

RA III Radiosonde Training Workshop, Buenos Aires, May 2006

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1. Introduction

Regional radiosonde training workshops were initiated for Region I in 2003 with workshops hosted in Botswana and Morocco, using lectures mostly prepared in English in the UK, and then translated into French for the workshop in Morocco.

In 2005, preparations were made to implement a similar workshop for managers of radiosonde networks in Region III, hosted by Servicio Meteorologico Nacional, Argentina in Buenos Aires... Lecture material was revised in the UK to bring it up to date and also to present the radiosonde monitoring statistics relevant to region III. Most of this material was then translated into Spanish under the guidance of Mario Garcia of Servicio Meteorologico Nacional, Argentina.

We are grateful to Comodoro Miguel Rabiolo who made available the facilities of Servicio Meteorologico Nacional, Argentina for the workshop and provided the resources necessary to prepare and implement the Workshop successfully.

It proved difficult to identify suitably qualified Spanish speaking instructors, so the decision was made that a team of three lecturers from the UK, J. Nash, R. Smout and D. Drew would again take responsibility for most of the lecturing and the practical work, helped by one Spanish speaking radiosonde expert, Alfredo Vega, from the USA. Unfortunately Dave Drew died shortly before the workshop was to be held. This was a big loss because Mr. Drew had been in charge of the radiosonde station at Camborne for many years and had hosted WMO meetings at this station. So at short notice he was replaced by Mark Smees, who is responsible for practical radiosonde matters in the Upper Air development team in the UK. Lectures by English speaking lecturers would be translated into Spanish with the teaching material displayed in Spanish for the participants, see Figs 2.1 and 2.2.

Three representatives of HMEI from InterMet, Modem and Vaisala were willing to participate in the workshop; they provided lectures on aspects of the use of their equipment and the suitability of the systems for operations in the region, including discussion of interoperability for future radiosonde systems. The representatives also brought examples of their ground systems and new radiosonde designs to Buenos Aires, so that the participants could see a wide range of new upper air equipment in operation.

Participants came from Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Surinam. In some countries they are highly developed radiosonde networks with good infrastructure and in others there have been problems in sustaining radiosonde observations and regular observations are only now being

established. Brazil has by far the largest number of radiosonde stations in Region III and it was a pity that more than one representative could not be invited from this country since there are several different organisations responsible for radiosonde operations within Brazil.

2. Conduct of workshop

The workshop was held from 8 to 12 May with the lecture, presentations by participants and discussions held in the headquarters of Servicio Meteorologico Nacional, Argentina in Buenos Aires, see Figs. 2.1 and 2.2.



Fig. 2.1 Regional Training Workshop, Buenos Aires, most lectures presented in English but translated into Spanish, PowerPoint presentations in Spanish.

The arrangements for translation worked well, and at the end of the workshop all participants were presented with a copy of the lecture material plus other information on CD.

None of the participants had met before and before very long a very friendly atmosphere developed which continued to grow throughout the event, with not only the participants but the HMEI representatives entering into useful discussions about many issues. Thus, it is suggested that one useful follow-up to the workshop is a mechanism to continue the discussions and exchange of ideas between the participants, particularly those responsible for GUAN station operations. It is hoped that a suitable mechanism could be suggested and managed by CIMO for the future.



Fig. 2.2 Mario Garcia (Argentina) who was responsible for local planning of the workshop.

Comments from Argentina on the success of the lectures, presentations and discussions were as follows:-

- The experience was very useful for all the staff from Argentina who participated in the workshop. The importance of making good measurements in the troposphere and the importance of maintaining the GUAN stations in Region III in full operation was explained very well.
- The lectures were very comprehensive so that all the participants benefited from some clarification of difficulties in specific tasks associated with upper air measurements.
- The new radiosonde technology in use in the world was presented very clearly in the lectures. The status of the observations in region III was reviewed and suggestions made for the best way to obtain good results in future.
- The participants were given the chance to show the status of radiosonde observing systems in their own countries. This was extremely useful, because they were able to discuss difficulties with the other countries and not just the local representatives of the manufacturers who are often not well equipped to answer queries from customers.

- In some countries in Region III there had been serious problems associated with hydrogen generation and it was suggested that future workshops discussed this issue in more detail.
- In Argentina, the upgrade of DigiCora II has been successfully completed and from August 2006 all stations use the Vaisala RS92SGP radiosonde. In doing this work the experience gained in the Workshop was used.
- It is planned that training of radiosonde observers in Argentina will be increased, using material derived from the lectures and documents of the workshop.

3. Practical work

The practical work during the workshop took place at the Regional Instrument Centre Buenos Aires. Practical work took place on two days with the first day concentrating on flying the different types of radiosondes and giving all the participants hands on experience with the different systems. On the second day, the participants were challenged to launch a comparison flight between all four radiosondes using techniques similar to those used in the WMO Radiosonde Comparison Tests. This was successfully achieved and was a credit to the skills of the participants involved.

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Fig. 3.1 Preparing to launch a radiosonde test flight- practical work RIC, Buenos Aires



Fig. 3.2 Participants discussing practical details during processing of data.

Fig. 3.1 shows the participants preparing to launch a radiosonde test flight outside of the Regional Instrument Centre building Fig. 3.2 shows the discussions taking place with the radiosondes in flight and data being received at the ground stations. Fig. 3.3 shows one of the HMEI representatives explaining about his system to participants during the practical.



Fig. 3.3 discussing the use of new technology



Fig. 3.4 Radiosonde test flight launched at Buenos Aires.

Fig. 3.4 shows one of several radiosonde test flights launched by the participants in the workshop. Figs. 3.5 and 3.6 show the results from two test flights performed as part of the practical with measurements from MODEM MKII radiosonde, Vaisala RS80 GPS radiosonde as supplied to Argentina and Brazil and Vaisala RS92 radiosondes supplied to the UK Met Office.

In Fig. 3.5, MODEM and Vaisala RS92 agree very closely at low levels and show similar relative humidity structure at upper levels. The RS80 measurements have a low bias of more than 10 per cent at high relative humidity. In contrast in Fig. 3.6, the Vaisala RS92 relative humidity agreed very closely with the RS80 measurements. The difference between these two test flights was that in the second flight the Vaisala RS80 humidity sensor was ventilated under a hand drier in the RIC toilets for about 5 minutes – and this drove off the chemical contamination that is clearly currently found in RS80 radiosondes that were delivered for operational use to Brazil and Argentina.



Fig. 3.5 Temperature and relative humidity comparison displayed as a function of height, with results shown from MODEM MKII, Vaisala RS80 and Vaisala RS92

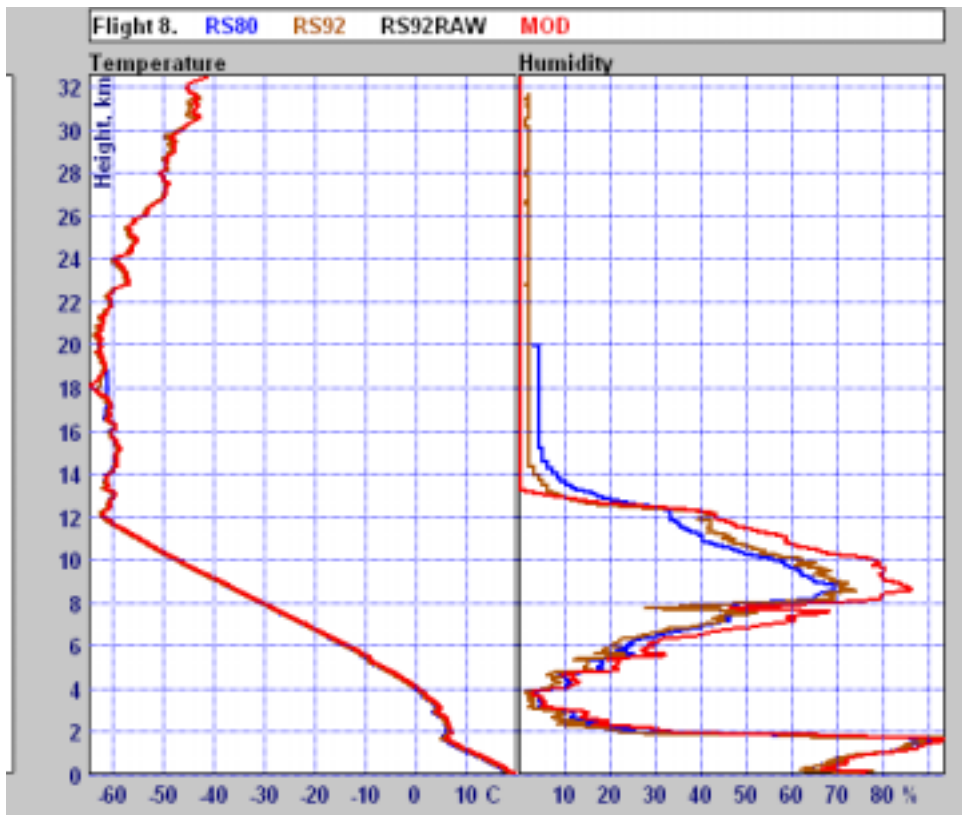


Fig. 3.6 Temperature and relative humidity comparison displayed as a function of height, with results shown from MODEM MKII, Vaisala RS80 and Vaisala RS92, where the RS80 humidity sensor was ventilated under a hand drier before launch.

This highlights that monitoring of radiosonde relative humidity in most regions of the world is not very good, and that the feedback relationship between manufacturer and customer in this area has not functioned very well in recent years.

4. Recommendations for the future.

Feedback from the Region III training exercise suggests that it has been a valuable exercise.

Thus , it is recommended that the radiosonde training programme is continued with possible training workshops in Region II or Region V.

Although the training workshops are aimed at those responsible for managing radiosonde operations , it is recommended that actions are taken to develop training material to be handed down to the operators as well, as will happen in Argentina.

In the larger networks it is probable that training is also required for young scientists who are also required to support the network operations of the larger networks, so it is also recommended that the scope of the training material is also expanded to take account of this requirement- which may be particularly relevant for a training workshop in Region II.

Actions should be taken by CIMO to encourage the circulation of experience and advice between the radiosonde operators in a given Region. This probably requires someone to initiate and maintain the circulation of information, since traditionally there has been very little communication between neighbouring countries in this area of work.

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