailored to their specific needs. The capacities of NMHSs to deliver climate services are still heterogeneous, despite the capacity development activities provided as part of the SWIOCOF.

Many efforts have been done to help communities to address these challenges through the implementation of projects and RCOFs in the region. To pursue these efforts in building resilience, it was proposed to establish WMO RCCs for the SWIO region, which will offer excellent opportunities for networking and pooling the capacities of NMHSs to enable them to

provide the full suite of climate services to meet national needs. However, since an RCC has not been established for the SWIO region, a regional coordination has been provided by the IOC, and there are also potential candidates and interested partners that could contribute to the establishment of an RCC for the SWIO region.

Furthermore, the financial resources available through ongoing regional projects will facilitate the implementation of an RCC for the SWIO region. In particular, EU funded Intra-ACP (African, Caribbean, Pacific Group of States) Climate Services and Related Applications (ClimSA) programme, aiming to strengthen the climate services value chain at the regional and national levels in 8 ACP sub-regions including SWIO region, and the Green Climate Fund (GCF) supported [Hydromet project](#), implemented by IOC in the SWIO region and aiming to strengthen the climate resilience and to enhance adaptive capacity of communities through strengthening national hydro-meteorological services in target countries (Comoros, Madagascar, Seychelles, and Maurice).

2. RCC Needs and capacities relevant to the SWIO region

To explore the rationale and opportunities for establishing an RCC in the SWIO region as well as to identify needs and challenges related to climate monitoring, prediction, service delivery and the underpinning data inputs, WMO, in collaboration with the Expert Team on Climate Services Information System Operations (ET-CSISO) of SERCOM, and IOC, organized a virtual [Scoping Workshop on Implementation of a WMO RCC Network for the SWIO Region](#). It was preceded by a survey of SWIO Members on the needs and capacities for RCC Services initiated by the WMO Secretariat. The organization of the workshop and the survey analysis was facilitated by Mr Jean-Pierre Ceron a member of ET-CSISO, recruited through the ClimSA project.

2.1. Survey of Members

The analysis of survey responses showed that six out of the nine countries replied to the survey, namely Comoros, Madagascar, Mauritius, South Africa, Tanzania, and France (La Réunion). NMHSs of these countries already offer some products listed in the RCC mandatory functions and perform some highly recommended functions. In particular:

- All mandatory functions are already provided by one or several NMHSs at the national level (from 50% up to 83% of the responding NMHS for each function)¹
- All mandatory functions should be covered in a future SWIO RCC (from 50% up to 100% of the responding NMHS are willing to contribute to each function)
- All highly recommended functions are already provided at the NMHS level (17% up to 83% of the responding NMHS for each function)
- The majority of the highly recommended functions should be covered in a future SWIO RCC (from 67% up to 100% of the responding NMHS are willing to contribute to each of the functions)
- Overall, the analysis of survey responses indicated a clear demand by countries in RCC products and services and their strong interest to contribute in the SWIO RCC. Given the large number of potential participating countries, willingness and capacities of all responding countries to contribute to the RCC functions, the best appropriate organizational model for the RCC in the SWIO region is in the form of an RCC Network.

¹ The meaning of the % is that all the mandatory functions (100%) are already provided by one or several NMHS (from 3 to 5 out of 6 NMHS depending of each function)

2.2. Scoping Workshop

A virtual [Scoping Workshop on Implementation of a WMO RCC-Network for the SWIO Region](#) was held on 15–17 March 2022, with the engagement of the national representatives of SWIO Members, as well as from the IOC, neighbouring RCCs, the ET-CSISO and the WMO Secretariat.

The workshop helped initiate the mapping of national capabilities for the SWIO RCC Network against the mandatory and highly recommended functions of an RCC. It highlighted the importance and crucial role of the operational delivery of reliable and high-quality climate services that address countries' priorities as defined in the Nationally Determined Contributions (NDCs) to the Paris Agreement in the SWIO region through the WMO RCC process. It was also recalled that the issue for an RCC in the SWIO region has been alluded to for a very long time at the IOC. The workshop also helped in the building of synergies between ongoing programmes and initiatives in the region to ensure complementarity but not duplication of the activities and to harness the existing resources to work towards the establishment of a SWIO RCC Network.

The workshop participants agreed on the following next steps and actions towards the implementation of a SWIO RCC Network:

1. Seek input from Members which did not respond to the survey, and did not attend the workshop;
2. Apprise the WMO RA I through the RA I Committee on Climate Services, as a follow-up to [Decision 2 \(RA I-17\)](#) - Implementation and coordination of Regional Climate Centre operations in Africa;
3. Seek RA I endorsement of the proposed structure of the SWIO RCC Network and support further actions on its implementation as articulated in the Concept Note;
4. Contact the PRs of contributing countries to request the detailed description of products and services as a national contribution to the SWIO RCC Network;
5. Convene an Implementation Planning Meeting to develop an implementation plan;
6. Seek endorsement of the implementation plan by RA I Management Group and obtain formal commitment by Members/entities contributing to the SWIO RCC Network as per the implementation plan and commence the demonstration phase with assistance from the WMO Secretariat on the applicable procedures for RCC implementation.

Some additional actions will also be required/recommended:

- The domain of responsibility of the SWIO RCC Network needs to be clearly defined as many existing regional centres already cover overlapping areas and several potential contributing NMHS are already participating to some of these RCCs. This domain of responsibility could be presented in the implementation plan.
- Participating countries will be encouraged to follow the WMO Unified data policy. Sharing data is beneficial for all countries and will enable to improve regional products.
- SWIO RCC Network data and products need to be disseminated through a single gateway. If required, access to some products may be restricted to NMHSs only. In this respect the existing regional platform could be an excellent base for an entrance portal for the SWIO RCC Network.

The SWIO RCC Network would leverage on the existing project funding and national and regional resources to support and sustain its activities.

The immediate step for the implementation of SWIO RCC Network is to develop a Concept Paper based on the outcomes of the Scoping Workshop that will include the distribution of functional responsibilities, proposals for governance arrangements as well as a description of the specific roles of each participating Member.

3. RCC concept and relevance to the SWIO region (mandatory and highly recommended functions)

WMO RCCs are Centres of Excellence designated to create regional climate products, including data, monitoring, and forecasting, to support and strengthen the capacity of WMO Members in a given region to deliver climate services. They play a critical role in the implementation of the Climate Services Information System (CSIS) on a regional scale. As of date, nine RCCs and three RCC-Networks are formally designated by WMO. Three RCC-Networks and one RCC have initiated their demonstration phase. RCCs and RCC-Networks are implemented by WMO, in close coordination with the WMO Regional Associations (RAs), the Commission for Weather, Climate, Water and Related Environmental Services and Applications (SERCOM) and the Commission for Observation, Infrastructure and Information Systems (INFCOM). WMO RCCs are part of the Global Data-processing and Forecasting System (GDPFS) and, hence, should follow respective standard practices and procedure.

In the *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485), the WMO RCC mandatory and highly recommended functions are presented. Detailed criteria of these functions are defined.

The mandatory minimum set of functions required for the designation of RCCs include operational activities for:

- Long-Range Forecasting (LRF)
- Climate Monitoring
- Operational Data Services to support operational LRF and climate monitoring
- Training in the use of operational RCC products and services.

The highly recommended functions include:

- Climate Prediction and Climate Projection
- Non-operational Data Services
- Coordination functions
- Training and Capacity-Building
- Research and Development

4. **Beyond the defined RCC functions: potential benefits and potential additional products and services**

An RCC or an RCC Network will facilitate sharing knowledge, tools, and technical capacities in the SWIO region. In addition, the more advanced NMHSs could help the other NMHSs to improve their capacities and their tools in all the domains of responsibilities of the RCC. Consequently, the participating countries would undoubtedly benefit from regional services and products provided by such an RCC and from the related synergy within the region. As a matter of evidence, the RCC Network would facilitate inter alia:

- Strengthened collaboration among NMHSs on topics of interest
- Additional regional climate prediction products taking into account specific needs in the SWIO region
- The development of sector-specific products
- Activities for user engagement such as regional or national climate outlook forums, during which users of the SWIO RCC products can learn more about the products and potential use in the decision-making process.

The mandatory functions are the ultimate minimum basis for WMO designation purposes; and therefore, RCCs are expected to go beyond the mandatory functions to address requirements of the Members in the region and perform some of the highly recommended functions that are of high priority in their region.

During the discussions at the Scoping Workshop, participants unanimously identified **Marine Services** to be added to the SWIO RCC Network functions and services as well as the products and services related to **Climate Change**. The information related to **Tropical Cyclone** (TC) activities (e.g. TC seasonal outlooks) is also of particular importance. These services and products should be reflected in the implementation plan, and the provisional structure should reflect such considerations.

5. **Provisional structure and governance**

During the discussions at the Scoping Workshop, all the countries represented at the workshop expressed a clear indication of interest to contribute to the activities of a SWIO RCC. Given the number of potential participating countries and the expressed willingness to contribute, an RCC Network seems to be the most appropriate.

A draft proposal for the potential structure was presented and discussed during the Scoping Workshop. The following provisional structure for the SWIO RCC Network was proposed:

- Node on Long-range forecasting
- Node on Climate monitoring
- Node on Data Services
- Node on Climate change
- Node on Marine services
- Potential node on training and capacity-building (see details in the [table](#))

La Réunion (France) proposed to lead the node on LRF and climate change. Mauritius and Seychelles expressed willingness to take up the lead (possibly co-leads) on the node on climate monitoring. IOC offered to play an overall coordination role given its ability to

intervene in public policies, and to build bridges with key sectors relevant for the region, such as agriculture, tourism, fisheries, health, etc. IOC also hosts a Regional Geo Portal. Although, the overall coordination of the SWIO RCC Network was proposed to IOC, the technical coordination on operational RCC activities needs to be under the responsibility of the node leads. The node lead on data services, maritime services, and training and capacity-building has not yet been determined.

The table summarizes the provisional organizational structure of the SWIO RCC Network, including the potential leads and consortium members. This structure will be further elaborated to specify the potential leads of the nodes as well as to include additional contributions from countries which have not yet responded to the survey and/or were not able to attend this Scoping Workshop.

Table: Provisional structure of the SWIO RCC Network

Countries in italic listed in the responsible consortium members column are countries interested in contributing to the functions and the others are countries already offering products.

Function/Node	Responsible consortium members
Long-range forecasting	La Réunion (lead) , Comoros, Madagascar, South Africa, Tanzania, <i>Mauritius</i>
Climate monitoring	Mauritius and Seychelles (possibly co-leads) , Comoros, Madagascar, South Africa, Tanzania, <i>La Réunion</i>
Data services	TBC (lead) , Comoros, Madagascar, South Africa, Tanzania, <i>Mauritius, La Réunion</i>
Climate change	La Réunion (lead) , Comoros, Madagascar, South Africa, Tanzania, <i>Mauritius, Seychelles</i>
Marine services	To be discussed – Madagascar will prepare a document on the potential products
Training and capacity-building	TBC (dedicated node vs incorporated in other node) Comoros, Madagascar, South Africa, Tanzania, <i>La Réunion, Mauritius, Seychelles</i>
Coordination of SWIO RCC Network	IOC overall coordinator (node leads – to provide technical input on SWIO RCC Network operational activities)

Regarding the governance of the SWIO RCC Network, it may be in the form of a panel under coordination of IOC comprising the representatives of the nodes leads to provide technical input on the SWIO RCC Network operational activities. SWIO RCC National Focal Points, nominated by respective PRs as part of the WMO Survey will be involved in the SWIO RCC Network planning and implementation activities. The proposed governance structure could be further discussed and finalized in the next phase dedicated to the development of the implementation plan and start of the demonstration process. Once the operational activities are in place, and countries make the necessary arrangements to ensure that the functions are conducted routinely, the SWIO RCC Network could consider including new products based on the Members' demand.

In addition, the maintenance of the RCC capacities to be fully operational should be regularly revisited and if needed discussed in terms of investments and priorities.

Additional resources, including physical infrastructure (e.g. acquisition of software) and human resources (e.g. staff training) might be required to run the SWIO RCC Network. However, the advice was to build on existing capacities of NMHSs, while further development of infrastructure and technical and human resources could be addressed through ongoing regional projects, e.g. Hydromet project implemented by IOC.

6. SWIO RCC Network and international partnership

Given that the existing neighbouring WMO RCCs and regional centres with overlapping domains, including SADC CSC, RCC IGAD, ACMAD, RCC Pune already disseminate climate products, it is important to ensure coordination with these centres to avoid duplication and inconsistency among the delivered products, and to leverage knowledge and products across regional boundaries. This may bring an additional responsibility to the SWIO RCC Network that must produce and deliver products that complement the existing products.

Furthermore, the above-mentioned RCCs could share their experience of guiding the implementation of the SWIO RCC Network. The mentioned RCCs were also encouraged to participate in the SWIOCOF sessions to harmonize their activities, methods and ensure homogeneity in regional datasets.

The potential regional synergies through coordinated collaboration should be mutually beneficial in terms of sharing methods, tools, products and practices. For instance, the operational procedures at GHACOF guided by RCC IGAD and SWIOCOF have been quoted in the [Guidance on Operational Practices for Objective Seasonal Forecasting](#) (WMO-No 1246) as good practices to be followed by other RCCs and RCOFs.

7. Way forward

Once the SWIO RCC Network concept is approved, an implementation plan (IP) will need to be developed with interested stakeholders to advance the implementation of the RCC Network. The IP will include the roles and responsibilities of all the partners as well as operational commitments including technical aspects. It is planned to convene an implementation planning meeting of the potential hosts/contributors to the SWIO RCC Network in order to discuss and finalize the IP and agree on the launch of a demonstration phase.

With this purpose, the WMO Secretariat will formally contact the Permanent Representatives (PRs) of the WMO Members interested to contribute to SWIO RCC Network, seeking formal expressions of commitment and requesting to specify the products/services for both mandatory and highly recommended functions that the Members would agree to provide (a template is suggested in [Annex 2](#)) with inputs from the SWIO RCC National Focal Points nominated by the PRs as part of the WMO Survey (ref. [Annex 4](#) List of SWIO RCC National Focal Points).

After the formal commitment expressed by contributing countries and the IP is developed, the SWIO RCC Network will be in position to initiate the demonstration phase.

**MEMBERS' POTENTIAL INPUTS TO SWIO RCC NETWORK TO BE FILLED IN BY THE
NATIONAL FOCAL POINTS/REPRESENTATIVES**
(see [Annex 4](#))

Table 1: Mandatory Functions

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<i>Products/services as per GDPFS Manual</i>	<i>Potential inputs to SWIO RCC Network by countries (indicate country name and description of relevant products)</i>	<i>Remarks</i>
<i>Operational Activities for Long-Range Forecasts (LRF)</i>		
Interpret and assess relevant LRF products from Global Producing Centres (GPCs), distribute relevant information to RCC Users; and provide feedback to GPCs		
Generate regional and sub-regional tailored products, relevant to RCC User needs, including seasonal outlooks, etc.		
Generate consensus statement on regional or sub-regional forecasts		
Perform verification of RCC quantitative LRF products, including the exchange of basic forecasts and hindcast data		
Provide online access to RCC products/services to RCC Users		
Assess use of RCC products and services through feedback from RCC Users		

<i>Products/services as per GDPFS Manual</i>	<i>Potential inputs to SWIO RCC Network by countries</i> <i>(indicate country name and description of relevant products)</i>	<i>Remarks</i>
<i>Operational Activities for Climate Monitoring</i>		
Perform climate diagnostics including analysis of climate variability and extremes, at regional and sub-regional scales		
Establish a historical reference climatology for the region and/or sub-regions		
Implement a Regional Climate Watch		
<i>Operational Data Services, to support operational LRF and climate monitoring</i>		
Develop quality controlled regional climate datasets, gridded where applicable		
Provide climate database and archiving services, at the request of NMHSs		
<i>Training in the use of operational RCC products and services</i>		
Provide information on methodologies and product specifications for mandatory RCC products, and provide guidance on their use		
Coordinate training for RCC Users in interpretation and use of mandatory RCC products		

Table 2: Highly Recommended Functions

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[Country]	
Highly recommended	
Additional (if any)	
[Country]	
Highly recommended	
Additional (if any)	
[Country]	
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[Country]	
Highly recommended	
Additional (if any)	

TEMPLATE ON TECHNICAL DETAILS OF CONTRIBUTIONS ON DATA PRODUCTS AND SERVICES

1. Contact information

Entity	Point of Contact
[Full official address]	[name, full address, phone and fax numbers, email address]

2. Overview of datasets, products, services offered

RCC Function/ Activity/ Criteria*	Data set/ Product/Service	Producer	Areal coverage	Time of issuance	Means of service provision	Remarks

*Refers to WCASP-n° 80, WMO-TD 1534, Detailed criteria for [WMO RCC mandatory functions](#). The table can be used, however, to list other products and services beyond RCC mandatory functions, [including highly-recommended functions](#)

3. Short data set/product/service description

Data set/ Product/Service	Description
[name of data set/ product/service]	<p>[Methodology]</p> <p>[Spatial resolution]</p> <p>[Temporal resolution]</p> <p>[Quality indicators/Validation]</p> <p>[References]</p>

LIST OF SWIO RCC NATIONAL FOCAL POINTS

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Country	Name, position, contacts
Comoros	Mr Ahmed Youssouf ABDOU Directeur du Département de la Météorologie Email: ayoussouf3@gmail.com
La Réunion	Mr Laurent LABBE Ingénieur développement Email: laurent.labbe@meteo.fr
Madagascar	Dr Nirivololona RAHOLIJAO (Ms) Directeur Général Email: niriraholijao@gmail.com
Mauritius	Mr Kumar Ram DHURMEA Deputy Director Email: meteo@intnet.mu , sadrame75@gmail.com
South Africa	Dr Christien ENGELBRECHT (Ms) Lead Scientist: Long-range Forecasting Email: christien.engelbrecht@weathersa.co.za
Tanzania	Dr Kantamla MAFURU Analyst In-Charge at Central Forecasting Office Email: kantamla.mafuru@meteo.go.tz