Report from the GCOS Lead Centre for Antarctica
2011

My overall assessment of the situation for Antarctica, the sub-Antarctic and Southern Ocean stations is one of broad stability. Antarctica is now above the global average for receipt of CLIMAT reports and averages around 95%. Many of the Antarctic GCOS stations are remote AWS, and many of these are aging. Further progress will require continued support for these important sites, with repair of failed or failing stations. A greater availability of original data would help with quality control and is a requirement of the Antarctic Treaty and WMO resolutions.

CLIMAT

The monitoring by Germany and Japan shows that there has been an improvement in the percentage of expected Antarctic CLIMAT reports being received, from around 70% at the beginning of 2009 to 88% at present. Since September 2009 the Antarctic percentage has generally remained above the global average. Some of the Antarctic AWS data is occasionally not available until after the monitoring deadline of the 20th of the month and this explains the drops seen by the monitoring centres. This data is however usually available after the deadline and our own monitoring gives 93% availability for the year.

Recommendation: It would be helpful if the monitoring centres could modify their software to give the true picture, though in general it is a relatively small number of stations that contribute such late reports.

In most cases isolated missing CLIMATs are just occasional lapses, often involving a failure in GTS insertion or forwarding, and these are sometimes made up in later months following prompting. Two operating stations do not generate their own CLIMATs. These are 89625 (Concordia, France/Italy) and 89662 (Mario Zuccelli Station, Italy). There are however sometimes sufficient SYNOPs on the GTS from these stations to generate monthly mean values and this has been carried out since 2010 October, following a decision by the WMO EC-PORS (Panel of Experts on Polar Observations, Research and Services). 89865 (Whitlock, USA) was restored in September, but 89377 (Lettau, USA) failed in August. 89327 (Mount Siple, USA), does not have sufficient battery strength to operate through the winter, and a repair visit here is unlikely.

Some stations suddenly show format errors in their messages. As Lead Centre we contact them or their parent body and give them the details. In most cases the cause can be traced to inexperienced operators and is soon corrected. We do some quality control by comparing values in the CLIMAT message with those generated from SYNOP messages. This has revealed one or two issues, for example it appears that some stations use different measurement systems for the two types of message.

Recommendation: Better quality control could be achieved through national operators making available original data as required by Antarctic Treaty, Scientific Committee on Antarctic Research (SCAR) and WMO resolutions.

Continued operation of some of the University of Wisconsin AWS cannot be guaranteed, due to problems of both funding and access. The operator has indicated that they would like to remove station 89327 (Mount Siple) from the GSN because of

the difficulty of getting access to the site for essential maintenance. The Mount Siple station is the only one in its vicinity and is highly desirable for climate studies, particularly in view of the apparent exceptional warming in West Antarctica. In addition funding constraints may restrict real-time availability of SYNOP data for some of the Antarctic Peninsula AWS, though this should not affect the prompt generation of CLIMAT messages.
Recommendation: Providing cheaper Argos or Iridium transmission tariffs for operational use would address the problem.

The WMO EC-PORS meeting held in 2010 October (see report at http://www.wmo.int/pages/prog/www/WIGOS_6_EC_PORS/Final_Report2010.pdf) discussed the Antarctic BSN and Antarctic BCN and has created a merged Antarctic Observing Network (AntON). The meeting also identified particularly important GSN stations, which are listed in the AntON, and requested work to identify critical areas where new stations might be sited. The majority of AWS sites are shown in a map at http://amrc.ssec.wisc.edu/aws/, and the manned stations are shown in the map at http://www.wmo.int/pages/prog/www/images/Antarctica/antarctic_region05.pdf, whilst the AntON sites are listed in the meeting report. The meeting also confirmed the desirability of generating a CLIMAT message from synoptic data for non-reporting stations where possible. The British Antarctic Survey, as Lead Centre, is therefore generating a provisional CLIMAT message from the available SYNOP messages for those stations that do not currently produce a CLIMAT. This is only done for those stations with greater than 95% availability of SYNOP messages. These provisional CLIMAT messages are necessarily incomplete, and are usually restricted to basic temperature and pressure means. Quality checks in support of this have revealed several issues with the SYNOP data and these have been communicated to the national operators. Plots showing the monthly data are available at http://www.antarctica.ac.uk/met/READER/GCOS/PLOTS/main_index.html
Recommendation: It is surprising that NWP sites had not identified the data problems and communicated them, and this is perhaps an area that WMO and GCOS could focus on.

TEMP
Following the WMO resolution to remove the requirement for CLIMAT TEMP messages, monitoring of the reception of CLIMAT TEMP bulletins ceased in 2010 July. Monitoring of the TEMP messages has continued and shows that all Antarctic stations are functioning, though there is a seasonal variation in availability. Only two of the twelve Antarctic GUAN stations (89532 Syowa, Japan and 89571 Davis, Australia) carry out a full program year round. The Russian stations (89512 Novolazarevskaya and 89592 Mirnyj) augment their routine daily program with additional flights at 12 UT every third month. Eleven stations usually carry out sufficient sonde flights to generate monthly means at one of the standard hours, and several have additional seasonal flights at a second standard hour. The program of flights from 89055 (Marambio, Argentina) has been maintained at around two per week, usually on the days when sondes are not flown at 89062 (Rothera, UK), with additional flights from both stations in support of research projects when required. Some stations provide their original data in support of the SCAR READER database and cross-checking against this suggests that the GTS may loose up to 5% of messages from certain stations. During the winter some stations continue to have

problems with balloons bursting before the sonde has reached 100hPa due to the very cold stratospheric temperatures.

GENERAL

There are still some stations being included in the wrong bulletins, i.e. not in the appropriate CSAA01 bulletin, but in a national bulletin. Binary messages have not been monitored. The UK Met Office converts all messages that it receives for insertion in text format into binary format for parallel insertion.

Jonathan Shanklin
GCOS Lead Centre for Antarctica
2012 March 2
On board RRS Ernest Shackleton, Southern Ocean