

ACTIVITIES OF THE SPACE TASK GROUP ON INTERNATIONAL POLAR YEAR

The session is informed on the current activities of the Space Task Group (STG) of the Sub-Committee on Observations of the ICSU/WMO Joint Committee for the International Polar Year (IPY). It is stressed that STG is instrumental in mobilizing the data acquisition and processing resources of Space Agencies to meet IPY science priorities and provide substantial contributions to the development of the Global Inter-agency IPY Polar Snapshot Year (GIIPSY) project. Significant progress has been achieved by Space Agencies during the first year of IPY in response to acquiring comprehensive Arctic and Antarctic snapshots. An impressive array of new data products have been acquired and archived, and a number of further key acquisition plans developed to address some of the key IPY scientific goals. Results also demonstrated significant progress in building a space-borne component of the IPY data legacy.

Recommendations proposed:

- 1) The session recommends to WMO to keep STG as an appropriate mechanism to promote cooperation between major satellite agencies ensuring coordination of their polar observations beyond IPY.
- 2) The session urges CGMS Members to continue their coordination of international efforts in securing collection of space-borne “snapshots” of the Polar Regions during the IPY and to give further consideration to the establishment of a preliminary structure for sustaining observations in the future, with the goal to achieve a Polar Satellite Constellation as a significant part of the IPY legacy.

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1 INTRODUCTION

1.1 The Space Task Group (STG) of the Sub-committee on Observations of the ICSU/WMO Joint Committee for the International Polar Year 2007-2008 (IPY) is the body tasked with addressing space-borne observational requirements of IPY. It is comprised of nominated representatives of 14 Space Agencies with the secretariat support provided by WMO. The basis of the work has been consolidation of observational requirements as defined through individual Space Agency Announcements of Opportunities, the Cryosphere Theme of the Integrated Global Observing Strategy Partnership (IGOS-P), the World Climate Research Programme (WCRP) CliC and other institutional requirements obtained via the IPY survey.

2 STG ACTIVITIES

2.1 During the period between CGMS-35 and CGMS-36 the STG has organized two sessions: STG2 hosted by EUMETSAT (Darmstadt, Germany, 26-27 November 2007) and STG3 hosted by ESA/ESRIN (Frascati, Italy, 5-6 May 2008). All participating Space Agencies were represented (at least once) at both meetings. Invited attendees included representatives from the IPY Joint Committee, WMO Space Programme and WCRP.

2.2 As part of ongoing STG activities, the Canadian Space Agency (CSA) hosted an IPY SAR/InSAR workshop (5-6 March 2008, St. Hubert, Quebec, Canada). The goal of the workshop was to try to develop an acquisition strategy for Synthetic Aperture Radar (SAR) and Interferometric SAR (InSAR) data that achieves the maximum number of IPY science objectives in such a way as to equitably distribute the acquisition and downlink load across the different agencies. In total 13 Organizations were represented at the meeting, including six Space Agencies, three ground segment operators, and others (e.g. Canadian Federal IPY Secretariat). The meeting reviewed existing requirements for SAR acquisition, and Agencies' strategic objectives that were in line with IPY Science Priorities. Results of the workshop were reported and discussed at STG3 in May 2008.

2.3 The STG meetings have provided opportunities for Space Agencies to document details of the contents of their respective IPY data portfolios. Existing agency portfolio contents are documented and now hosted on-line on the GIIPSY web site linked to the IPY web site. The STG3 provided an excellent opportunity to review and summarize progress achieved to date by all participating Space Agencies including substantial new results presented (for the first time) by ASI (Italy) and JAXA (Japan). The meeting focussed on the extent to which the multi-agency portfolio contents meet the challenge of the identified high-level scientific "firsts" documented at the STG1 meeting and reviewed IPY objectives (goals) progress centred on:

- (a) Pole to coast InSAR multi-frequency SAR - for ice sheet dynamics;
- (b) Fine-resolution SAR mapping of the entire Southern Ocean sea-ice cover - for sea ice motion;
- (c) One complete high resolution visible and thermal IR (Vis/IR) snapshot - for circumpolar permafrost;
- (d) Pan-Arctic high and moderate resolution Vis/IR snapshots - for lake and river freeze-up and break-up);
- (e) Atmospheric Dynamics and Composition.

2.4 The review indicated significant progress during the first year of IPY in response to acquiring comprehensive Arctic and Antarctic snapshots. An impressive array of new data products has been planned, acquired and archived with which to address some of the key scientific goals. Results also demonstrated significant progress in building a space-borne component of the IPY data legacy. STG3 has also determined gaps that should be covered and has identified proper actions and recommendations to this effect. It was also noted that Radarsat-2 was commissioned at the end of April 2008, and that the Radarsat-1 agreement for Alaska SAR Facility (ASF) data reception ceased preventing regular synoptic coverage of the Arctic basin. Following an STG3 recommendation, a letter has been sent on behalf of the IPY JC to the Agencies concerned requesting them to continue to order, receive, process and archive RADARSAT data for science purposes in a routine or background mode for the duration of IPY (at least until 31 March 2009). Intermediate replies recently received from the Agencies concerned contain information that CSA is currently under negotiations with MacDonald Dettwiler and Associates Ltd. (MDA) as the commercial arm of the RADARSAT-1 programme. There is some hope that in due course MDA will be in position to provide some RADARSAT-2 data via the ASF to bridge some of the critical data reception gaps in the north.

2.5 In addition, as part of its activity STG reviewed the progress achieved in the IGEOLAB HEO forum, which has taken up responsibility to further cooperation in the context of geostationary laboratories in highly elliptical orbit. The STG noted with satisfaction the progress and recent achievements in engaging partners in the "Arktika" project (Russian Federation) and welcomed the opportunity that had been provided for other Space Agencies to participate in "Arktika" mission, including the positive steps taken to allow national user requirements to drive development and integration of additional candidate instruments/payloads.

2.6 Close communications are established between focal points on satellite data nominated by several Space Agencies (this process is continuing) and the IPY operational geophysical data management coordinators. Regarding satellite data, it is clear that not all that is acquired by satellites is processed or accessed by scientists yet. In the context of ESA, for instance, teams of IPY Project PIs have been established under IPY projects hosted by the International Space Science Institute (ISSI) for collaborative research projects to be furthered. Examples in the context of the STG goals include Southern Ocean sea-ice drift product generation from the SAR imagery. It was suggested that further efforts can be made to survey the IPY users and/or to engage scientists in projects to deliver higher level products from processed SAR and other satellite data and products.

2.7 At the first IPY Conference "Polar Research – Arctic and Antarctic perspectives in the International Polar Year " organized by SCAR, IASC and IPY JC a special

session was dedicated to observations of the Poles from space and advanced observing techniques for Polar regions. The session provided an opportunity to review progress in making remotely-sensed measurements of the high-latitude regions, both from polar-orbiting satellites and in-situ vantage points. Papers spanned near-real time operational meteorological satellite observations through scientific satellite and in-situ observatories, and were broken into two sections capturing GIIPSY status and progress, and new observing techniques. The suite of GIIPSY presentations indicated the current status of the STG efforts to coordinate the various Space Agencies during IPY, as well as some of the considerable challenges evident in planning data acquisitions. Presentations highlighted progress in acquiring daily, multi-satellite meteorological mosaics (for cloud tracking and upper level winds), observations of polar atmospheric trace gases, satellite-based operational ice charting (IPY logistics portal), SAR mosaics and SAR interferometry for ice sheet and glacier dynamics, and benchmark altimeter topographies and optical stereoscopic optically-derived digital terrain model and ice stream velocity data.

2.8 In response to a STG3 recommendation, the second STG/IPY SAR coordination meeting hosted by DLR took place in Munich, Germany from 30 September to 1 October 2008. The meeting reviewed space-borne SAR activities carried out by Agencies and Organizations, identified gaps, overlaps and needs for planning and coordination, discussed distribution of imaging activities to Agencies and Organizations as well as data processing plan and distribution strategy. The Space Agencies and Organizations have come up with a coordinated plan to meet the four thematic applications prioritized by the scientists. It was also agreed to develop a concept paper on the coordination of programmes to support the science activities and development of products. Results of the SAR meeting can be found at http://bprc.osu.edu/rsl/GIIPSY/index_files/stgsarworkshpdlr.htm and will be presented at the STG4 hosted by WMO, which will take place in Geneva, Switzerland on 3-4 February 2009. Members of the CGMS are invited to participate in the session.