

REPORT OF WORKSHOP ON COORDINATION OF KING GEORGE ISLAND SCIENCE

Room B, Pribaltiskaya Hotel, St Petersburg, 0900-1045, July 6, 2008.



Participants:

Colin Summerhayes (Executive Director, SCAR) (Meeting Chairman)
 José Retamales (Chairman of COMNAP, and Director of Instituto Antartico Chileno, Chile)
 Sergio Marensi (SCAR Vice President, and Director of Instituto Antartico Argentino, Argentina)
 Viviana Alder (Instituto Antartico Argentino)
 Jefferson Simões (Instituto de Geociências-Universidade Federal do Rio Grande do Sul, Brazil)
 Hernan Moreano (Instituto Antartico Ecuatoriano, Ecuador)
 Bulat Mavlyudov (institute of Geography, RAS, Moscow, Russia)
 Vicor Lagun (Chair of SCAR KGI Coordination Action Group, and AARI, Russia)
 Hans-Ulrich Peter (Polar Bird Ecology Group, Jena Univ., Germany)
 Chuck Kennicutt (SCAR Vice President, and Texas A & M University, USA)
 Andrzej Tatur (DAB Polish Academy of Sciences, Poland)
 Timothy Moffat (British Antarctic Survey, UK)
 Sandy Shan (Polar Research Institute of China, Shanghai, China)
 Bo Jin (Chinese Arctic and Antarctic Administration, Beijing, China)
 Kim Ki Youn (Kangwon National University, Korea)

Colin Summerhayes opened the meeting by reminding participants that SCAR sought to explore ways in which it might work together with individual scientists and

national operators to improve coordination of science across KGI, especially in such a way as to facilitate a greater contribution of KGI activities to achieving the goals of SCAR's various scientific programmes, to the benefit of all. Whatever solution was chosen would need to be sensitive to the interests and prerogatives of national operators; it was not in SCAR's interests to 'dictate' what needs to be done; rather what SCAR wished to do was to explore with national operators how best to proceed so that KGI science made a greater contribution to SCAR programmes.

Victor Lagun, Chairman of the SCAR Cross-SSG Action Group on Coordination of KGI scientific activities, which was formed 3 years ago in response to a requirement of the SCAR Strategic Plan 2004-2010, gave a presentation on the progress of his group to date. The group comprises one or two scientists from each KGI station. These links are informal and between individuals. There are still some problems in acquiring data.

The group has worked to create a comprehensive interdisciplinary dataset of current and historic scientific observations of King George Island parameters, including meteorological, actinometric, upper-air, sea and terrestrial ice cover, geobotanic, biologic, permafrost dynamics and atmospheric chemistry data provided by 9 permanent scientific stations, automatic weather stations and satellite information (1968-2008) for the numerical detection of the local climate warming signal and to facilitate coordination of IPY studies.

With colleagues, Victor has carried out intercomparison studies, joint probabilistic data analysis, data quality control processing, and meteorological estimates in collaboration with Chile, Argentina, Poland, Germany, Uruguay, Brazil, UK, USA, China, Korea and Ukraine scientists. A special Internet resource has been created to demonstrate the use of data for a regional electronic Climate Handbook.

Preliminary inventory of the following type has been developed:-

Station	operating nation	Lat, S	Lon, W	S M	U A	H R	G R	B R	G L R	EP R	S I R	G H G	G C R
A hut Ecuador	Ecuador	62°	58°	-	-	-	-	+	-	+	-		
Arctowski	Poland	62°09'34"	58°28'15"	-*	-	+	-	+	-	+	-	-	-
Artigas	Uruguay	62°11'04"	58°54'09"	+	-	-	-	-	-	+	+	-	-
Bellingshausen	Russia	62°12'	58°58'	+	-*	+	-*	+	+	+	+	+	+
Field Camp Copacabana	USA	62°	58°	-	-	-	-	+	-	+	-	-	-
Frei	Chile	62°12'S	58°58'	+	-	-	+	+	+	+	-	-	+
Ferraz	Brazil	62°05'00"	58°23'28"	+	-		+	+	-	+	-	+	-
Great Wall	China	62°12'59"	58°57'44"	+	-		+	+	-	+	+	+	-
Jubany	Argentina	62°14'16"	58°39'52"	+	-	+	-	+	-	+	+	-	+
King Sejong	Korea	62°13'24"	58°47'21"	+	-	+	+	+	+	+	+	-	+
Machu Pichu	Peru	62°04'	58°17'	-	-	-	-	+	-	+	-	-	-

Comments

SM – standard surface meteorology programme

UA – upper-air observation programme

HR – hydrology research programme

GR - geophysical research programme

BR – biological research programme

GLR - geological research programme

EPR – environment protection programme

SIR – sea ice research

GHG –greenhouse gases measurement programme

GCR - glaciology research programme

* - programme re-start planed

It was gratifying to note that the Polish meteorological station will be restarted in the near future, as this provides an important time series for understanding local variability.

Where possible an understanding of the meteorological and climatic variability on KGI and in the region requires that 3-hourly and 6-hourly observations are made available by each station and provided for the SCAR READER database (as is done by the Russian station).

Victor showed the results of detailed comparisons between the Arctowski and Bellingshausen meteorological data (on temperature, pressure, wind and precipitation), which forms the basis for an improved understanding of weather and climate, and enables a high level of quality control annually and interannually. Intercomparisons were made between Bellingshausen and Arctowski and Bellingshausen and Frei (Chilean Station) as a means of quality control, to enable the regional climate signal to be identified. The Koreans and Russians are also working together - on Sea Surface Temperatures.

Victor Lagun noted that although there are 6 met stations on the island, they do not all provide useful climatological data because some suffer from local effects (e.g. distortion of the signal by local slopes). To understand what the value of each station may be in climatological terms, a comprehensive review of all the data was undertaken to pinpoint microclimate effects. A paper on this will come out this year.

A key ongoing problem is that since 1999, when the Russians stopped radiosonde measurements, because of cost, there have been few or no radiosonde measurements of the upper atmosphere on KGI, something long noted as a problem by SCAR. This problem remains.

The Group has compiled on its web site much of the available biological data e.g. lichens, seals, birds.

Currently there is a cooperative cryology project taking place as part of the international CALM (Circumpolar Active Layer Monitoring) Project (Antarctic permafrost dynamics studies).

Key results from the work of AG were as follows:-

The definitive archive of meteorological and upper air data for King George Island has been constructed using individual observation results;

The surface and free atmosphere temperature, wind speed, geopotential and water vapour trends have been determined;

The annual surface temperature trend over the northern part of Antarctic Peninsula is $+0.03 \pm 0.02^\circ\text{C}/\text{year}$, being significant at 1% level

Great tropospheric warming and increasing of water vapour have been observed from 850 hPa and higher, and an increase of total cloud thickness has been detected.

Other participants noted that nice scientific results are emerging from coordinated glaciological research on the age of the KGI ice cover. Furthermore, Lucia Campos (Brazil) is coordinating CAML activities in that region.

Chuck Kennicutt reminded participants that the Treaty Parties had organised an Antarctic Specially Managed Area (ASMA) for Admiralty Bay on KGI. This evidently meant that operators had been convinced it was in their interests to work cooperatively. He asked to what extent this scientific work was coordinated outside that area. Participants noted that this work was primarily aimed at conservation and environmental monitoring of local impacts, rather than basic science. Nevertheless the coordination mechanism might be applicable across the island.

Participants agreed that while it was good to see cooperation developing between individual scientists and even between individual programmes, it would be highly desirable if there were some common goals for the science carried out on the island. It would be highly desirable also if the science carried out there contributed to the goals of SCAR's several science programmes and science groups. Participants agreed that we need to find a mechanism to convey to KGI scientists and operators the main themes of SCAR science, and to encourage them to work together in such a way that their activities contributed as much as possible to those themes. It was envisaged that KGI activities could form useful subsets of wider ranging SCAR programmes.

Participants rejected the suggestion that we hold a scientific workshop on KGI to discuss scientific coordination, because there was no guarantee that all the key players would be present on the island at any given time. Instead it would make more sense for SCAR to prepare a working paper on the main scientific themes that could be addressed by scientific activities on KGI, and to ensure that this was distributed widely through SCAR delegates and national committees on the one hand, and to operators via COMNAP on the other hand.

José Retamales pointed out that the rapid increase in the price of fuel would be likely to limit the amount of science done in the future (assuming that Antarctic research budgets stayed constant), which would provide an added driver for increased sharing of facilities (planes, ships, helicopters, equipment, etc). This the time was ripe to discuss with operators, using COMNAP as a forum, how such cooperation might be achieved in the interests of science in the South Shetlands in general and on KGI in

particular. This issue could possibly be a key topic for the next COMNAP meeting (in Punta Arenas, 2009).

Several examples of possible cooperative science were suggested, for example:-

- compiling the meteorological and climate data for KGI, the Antarctic Peninsula, and southern South America, as inputs to a regional climate model for climate forecasts (contribution to SCAR's AGCS programme – Antarctica in the Global Climate System);
- routinely collecting, to a standard pattern, KGI-wide data on the distribution and reproduction of the Southern Giant Petrel (contribution to SCAR's Life Sciences Group).

Participants agreed that if it proved possible, working with COMNAP, to persuade KGI operators to work together to support SCAR science, the KGI could end up as a model for how cooperative scientific research could be carried out across Antarctica.

I also agreed that the data produced should be fed into the SCAR KGI Geographical Information System (GIS), which would progressively grow to be more and more useful to the operators and scientists working on the island.

Current synoptic data for total observation period collected in the frame of KGI AG (<http://www.aari.aq>) will be used for mapping of local island warming signal based on KGIS tool possibilities.

Recommendations:

- 1. that support be provided (perhaps multi-operator) for a KGI radiosonde programme;***
- 2. that the Arctowski synoptic observations be renewed (this is in hand)***
- 3. that a wide range of climate parameters be collected at 3-hourly and 6-hourly intervals by all stations, and routinely exchanged.***
- 4. the SCAR KGI Action Group continue to compile information to complete the inventory of KGI science by XXXI SCAR.***
- 5. the Chief Officers of the SCAR SSGs or their representatives be enrolled as part of the KGI Action Group to provide a close connection to SCAR science programmes.***
- 6. that Jefferson Simões contact Tania Brito to find out what the Admiralty Bay ASMA encompasses, and to see to what extent its work could be a model for other scientific activities across KGI, and to determine how best to link it (if possible) to SCAR's interests across KGI.***
- 7. that SCAR and COMNAP to be asked to consider the proposal that a working paper on “Major scientific themes that could be addressed by a coordinated approach to KGI science” (or some such title) should be addressed to the COMNAP***

meeting in Punta Arenas (June 2009), as the basis for a discussion on how such coordination might be achieved, and by what means.

8. that national SCAR representatives be urge to broadcast widely the message that to the extent possible we need local (i.e. KGI) science to be devised in such a way as to make a significant contribution to SCAR science programmes.

9. that SCAR recommend consideration be given to applying the experience of Svalbard area science programme coordination for optimization of KGI investigations