

Full Proposals for International Polar Year 2007-2008 Activities

Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

(Activity ID No: 341)

1.1 Title of Activity

Taking the Antarctic Arctic Polar Pulse-IPY 2007-8 Human Biology and Medicine Research

1.2 Short Form Title of Proposed Activity

TTAAPP-IPY 2007-8

1.3 Activity Leader Details

Dr Jeff Ayton

SCAR SSG-Life Sciences: Expert Group Human Biology and Medicine
Australia

1.4 Lead International Organisation(s) (if applicable)

SCAR SSG-Life Sciences: Expert Group Human Biology and Medicine

Further discussions pending with a number of international organizations such as IUCH,
IUPsyS, International Society of Behavioural Medicine

1.5 Other Countries involved in the activity

Australia

China

Italy

Argentina

Spain

Finland

Japan

Sweden

Uruguay

Canada

France

New Zealand

United Kingdom

Chile

Germany

Norway

Russia

USA

1.6 Expression of Intent ID #'s brought together in this proposed activity

181,81,152,222,914,516,1046

1.7 Location of Field Activities

Bipolar

1.8 Which IPY themes are addressed

6. The human dimension in polar regions

1.9 What is the main IPY target addressed by this activity

4. Legacy

2.0 SUMMARY OF THE ACTIVITY

The IPY 2007-2008 provides a unique opportunity to create a human polar observatory and enhance our capacity to develop an innovative multinational and multidisciplinary Polar Health Surveillance System (PHSS) utilising synergies of existing national polar research programs, activities and data collection, and to coordinate the use of data from the PHSS to understand the biophysical, clinical, cultural, social and behavioural processes that shape the sustainability of circumpolar human societies (IPY Theme #6). We propose to use the PHSS to address the following questions:

- What physiological, psychosocial and clinical changes occur in humans temporarily resident and interacting with the extreme environment of Antarctica?
- Are these changes comparable to those experienced in temporarily resident non-indigenous Arctic populations exposed to difficult environments?
- How can we best prevent and treat any adverse effects of these changes?
- How can this understanding enable us to improve healthcare, health and wellbeing of humans in Polar regions, in space and other extreme environments, and in humankind in general?

Activities during this period will include the utilization and enhancement of efficient smart, innovative eHealth and telemedicine technologies in the collection and support of this snapshot of human health during the IPY in polar regions.

The programme will provide an opportunity for students and scholars from a consortium of educational facilities, universities and research institutes to participate in the proposed research activities and acquire the experience and skills necessary to become the next generation of polar human biology and medicine researchers.

Once the comprehensive IPY science and operational plans are cemented in national programs, detailed flexible, modular and opportunistic human biology and medicine research planning will be possible, utilizing the various platforms including isolated polar communities, traverses and polar marine cruises. Subprojects utilizing or contributing to the PHSS based on nationally funded priorities will be coordinated by the research group and will include studies in the following domains of interest to Antarctic and Arctic researchers:

- Epidemiology
- Physiology
- Social and Behavioral Sciences (including anthropology, sociology, psychology, social geography and archival domains)
- Immunology
- Photo/Chronobiology
- Public health
- Nutrition
- Occupational health
- eHealth

Many of these subprojects have research modules currently in the field (e.g., Antarctic Multinational Psychology Research Project, Long Term Medical Survey) which will benefit greatly by increased participation and synergies of cross-analysis of datasets across nations, across disciplines and at both poles. Existing and new research modules utilizing new observational techniques will provide a unique opportunity to obtain a snapshot of polar health (leaving a legacy of data and health surveillance systems into the future)

Examples of subprojects under consideration include the following:

1. Antarctic Multinational Psychology Research Project (PI Antonio Peri)

The AMPRP investigates the modifications of mood, subjective health complaints, coping strategies, interpersonal relationships occurring during a Antarctic winter campaign in groups of different nationalities.

2. Nutrition and Body Composition in Arctic (NuBCA) (PI Rosalba. Mattei)

Nutrition is a vital necessity and eating in an adequate way represents the fundamental step in order to assure health status. The aim of the study is to anticipate malnutrition that could be the cause of any reduction in physiology and psychological efficiency.

3. Long Term Medical Survey Concordia Station Antarctica

4. Concordia Station Study -Behavior, Coping, Group phenomenon, and psychosocial adaptation to isolation and confinement in a multicultural group combination of psychological, ethological and ethnographic methods. (PI E Rosnet)

The program deals with the psychosocial adaptation of a multicultural group in an isolated and confined environment. It will particularly be stressed on coping strategies and on social structure, social agreement, leadership and environmental affordances This second point will be studied toward complementary scientific approaches : psychological , ethological, and anthropological. The results will be related to the sociocultural background and the psychological characteristics of the participants and to the data of LTMS

5. Svalbard Miner's Study (PI G Leon, H Ursin)

6. GEOMED and others (PI Cermack). An interdisciplinary, multi-centre study to investigate the effects of the geomagnetic component of space weather on the parameters related to human health

7. Dome A East Antarctica Psychology and Physiology Studies (X. Quanfu PI) Investigation of seasonal changes in mood and hormonal profiles, including thyroid hormones, catecholamines, and cortisol.

8. Telemedicine respiratory system assessment and monitoring (PI S. Pillon)

9. Seasonal Activity Variations-Polar regions (SAV-PR) (PI G Steel)

Investigation of seasonal psychological patterns, activity levels and arousal impacting deployments of polar sojourners in both Arctic and Antarctic.

2.1 What is the evidence of inter-disciplinarity in this activity?

Research collaborators and participants represent different aspects of medicine, physiology biophysical, health science, occupational health , behavioural and socio-cultural sciences.

By nature of study of polar human populations interdisciplinary activities are necessary and will include the environmental exposures in the following fields:

- Photobiology(Solar Ultraviolet Radiation)
- Environmental science
- Toxicology
- Chronobiology
- Climatology and Meteorology
- Upper Atmospheric and Space Physics

2.2 What will be the significant advances/developments from this activity? What will be the major deliverables? What are the outputs for your peers?

Promotion of Occupational Health and Safety performance in Polar Environments

Reduce long term health risks in Polar regions

Promotion of North-South polar interaction of transient non-indigenous populations

Creating stronger links of researchers between North –South

Encourage continued Polar research

Develop further research training for scientists in Polar regions

Public Outreach

Leave baseline legacy data and health systems for subsequent international polar year analysis and comparison..

2.3 Outline the geographical location(s) for the proposed field work (approximate coordinates will be helpful if possible)

Locations	Coordinates
All Antarctic stations, field camps and shipping	
Svalbard Norway	80degN
Russian Arctic	

2.4 Define the approximate timeframe(s) for proposed field activities?

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
12/07 - 12/08	09/07 - 04/10
	MM/YY - MM/YY
	MM/YY - MM/YY

2.5 What major logistic support/facilities will be required for this project?

Further details – This research proposal will be largely opportunistic and utilising existing research networks, national Antarctic programs, arctic programs and medical logistics. No major logistic requirements are anticipated.

2.6 How will the required logistics be supplied? Have operators been approached?

Source of logistic support	Likely potential sources	Support agreed
Consortium of national polar operators		
Own national polar operator		
Another national polar operator		
National agency	Y	Y
Military support		
Commercial operator		
Own support		
Other		

2.7 If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access?

Arctic regional studies will include specific groups of temporarily resident non-indigenous populations and will synergise with current and future research programs eg Svalbard Miner's study. These linkages will facilitate the required access to the relevant Arctic communities. Linkages with the Arctic Human Health Initiative may also provide useful synergies in the study of temporary resident non-indigenous populations. Antarctic human research will be facilitated via national Antarctic programs and relevant human research ethical processes.

3.0 STRUCTURE OF THE ACTIVITY

3.1 Origin of the activity

This is a pulse of activity during 2007-2009 within an existing programme

If part of an existing programme please name the programme – SCAR SSG-LS Expert Group Human Biology & Medicine research program. This is a longstanding group with constituted management structure which has coordinated and collaborated on multiple polar research activities over many years.

3.2 How will the activity be organised and managed? Describe the proposed management

structure and means for coordinating across the cluster

This research proposal forms an intensive pulse of research activity of the well established SCAR SSG-LS Expert Group on Human Biology and Medicine research program conducted over the 2007-9 years. Critically it will be coordinated and managed from within this Expert Group to ensure future success by building upon established programs and polar human research networks.

The Expert Group of Human Biology and Medicine has representatives from Antarctic, Arctic, circumpolar and extreme environments and has capability to coordinate and manage this bi-polar project. The necessary linkages with collaborators both in the Arctic and Antarctic are mature and existing.

Development of a lead coordinating group from within the Expert Group with both Antarctic and Arctic representatives will ensure appropriate, efficient scientific endeavour is undertaken.

This key coordinating group will report to the executive of the Expert group who in turn report to the SCAR Scientific Standing Group-Life Sciences and SCAR executive.

Principal investigators of the Polar Health Surveillance System and approved sub- projects(eg Multinational Antarctic Psychological project and others) will develop focussed working groups from interested national members and interdisciplinary researchers in order to maximise synergies of each project and across the whole cluster.

Necessary outreach and legacy will be drawn from associated proposals in the cluster to optimise IPY objectives including the peer reviewed supplements of International Journal of Circumpolar Health.(EOI#1046). Representatives of the SACR SSG-LS Expert group coordinating the TTAAPP have cross representation on the AHHI(EOI#914) and the International Union of Circumpolar Health.

3.3 Will the activity leave a legacy of infrastructure and if so in what form?

The critical infrastructure this activity will leave is a Polar Health Surveillance Database which will be a reference and baseline as a critical snapshot the health and wellbeing of temporarily resident populations in the Arctic and the Antarctic. The multidisciplinary human data collected at this time will provide the backbone of scientific endeavour considerable outreach and fostering of future polar researchers and fundamental and applied research outputs to promote human health and wellbeing in polar regions.

3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?

Yes.

The SCAR SSG-LS Expert Group consists of a number of non traditional polar nations such as China, India, Japan, Australia, and New Zealand. Cross cultural and international collaboration has been a tenet of the group's research activities to date.

3.5 Will this activity be linked with other IPY core activities? If yes please specify

Yes, it will be opportunistic study of human health which will study national Antarctic program expedition participants during the IPY period and compare this health observatory data with Arctic and other extreme environment temporary resident populations. The IPY core activities and their participants will be themselves integral components of this research activity.

This project will investigate crucial facets of the human dimension of polar regions and lead to creation of datasets on the changing conditions of circumpolar human populations.

Additionally the outreach and legacy activities of this proposal will also address IPY Core activities

3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?

Data Management is at the core of this project with the development of a long awaited Polar Health Surveillance System which will collate data from many national programs and comparable research projects optimising and up-scaling the health research of multiple small temporarily resident non-indigenous populations to allow epidemiological analysis of injury, illness, occupational health and socio-cultural and behavioural parameters.

With standardised de-identified privacy preserving datasets subprojects will be able to utilise similar populations as controls and validate their observations to ensure meaningful outcomes.

It is envisaged the data will be managed by a centre experienced in Antarctic data management and with expertise with privacy preserving informatics to allow approved researchers secure portals to query the database according to clearly defined parameters.

The Australian Antarctic Data Centre has considerable expertise in this area and has offered indicative interest in providing this service to the project subject to appropriate funding from participant nations.

This polar health surveillance database will provide the snapshot data which can be referenced in future years for approved future polar human health researchers.

3.7 Data Policy Agreement

Will this activity sign up to the IPY draft Data Policy (see website)

Yes

3.8 How will the activity contribute to developing the next generation of polar scientists, logisticians, etc.?

Human health is of high public interest and profile. This project will provide a snapshot of the human polar pulse and human interaction with extreme polar environment which students and young scientists will be able to grasp, participate in and develop as they participate and undertake core IPY activities.

Scientists and logisticians will gain a greater understanding of polar human biology and medicine and seek future challenges and apply this knowledge to other frontiers of human endeavour.

3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?

Human biology and Medicine and human health perspectives in general and in polar regions have high public impact and significant ease of understanding allowing a powerful outreach opportunity to communicate the process and outcomes of this exciting IPY research activity.

The impact and interaction of the polar environment on human beings participating in the IPY 2007-8 themselves will provide a unique snapshot and opportunity to highlight the critical role of both Arctic and Antarctic environments on those who temporarily reside in these areas highlighting the impacts across all nations.

Current critical linkages with the International Journal of Circumpolar Health (EOI#1046) proposes significant dedicated supplemental scientific publications in addition to their regular scientific publications specifically addressing the required communication needs of this proposal. All collaborators in addition have their existing network of scientific publication in their relevant field of expertise where peer reviewed and high public impact communications will be published and delivered in international and national scientific and public fora.

Of considerable note will be linkages with human research outreach projects eg EOI # 81 which will utilise the opportunities of increased access to polar regions of the IPY to involve school and university students, young scientists and the general public in an organized concerted manner. It is anticipated these outreach efforts will target the following:

1. interactive media to bring the polar field research to schools and the homes of the general public via the internet
2. encourage students to participate as novice researchers on voyages as representatives of their schools and universities
3. encourage polar researchers to supervise, involve and teach students in the field
4. ultimately raise the awareness globally in homes, schools, institutions and offices of decision makers of the critical importance of the polar regions to all people on Earth.

3.10 What are the proposed sources of funding for this activity?

National IPY committees and scientific academies and scientific foundations
National Antarctic and Polar programs
COMNAP

3.11 Additional Comments

This research proposal is focussed on Antarctic human health which is an important and obvious deficiency in current IPY research proposal mapping of human studies and themes. The breadth and expertise of the researchers involved in this study of temporary resident populations in Antarctica critically recognises the opportunity that IPY brings to facilitate and encourage collaborative study of similar non-indigenous communities in the Arctic and extreme polar environments which will contribute to achieve IPY themes and objectives most importantly of outreach, education and data legacy.

This focus on temporary resident expedition type human populations and comparisons and synergies with other proposals require a level of similarity of population types to achieve the scientific research outcomes. IPO support in this regard when considering this project is sought to ensure that the TTAAPP research project's fundamentals are preserved by clustering where scientifically appropriate given this critical premise.

It should be noted subsequent to the June 30 2005 proposal submission that further progress among subprojects has been made at various national levels. Representation and discussions are continuing with possible synergies with the Arctic Human Health Initiative (EOI 914) where their may be synergies in studying temporary resident non-indigenous populations.

It is anticipated that there will be representation of TTAAPP 2007-9 SCAR Expert Group Human Biology and Medicine at the upcoming International Committee of Circumpolar Health meeting in Novosibirsk June 2006 which is a key milestone for the AHHI.

There is cross representation of members of the Expert Group with AHHI and the International Union of Circumpolar Health and the International Journal of Circumpolar Health(EOI#1046) Importantly the TTAAPP coordinating group has convened a working meeting at the XXIV SCAR/COMNAP XVIII meeting in July 2006 in Hobart , Australia to further progress the research activities, develop management structures and funding proposals to achieve the stated outcomes during IPY 2007-9

* Item 3.6 and 3.7 Important Note This project will comply with the data with the proviso that national privacy, confidentiality of human medical and social science data information will impose restrictions at variance to this policy. The importance of anonymised collaborative datasets of small populations aims to assist with data access to researchers and as a legacy dataset.,

4.0 CONSORTIUM INFORMATION

4.1 Contact Details

Lead Contact

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4.2 Other significant consortium members and their affiliation

Name	Organisation	Country
Mr Iain Grant	British Antarctic Service Medical Unit	United Kingdom
Prof Larry Palinkas	University of Southern California	USA
Dr Antonio Peri	Progetto Antartide C.R ENEA Cassacia/IUCH	Italy
Prof Holger Ursin	University of Bergen	Norway
Professor Juhani Hassi	International Union Circumpolar Health	Finland
Prof Peter Suedfeld	University of British Columbia/IUPsyS	Canada
Prof Des Lugg	NASA HQ Washignton DC/IUPS	USA
Dr Gary Steel	Lincoln University	New Zealand
Prof Sergio Pillon	University of Rome	Italy
Prof Gloria Leon	University of Minnesota	USA
Prof Arkady Maximov	International Scientific Center Arktika	Russia
Prof Elizabeth Rosnet	University of Reims	France
Dr Mariano Memmoli	Direccion Nacional del Antartico	Argentina
Dr Giichiro Ohno	Yoyogi Hospital	Japan
Prof Gro Sandel	University of Bergen	Norway
Dr Xue Quanfu	Institute of Basic Medical Sciences Beijing	China
Prof Rosalba Mattei	University of Siena	Italy
Dr Milan Cermak	International Space University/ACG Space Technologies	France/Switzerland
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Dr Tim Dye	IUAS	USA
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