

Minutes on Term Review Meeting
Polar Studies Division
Geological Survey of India
NCEGR, Faridabad

The Term Review meeting for the Polar Studies Division (PSD), NCEGR, GSI, Faridabad for FS 2018-19 was held through video-conferencing under the chairmanship of ADG & NMH, M-IV at Oldham Hall, CHQ, GSI, Kolkata on 29th July 2019 at 11:00 AM. Dr. S. Raju, Addl. Director General and Head, NMH-IV welcomed all the members and participants of the meeting. The meeting was attended by the Term Review Committee members, officers of the NCEGR, Faridabad, External Reviewer and officers of M-IV.

Dr. S.P Shukla, Director, NCEGR, Faridabad briefed about all the five projects of the PSD and activities of the PSD in the Arctic and Antarctic Regions during Annual Programme 2018-19. He gave an overview about the all projects of PSD under review i.e. three items on glaciology, one on glacial sediments and the other on relationship between paragneiss and orthogneiss. He informed that Campaign mode expeditions are being planned and apprised about the requirement of seven officers as there is severe shortage of suitably skilled officers. Dr. Shukla informed that several MOU's with MOES, VCPOR, JNU and other organizations are in the process and communication with such organizations have been initiated. The review committee was apprised that as an off-shoot of the field work, total of 21 research papers, 19 abstracts in conferences and 10 technical reports have been submitted by Polar Studies Division.

The Review Committee observed that-

ADG & NMH-IV and Chairman advised the supervisory officers to check quality and format of presentations to make them impressive, informative and leave impact on audience. He expressed his belief that the Polar Studies Division would be benefitted by the valuable suggestions given by the external reviewers and members of the panel

Shri Nitish Das, external reviewer stated that very good team is carrying out work in Polar Studies Division. Highlighting the International significance of the projects he expressed satisfaction on the quality of fieldwork but advised for more efforts to present the data with better co-relation so that the presentation is more communicative and comprehensive with

logical conclusion. In general, the objective and methodology has to be focussed to come up with a step by step simpler model. To acquire the pertinent skills, training of officers may be looked at by the Dy. D.G., NCEGR, Faridabad. He advised to review the published research papers to identify the areas where GSI can work further. Shri Das emphasized upon aggressive adoption of technology enabling optimum use of human resources to come out with meaningful results in reasonable time frame.

Shri Ashish Nath, Director (PSS-P&M-4), opined that the work In Polar Studies Division is being executed satisfactorily. Work similar to Schirmacher Oasis should be taken up in Larsemann Hills also so that in 5 years' time PSD should be in a position to compare the two areas. He opined that comparative studies need to be carried out to put the things into proper perspective. Report writing has to be carried out carefully.

Dr. Ravindra Kumar, Dy. D.G., NCEGR, Faridabad expressed his thanks to the external reviewer and Term review committee and to the Chairman for appreciating that the Polar Studies Division has been carrying out work for the last 36 years. He assured that the recommendations given by the committee will be followed properly and all efforts will be made to incorporate input regarding climate change and global warming. The meeting ended with a vote of thanks to the chair and all the other member.

The recommendations of the Review Committee follows as Annexure-1 while the list of participants follows as Annexure-2.

Annexure-1

Comments of the Term Review Committee, 29th July 2019
Polar Studies Division, NCEGR, Faridabad

S. No.	Title of The Item (Item Code)	Name of Supervisory Officer	Region	Comments on Item's Technical Content, Delivery and Any Other Aspect (TR Recommendations)	Grading on Item
1	Late Quaternary paleoclimatic evaluation of Storness Peninsula, Larsemann Hills, East Antarctica (M4POS//CHQ//2017/19665)	Dr. S.P. Shukla, Director	NCEGR Faridabad	<p>Technical Content:</p> <ul style="list-style-type: none">(i) The 2nd objective has not been discussed in the write up submitted or in the PPT presentation which is to be addressed properly in the report.(ii) The data collection and presentation was good but some more efforts need to be given in interpretation part. For example, in Fig. 5, the change in concentration of TOC, sand/pebble and clay fractions in Lake-A and B sediment core samples in the depth range of 20 cm to 35 cm should have been explained in terms of climate change during that part of the time i.e. during Late Quaternary. It is significant when lakes in close proximity show such variation in its TOC, sand/pebble and clay fractions.(iii) Specific time span of deposition vis-à-vis rate of sedimentation needs to be worked in and discussed.(iv) While pursuing limnological studies with an objective of constraining paleoclimatic conditions and its correlation, it is mandatory to constrain the micro/macro/mega paleoclimatic events from a sediment core. <p>Presentation: Very Good.</p> <p>Others: The report should be submitted in time with action on all the recommendations suggested by the TR Committee.</p>	Good

2	<p>Relationship between the paragneiss and orthogneiss in the area between the Larsemann Hills and Rauer Islands in the Prydz Bay area of East Antarctic Shield: their bearing in the understanding of supercontinent reconstruction models (M4POS//CHQ//2017/19672)</p>	Shri Amit Dharwadkar, Director	NCEGR Faridabad	<p>Technical Content:</p> <ul style="list-style-type: none"> (i) More care should be taken in the preparation of the write up for the Term Review material, specially on the para on 'Relationship among various litho units' and 'Structures'; a better understanding and clarity requires. (ii) Correlation of orthogneiss and para-gneiss in the study area should be made in terms of petrography, chemistry, structure and metamorphism (iii) Structural mapping has to be done, metamorphic history, deformational history and impact of different deformation events should be correlated to constrain the tectono-metamorphic/ magmatic evolution of the study area. This can be substantiated by the age data. (iv) Structural data presented in the map do not support the events discussed. (v) In the map, Island north of Mirror Peninsula, the rock classification 'Gt-Bt Gneiss' and 'Gt-Bt Gneiss with pegmatite' is not acceptable. How only based on pegmatite intrusion a rock can be classified as a separate rock type? Also, as shown in the map, the granite gneiss (G1) seems to be occurring as enclaves within the mafic granulites and has been shown as younger than the mafic granulite, then either G1 is a partial melt product of the mafic granulite or is an intrusive into the mafic granulite. Proper justification should be given in either case or otherwise. (vi) In the southern part of the map of Bread loaf Is., drastic variation in dip direction and strike in metapelite and granite gneiss litho-units, within a 100 m radius, need explanation specifically when the foliations are steeply dipping; whereas, there is a F2 synformal axial trace has been marked in the northern part. (vii) The proposed revised stratigraphy should be shown against the existing one (say by Grew et al, 2007, 2012 or any other) to substantiate GSI's findings. (viii) Not much has been commented about the main objective of the item i.e. to study the basement cover relationship in constraining the model 	Very Good
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				<p>of Gondwana or Rodinia suturing. This has to be given the maximum importance and accordingly be incorporated in the report.</p> <p>(ix) The dating of samples should be done on priority basis and should be requested to NMH-IV for the same at the earliest.</p> <p>(x) The data collection and representation is very good but some more efforts need to be given in interpretation and modeling part.</p> <p>Presentation: Very Good.</p> <p>Others: The draft report should be submitted in time to the ADG & NMH, M-IV for technical review and vetting with all the recommendations suggested by the TR Committee before final submission.</p>	
3	<p>Ice dynamics of the glaciers from Broggerbreen Peninsula based on the glaciological studies on Vestre Broggerbreen Glaciers, Svalbard Arctic (M4POS/NC/CHQ//2018/17848)</p>	<p>Dr. S.P. Shukla, Director and Shri Amit Dharwadkar, Director</p>	<p>NCEGR Faridabad</p>	<p>Technical Content:</p> <p>(i) Stake monitoring are becoming obsolete, time and energy consuming and less reliable and hence should be replaced with modern technology like high resolution satellite imagery, remote sensing, SAR data, etc. to study the glacier movement and health of a glacier over time.</p> <p>(ii) Yearly data should be compared and correlated with the earlier data collected from the same area by GSI or other organisations to constrain the actual picture of change in glaciological parameters in the same region.</p> <p>(iii) As suggested in the previous TR Meetings, there should be a record of temperature and other meteorological data along with the recession and advancement records of glaciers in a particular area to constrain the climate change with time.</p> <p>(iv) It is high time, GSI should venture to new glaciers in the Arctic Region as the present VB-I and VB-II are too small to continue for more than 10 years of study. Reason for snow accumulation and ablation in VB-1 & VB-2, respectively should be enumerated.</p> <p>(v) As suggested by NCPOR, there should be MoU between stake holders for glaciological studies in Arctic under the leadership of GSI. Already</p>	<p>Very Good</p>

				<p>one year has passed, the process may be expedited by the PSD in signing the MoU with the other stake holders.</p> <p>(vi) Data may be compiled and brought out as publication.</p> <p>Presentation: Very Good.</p> <p>Others: The report should be submitted in time with all the recommendations suggested by the TR Committee.</p>	
4	<p>Ice sheet dynamics between Polaraboken and Dalk glaciers, Larsemann hills, east Antarctica and their stress pattern (M4POS/NC/CHQ/2018/17852).</p>	<p>Dr. S.P. Shukla, Director and Shri Amit Dharwadkar, Director</p>	<p>NCEGR Faridabad</p>	<p>Technical Content:</p> <p>(i) Nature of climate change and its effects on ice to be clearly brought out, reasons for differential ice loss i.e. from inner areas and near shore may be discussed</p> <p>(ii) Stake monitoring should be replaced with modern technology like high resolution satellite imagery, remote sensing, SAR data, etc. to study the glacier movement and health of a glacier over time.</p> <p>(iii) Yearly data should be compared and correlated with the earlier data collected from the same area by GSI or other organisations to constrain the actual picture of change in glaciological parameters in the same region.</p> <p>(iv) As suggested in the previous TR Meetings, there should be a record of temperature and other meteorological data along with the recession and advancement records of glaciers in a particular area to constrain the climate change with time.</p> <p>(v) Similar approach, taken in the cDML, should be adopted in the Larsemann Hills area also and the data base thus generated should be compared to constrain the ice sheet dynamics between cDML and Larsemann Hills areas.</p> <p>Presentation: Very Good.</p> <p>Others: The report should be submitted in time with all the recommendations suggested by the TR Committee.</p>	<p>Very Good</p>

5	Ice Sheet Dynamics from Schirmacher Oasis to Wohlthat Mountains, cDML, East Antarctica and their stress pattern (M4POS/NC/CHQ/2018/17855).	Dr. S.P. Shukla, Director and Shri Amit Dharwadkar, Director	NCEGR Faridabad	<p>Technical Content:</p> <ul style="list-style-type: none"> (i) Comparative study to be made for three areas of investigation (ii) Flow rate of polar ice in each sector to be calculated based on mass balance calculation. (iii) Data for past years, based on the availability, may be compiled to know the pattern, if any. (iv) The method adopted for studies in this part is reasonably good one but can be made more effective by adopting new technology. (v) Stake monitoring should be replaced with modern technology like high resolution satellite imagery, remote sensing, SAR data etc. to study the glacier movement and health of a glacier over time. (vi) Yearly data should be compared and correlated with the earlier data collected from the same area by GSI or other organisations to constrain the actual picture of change in glaciological parameters in the same region or far off regions like Larsemann Hills area. (vii) As suggested in the previous TR Meetings, there should be a record of temperature and other meteorological data along with the recession and advancement records of glaciers in a particular area to constrain the climate change with time. (viii) The data collection and representation is very good but some more efforts need to be given in interpretation part keeping in view of the climate change. <p>Presentation: Very Good.</p> <p>Others: The report should be submitted in time with all the recommendations suggested by the TR Committee.</p>	Very Good
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List of participants in the Term Review Meeting of Polar Studies Division held on 29th July, 2019

Sl. No.	Name	Designation / Division
1	Dr. S. Raju	ADG & NMH-IV (Chairman)
2	Shri Prakash Chandra Patra	Dy.DG, PSS-P&M, CHQ (Member)
3	Dr. Ravindra Kumar	Dy.DG, NCEGR, Faridabad (Member)
4	Shri Nitish Das	Director (Retd.) (External Reviewer)
5	Shri Ashish Kumar Nath	Director, PSS-P&M-4, CHQ (Member)
6	Smt. Moumita Mitra Sinha	Director, CPL, CHQ (Member)
7	Dr. S.P. Shukla	Director, NCEGR Faridabad
8	Shri Amit Dharwarkar	Director, PSD, NCEGR Faridabad
9	Shri Bhrigu Shankar	Superintending Geologist, M-IVA, CHQ (Member)
10	Md. Sadiq	Sr. Geologist, PSD, NCEGR, Faridabad
11	Shri Surendra Jat	Sr. Geologist, PSD, NCEGR, Faridabad
12	Shri Abhishek Verma	Sr. Geologist, PSD, NCEGR, Faridabad
13	Shri Vikash Chandra	Sr. Geologist, PSD, NCEGR, Faridabad
14	Shri Pradeep Kumar	Sr. Geologist, PSD, NCEGR, Faridabad
15	Shri Sabyasachi Dutta	Sr. Geologist, CPL, CHQ , Kolkata
16	Shri Abhijit Sarkar	Sr. Geologist, MPSD & TC(NM-IV) Kolkata
17	Smt. Debdatta Basu	Sr. Geologist, MPSD & TC(NM-IV) Kolkata
18	Shri Praveen Baskey	STA, CPL, CHQ , Kolkata