



Fifth Meeting of the Programmes and Projects Review Committee (PPRC/5)
 Mexico City, Mexico, 16 to 18 July 2019

Agenda Item 9: Other Business

DETERMINATION OF AN AERONAUTICAL REQUIREMENT FOR TROPICAL CYCLONE ADVISORY INFORMATION IN THE WESTERN SOUTH ATLANTIC

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This Working Paper invites the PPRC to continue with the process for the determination of an aeronautical requirement for tropical cyclone advisory information in the Western South Atlantic in light of the development of Tropical Storm “Iba” off the east coast of Brazil in March 2019, and the known, but infrequent development of tropical/subtropical storms or tropical cyclones in the same area over the past decade and more.

The Third Meeting on Projects of the Planning and Implementation Regional Group (GREPECAS) Meteorology (MET) Programme for the SAM Region held in Lima, Peru, from 17 to 20 June 2019 considered necessary to submit the aeronautical requirement to GREPECAS and to modify the CAR/SAM Regional Air Navigation Plan accordingly.

Action:	Indicated in item 4.
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Safety • Capacity and Efficiency
<i>References:</i>	<ul style="list-style-type: none"> • Annex 3 – Meteorological Services for International Air Navigation • Report on ICAO METP Working Group on Meteorological Operations Groups (WG-MOG/9) held in Toulouse, France, from 2 to 4 April 2019 • Report on the Third Meeting on Projects of the GREPECAS MET Programme for the SAM Region (SAM/MP/3), held in Lima, Peru, from 17 to 20 June 2019

1. Introduction

1.1 ICAO and the World Meteorological Organization (WMO) coordinate, collaborate and cooperate on international standards for aeronautical meteorological service provision, as contained in ICAO Annex 3/WMO Technical Regulations (WMO-No. 49), Volume II, *Meteorological Service for International Air Navigation* and supporting ICAO and WMO guidance material.

1.2 Through its Secretariat, the WMO has expert representation in global and regional ICAO groups, including, but not limited to, the Meteorology Panel (METP) and its working groups (global) and the GREPECAS MET Programme Projects group (regional).

1.3 The Third Meeting on Projects of the GREPECAS MET Programme for the SAM Region, held in Lima, Peru, from 17 to 20 June 2019, analysed the information submitted by the WMO regarding the need to determine an aeronautical requirement for tropical cyclone advisory information in the Western South Atlantic, in light of the development of Tropical Storm “Iba” off the east coast of Brazil in March 2019, and the known but infrequent development of tropical/subtropical storms or tropical cyclones in the same area over the past decade and more. The SAM/MP/3 Meeting considered necessary to submit the aeronautical requirement to GREPECAS and to modify the CAR/SAM Regional Air Navigation Plan accordingly.

1.4 To continue with the process for determining an aeronautical requirement for tropical cyclone advisory information in the Western South Atlantic, a new area of coverage would need to be defined, and a new tropical cyclone advisory centre with designated responsibility would need to be identified by ICAO, through GREPECAS and in coordination with the WMO, together with all of the associated tropical cyclone advisory information exchange requirements.

2. Discussion

2.1 At the Ninth Meeting of the ICAO METP Working Group on Meteorological Operations Groups (WG-MOG/9), held in Toulouse, France from 2 to 4 April 2019 (final report [available here](#)), the Working Group discussed matters that included the provision of tropical cyclone advisory information by designated Tropical Cyclone Advisory Centres (TCAC), and the inclusion of TC-related information on significant weather forecasts issued by the World Area Forecast Centres (namely WAFC London and WAFC Washington).

2.2 The ICAO METP WG-MOG/9 was informed of the development of Tropical Storm “Iba” (TS “Iba”), which had developed a few weeks previously (in March 2019) off the east coast of Brazil. The Working Group was notified that, since the Western South Atlantic was not currently under the area of responsibility of any TCAC, there was uncertainty within the WAFCs as to whether to include TC-related information on the WAFS SIGWX forecasts, if TS “Iba” had developed into TC “Iba”.

2.3 Presently, through the Regional Air Navigation (RAN) agreement, ICAO has stated requirements for TCAC coverage in all oceanic basins of the world *except for* the Western South Atlantic Ocean, the Eastern South Pacific Ocean, the Southern Ocean and the Arctic Ocean. In total, seven TCACs are currently designated through the ICAO RAN agreement as follows (the co-located WMO RSMC/TCWC¹ and approximate areas of responsibility are indicated for reference):

¹ Regional specialized meteorological centre (RSMC)/Tropical cyclone warning centre (TCWC) of the WMO.

TCAC (ICAO)	RSMC/TCWC (WMO)	Area(s) of responsibility (approximate)
TCAC Miami	RSMC Miami	North Atlantic, Caribbean Sea and Gulf of Mexico plus Eastern North Pacific
TCAC Honolulu	RSMC Honolulu	Central North Pacific
TCAC Tokyo	RSMC Tokyo	Western North Pacific
TCAC Nadi	RSMC Nadi	Central and Western South Pacific
TCAC Darwin	TCWC Darwin	Seas surrounding Australia, Indonesia and Papua New Guinea and the Eastern Indian Ocean
TCAC La Réunion	RSMC La Réunion	South-West Indian Ocean
TCAC New Delhi	RSMC New Delhi	Arabian Sea and Bay of Bengal

Table 1. ICAO-designated TCACs (as of May 2019)

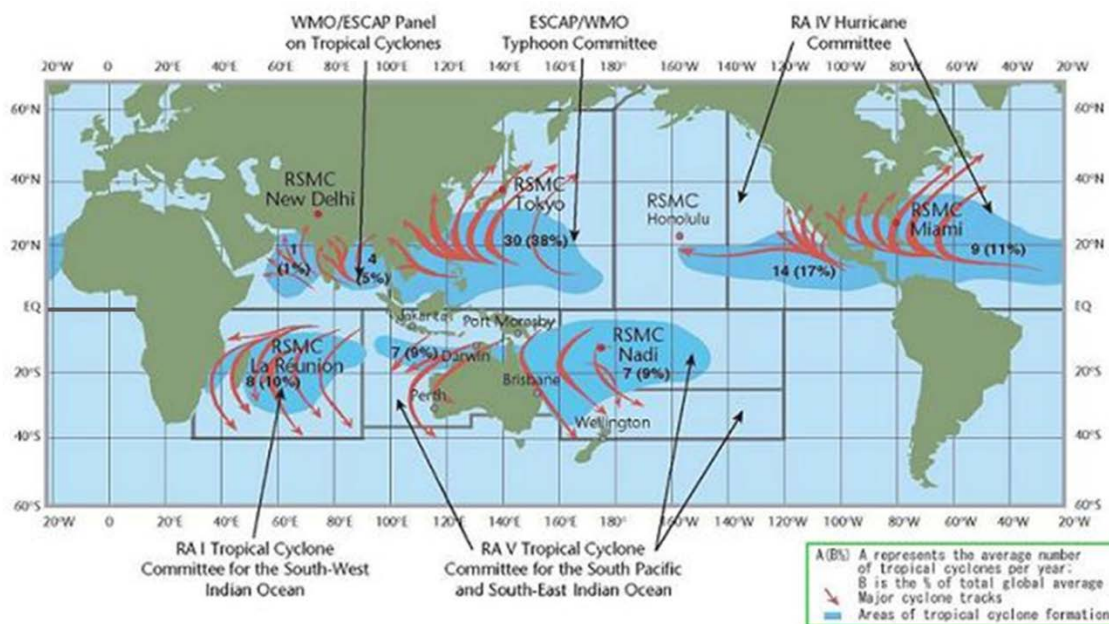


Figure 1. WMO RSMC/TCWC areas of responsibility (as of May 2019)

2.4 As the foregoing illustrates, at the present time there is no TCAC (or RSMC) designated for the Western South Atlantic or for the Eastern South Pacific.

2.5 The CAR/SAM Electronic Air Navigation Plan (e-ANP) Volume I contains stable plan elements, which require approval by the Council, as well as the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services in accordance with Article 28 of the Convention on International Civil Aviation (Doc 7300); the e-ANP Volume I designates the TCACs for the CAR/SAM Regions.

2.6 Tropical cyclone formation in the Western South Atlantic is currently a rare occurrence due to a general prevalence of very strong vertical wind shear in the troposphere and absence of weather disturbances – for example, the inter-tropical convergence zone (ITCZ) seldom occurs over this part of the Atlantic Ocean, yielding a general lack of vorticity ('spin-up') and convergence. Sea surface temperatures are also generally lower when compared with those of the Western North Atlantic, the Caribbean Sea and the Gulf of Mexico, where tropical cyclone formation is comparably more favourable. These factors have, historically, tended to suppress tropical storm and tropical cyclone development in the Western South Atlantic (and similarly in the Eastern South Pacific). The impact of climate change on tropical cyclone formation is an active area of continuing scientific research.

2.7 While tropical cyclone (and precursor tropical storm) formation in the Western South Atlantic is rare, it is not altogether absent. In 2004, for example, tropical cyclone Catarina (Hurricane Catarina) developed off the east coast of Brazil. Hurricane Catarina was thought to be only the second Western South Atlantic hurricane in recorded history. A number of tropical storms, including TS Iba, mentioned above, and subtropical storms are known to have developed in the Western South Atlantic.

2.8 SAM MP/3, in analysing this information, and the history of tropical cyclones developed on Brazil's Atlantic coast, recommended that the request to support an aeronautical requirement be raised to the PPRC and, through it, to GREPECAS to establish tropical cyclone advisory information services for the Western South Atlantic. Brazil, as the main affected State, requested the approval of the aeronautical requirement for advice information on tropical cyclones for the Western South Atlantic. Additionally, it requested that a TCAC, currently in service, extend its area of responsibility, in order to cover the area, taking into account the experience they have in this task.

3. Conclusion

3.1 At present, due to the absence of an aeronautical requirement established through the ICAO RAN agreement, there is currently no defined area of coverage and no designated TCAC for the Western South Atlantic. Thus, whenever a subtropical or tropical storm develops into a tropical cyclone in the Western South Atlantic, no tropical cyclone advisory information will be available for international air navigation (since there is no designated TCAC), and there is the possibility that no tropical cyclone information concerning en-route weather phenomena (SIGMET) will be available either (since SIGMET for TC should be based on TC advisory information, in accordance with ICAO Annex 3, Chapter 7, paragraph 7.1.4).

3.2 Appreciating that tropical storm and tropical cyclone formation in the Western South Atlantic is a rare occurrence, especially compared with some other oceanic basins, and appreciating also that staffing and infrastructure costs associated with hosting a TCAC are not insignificant, it may be necessary for ICAO to consider, in coordination with the WMO, the need to designate a TCAC, perhaps an existing TCAC. It is worthwhile to note that the *only* WMO RSMC currently with specialisation in tropical cyclone analysis and forecasting in the Americas and neighbouring oceanic basins is the RSMC Miami (TCAC Miami). As illustrated on Figure 1 above, RSMC Miami's current area of responsibility only extends to the north of the Equator.

3.3 The PPRC/5 could support an aeronautical requirement to establish tropical cyclone advisory services for the Western South Atlantic, and request the Secretariat to monitor this action by coordinating with ICAO Headquarters to coordinate, in coordination with the WMO, reflect this aeronautical requirement by assigning a previously existing Tropical Cyclone Advisory Center, and extending its area of responsibility to cover the South Atlantic. Considering the previous paragraphs, the PPRC/5 could approve the following decision:

Draft Decision PPRC/5-XX: Inclusion of the aeronautical requirement of Tropical Cyclone Advisory information for the Western South Atlantic:

That, considering the occurrence of tropical cyclones in the Western South Atlantic, and the absence of SIGMET by tropical cyclones for this event due to the lack of advisory information on tropical cyclones, the PPRC/5:

- a) supports the existence of the aeronautical requirement of tropical cyclone advisory information in the Western South Atlantic, up to the parallel of 30° South;
- b) requests to Secretariat that, in coordination with the World Meteorological Organization, to take the necessary actions for the designation of a Tropical Cyclone Advisory Centre (TCAC) to cover the area between Ecuador and the 30° South parallel, limited by the continental blocks of Africa and South America; and
- c) once the designation of the new Tropical Cyclone Advisory Centre has been approved, the Secretariat proceeds with the amendment of the CAR/SAM e-ANP, Vol. I.

4. Action by the meeting

4.1 The PPRC/5 is invited to:

- a) endorse an aeronautical requirement for tropical cyclone advisory information for the Western South Atlantic; and
- b) approve the draft decision presented in paragraph 3.3