



**SCAR Sub-Group**

**IPICS**

SG

PS

Person Responsible: Tas van Ommen



## SCAR Delegates Report 2020

# International Partnership in Ice Core Sciences (IPICS) 2018-2020 Report

## Summary

### Report Author(s)

Tas van Ommen (Australia)  
Hubertus Fischer (Switzerland)

### Summary of activities from 2018-20

Major progress since 2018 delegates meeting has been in the planning and implementation of Oldest Ice core drilling in Antarctica. This has a goal to retrieve an ice core reaching back beyond the Mid Pleistocene Transition to 1.5 Myr (details available in IPICS White Paper). Several national projects are planned with varying degrees of progress: from Australia, Japan, Korea and Russia. The European Beyond EPICA – Oldest Ice (BE-OI) project finished its reconnaissance phase in 2019 and the drilling phase officially started in June 2019. BE-OI is funded by the EU and national contributions and has established a drill site and camp at Little Dome C, around 35 km from Concordia Station.

In other activities, older ice from Antarctic blue ice areas has also featured prominently in the literature, while the ICE MEMORY initiative has progressed in its goal to retrieve and secure high alpine ice core records threatened by climate change. A number of other international activities in Greenland and Antarctica and cannot be fully described here, however the WAICSWAIN project has conducted fieldwork with an ice core retrieved to investigate the sensitivity of the West Antarctic ice sheet to warmer climate conditions in the last interglacial, and the EAIIST project conducted extensive traverse studies using ice cores retrieved from central East Antarctica.

In September 2019, a major symposium in ice core drilling was held at the University of Copenhagen, furthering this aspect of IPICS work as described in the White Paper on “Ice core drilling technical challenges”. A key difficulty has been created by the coronavirus pandemic. This has impeded planning meetings and also resulted in deferring the planned Open Science Conference from October 2020 to October 2021.

### Summary Budget 2019 to 2022

	2019	2020	2021	2022
	Spent	Allocated	Request	Request
(US\$)	3150*	3150*	0	0

\* Allocated for IPICS Open Science Conference 2020 and held on a/c at PSI for delayed OSC in 2021

## Progress to date

### Sub-group Outcomes Summary

(Summarize the above and in each case provide your sub-group name in left hand column to assist Science Group COs in compiling their reports)

Sub-group	Activity/Outcome/Benefit/Achievement
IPICS	Agreement with EGU for an ongoing special issue of TC, ESSD and CP of collected papers on the theme “Oldest Ice: finding and interpreting climate proxies in ice older than 700,000 years”
IPICS	Symposium on ice core drilling, to build and share capability and foster development of necessary technologies.
IPICS	Major field activities including continued drilling in Greenland (EGRIP) with associated capability development; site selection activities at Dome C and Dome F

### Sub-group Cash Flow

(From previous Delegates meeting to date)

Sub-group	Allocation	Amount spent		
		2018	2019	2020
IPICS	7300		3150	3150

## Future plans

### Planned activities in 2020 to 2022

Sub-group	Planned activity
IPICS	Third Open Science Conference, Switzerland, October 2021

### Planned use of funds for 2020 to 2022

We note that in recent years, IPICS has usually requested funding in the year of its Open Science Conference meetings and the year immediately prior. Thus we have no funding request for 2021 or 2022.

Year (YYYY)	Purpose/Activity	Amount (in USD)	Contact Name	Contact Email
2020	Support of ECR travel to IPICS Open Science Conference (now deferred to 2021)	3150	Margit Schwikowski	<a href="mailto:margit.schwikowski@psi.ch">margit.schwikowski@psi.ch</a>
<b>Total</b>		<b>3150</b>		

### Any additional detail on funds usage and desired results/outcomes

The funds for 2020 are retained with those allocated in 2019 with the organisers in Switzerland of the Open Science Conference which has been deferred to 2021 due to the coronavirus pandemic.

### Percentage of the budget to be used for support of early-career researchers

2020: 100% to ECR travel grants  
 2021: nil requested  
 2022: nil requested

### Percentage of the budget to be used for support of scientists from countries with developing Antarctic programmes

2020: nil allocatable  
 2021: nil requested  
 2022: nil requested

## Membership

### Leadership

Role	First Name	Last Name	Affiliation	Country	Email	Date Started	Date Term is to End
Co-chair	Hubertus	Fischer	Uni. Bern	Switzerland	Hubertus.Fischer@climate.unibe.ch	Aug 2017	2021
Co-chair	Tas	van Ommen	Australian Antarctic Division	Australia	Tas.van.ommen@awe.gov.au	Aug 2017	2021

*Please identify early-career researchers with \* in first column*

### Other members

First Name	Last Name	Affiliation	Country	Email
Nerilie	Abram	Australian National University	Australia	<a href="mailto:nerilie.abram@anu.edu.au">nerilie.abram@anu.edu.au</a>
Nobuhiko	Azuma	Nagaoka University of Technology	Japan	<a href="mailto:azuma@mech.nagaokaut.ac.jp">azuma@mech.nagaokaut.ac.jp</a>
Carlo	Barbante	IDPA-CNR, University Ca' Foscari, Venice	Italy	<a href="mailto:barbante@unive.it">barbante@unive.it</a>
Nancy	Bertler	Victoria University of Wellington	New Zealand	<a href="mailto:nancy.bertler@vuw.ac.nz">nancy.bertler@vuw.ac.nz</a>
Ed	Brook	Oregon State University	USA	<a href="mailto:brooke@geo.oregonstate.edu">brooke@geo.oregonstate.edu</a>
Alison	Criscitiello	University of Alberta	Canada	<a href="mailto:crisciti@ualberta.ca">crisciti@ualberta.ca</a>
Dorthe	Dahl-Jensen	University of Copenhagen	Denmark	<a href="mailto:ddj@gfy.ku.dk">ddj@gfy.ku.dk</a>
Kumiko	Goto-Azuma	NIPR	Japan	<a href="mailto:kumiko@nipr.ac.jp">kumiko@nipr.ac.jp</a>
Margareta	Hansson	University of Stockholm	Sweden	<a href="mailto:margareta.hansson@natgeo.su.se">margareta.hansson@natgeo.su.se</a>
Soon	Do Hur	Korea Polar Research Institute	Korea	<a href="mailto:sdhur@kopri.re.kr">sdhur@kopri.re.kr</a>

## IPICS: 2018-2020 Report, cont.

Elizabeth	Isaksson	Norsk Polarinstitut	Norway	<a href="mailto:elli@npolar.no">elli@npolar.no</a>
Jay	Johnson	Ice Coring and Drilling Services	USA	<a href="mailto:jay.johnson@ssec.wisc.edu">jay.johnson@ssec.wisc.edu</a>
Fabrice	Lambert	Catholic University of Chile	Chile	<a href="mailto:lambert@uc.cl">lambert@uc.cl</a>
Amaelle	Landais	LSCE, Saclay	France	<a href="mailto:amaelle.landais@lsce.ipsl.fr">amaelle.landais@lsce.ipsl.fr</a>
Vladimir	Lipenkov	Arctic and Antarctic Research Institute	Russia	<a href="mailto:lipenkov@aari.nw.ru">lipenkov@aari.nw.ru</a>
Thamban	Meloth	NCAOR	India	<a href="mailto:meloth@ncaor.gov.in">meloth@ncaor.gov.in</a>
Heinz	Miller	Alfred Wegener Institute	Germany	<a href="mailto:Heinz.Miller@awi.de">Heinz.Miller@awi.de</a>
Rob	Mulvaney	British Antarctic Survey	UK	<a href="mailto:RMU@bas.ac.uk">RMU@bas.ac.uk</a>
Joel	Savarino	Université Grenoble Alpes	France	<a href="mailto:joel.savarino@univ-grenoble-alpes.fr">joel.savarino@univ-grenoble-alpes.fr</a>
Elisabeth	Schlosser	University of Innsbruck	Austria	<a href="mailto:Elisabeth.Schlosser@uibk.ac.at">Elisabeth.Schlosser@uibk.ac.at</a>
Margit	Schwikowski	Paul Scherrer Institut	Switzerland	<a href="mailto:margit.schwikowski@psi.ch">margit.schwikowski@psi.ch</a>
Jeff	Severinghaus	Scripps Institute of Oceanography	USA	<a href="mailto:jseveringhaus@ucsd.edu">jseveringhaus@ucsd.edu</a>
Hou	Shugui	Nanjing University	China	<a href="mailto:shugui@nju.edu.cn">shugui@nju.edu.cn</a>
Jefferson	Simoes	Universidade Federal do Rio Grande do Sul - UFRGS	Brazil	<a href="mailto:jefferson.simoes@ufrgs.br">jefferson.simoes@ufrgs.br</a>
Barbara	Stenni	University of Venice	Italy	<a href="mailto:barbara.stenni@unive.it">barbara.stenni@unive.it</a>
Thomas	Stocker	University of Bern	Switzerland	<a href="mailto:stocker@climate.unibe.ch">stocker@climate.unibe.ch</a>
Bo	Sun	Polar Research Institute of China	China	<a href="mailto:sunbo@pric.org.cn">sunbo@pric.org.cn</a>
Elizabeth	Thomas	British Antarctic Survey	UK	<a href="mailto:liith@bas.ac.uk">liith@bas.ac.uk</a>
Thorsteinn	Thorsteinsson	Icelandic Met Office	Iceland	<a href="mailto:thor@vedur.is">thor@vedur.is</a>
Jean-Louis	Tison	Université Libre de Bruxelles	Belgium	<a href="mailto:jtison@ulb.ac.be">jtison@ulb.ac.be</a>
Rein	Vaikmäe	Tallinn University of Technology	Estonia	<a href="mailto:Rein.Vaikmae@ttu.ee">Rein.Vaikmae@ttu.ee</a>
R.	Van de Wal	University of Utrecht	Netherlands	<a href="mailto:r.s.w.vandewal@phys.uu.nl">r.s.w.vandewal@phys.uu.nl</a>
Frank	Wilhelms	Alfred Wegener Institute	Germany	<a href="mailto:Frank.Wilhelms@awi.de">Frank.Wilhelms@awi.de</a>
*John	Fegyveresi	Boston University / CRREL	USA	<a href="mailto:johnfegy@bu.edu">johnfegy@bu.edu</a>
Eric	Wolff	University of Cambridge	UK	<a href="mailto:ew428@cam.ac.uk">ew428@cam.ac.uk</a>
Li	Yuansheng	Polar Research Institute of China	China	<a href="mailto:liyuansheng@pric.org.cn">liyuansheng@pric.org.cn</a>

*Please identify early-career researchers with \* in first column*

### Additional information (optional)

*Please add any more detail here that you wish, on your subgroup activities, papers published, etc.*

### Notable Papers

1. Buizert, C., Sigl, M., Severi, M., Markle, B.R., Wettstein, J.J., McConnell, J.R., Pedro, J.B., Sodemann, H., Goto-Azuma, K., Kawamura, K., Fujita, S., Motoyama, H., Hirabayashi, M., Uemura, R., Stenni, B., Parrenin, F., He, F., Fudge, T.J., Steig, E.J., 2018. Abrupt ice-age shifts in southern westerly winds and Antarctic climate forced from the north. *Nature* 563, 681-685.
2. Baggenstos, D., Häberli, M., Schmitt, J., Shackleton, S.A., Birner, B., Severinghaus, J.P., Kellerhals, T., Fischer, H., 2019. Earth's radiative imbalance from the Last Glacial Maximum to the present. *Proceedings of the National Academy of Sciences* 116, 14881-14886.

3. Brugger, S.O., Gobet, E., Blunier, T., Morales-Molino, C., Lotter, A.F., Fischer, H., Schwikowski, M., Tinner, W., 2019. Palynological insights into global change impacts on Arctic vegetation, fire, and pollution recorded in Central Greenland ice. *The Holocene*, 0959683619838039.
4. Fischer, H., Schmitt, J., Bock, M., Seth, B., Joos, F., Spahni, R., Lienert, S., Battaglia, G., Stocker, B.D., Schilt, A., Brook, E.J., 2019. N<sub>2</sub>O changes from the Last Glacial Maximum to the preindustrial – Part 1: Quantitative reconstruction of terrestrial and marine emissions using N<sub>2</sub>O stable isotopes in ice cores. *Biogeosciences* 16, 3997-4021.
5. Hmiel, B., Petrenko, V.V., Dyonisius, M.N., Buizert, C., Smith, A.M., Place, P.F., Harth, C., Beaudette, R., Hua, Q., Yang, B., Vimont, I., Michel, S.E., Severinghaus, J.P., Etheridge, D., Bromley, T., Schmitt, J., Faïn, X., Weiss, R.F., Dlugokencky, E., 2020. Preindustrial 14CH<sub>4</sub> indicates greater anthropogenic fossil CH<sub>4</sub> emissions. *Nature* 578, 409-412
6. Markle, B.R., Steig, E.J., Roe, G.H., Winckler, G., McConnell, J.R., 2018. Concomitant variability in high-latitude aerosols, water isotopes and the hydrologic cycle. *Nature Geoscience* 11, 853-859.
7. Nicewonger, M.R., Aydin, M., Prather, M.J., Saltzman, E.S., 2018. Large changes in biomass burning over the last millennium inferred from paleoatmospheric ethane in polar ice cores. *Proceedings of the National Academy of Sciences* 115, 12413.
8. Rubino, M., Etheridge, D.M., Thornton, D.P., Howden, R., Allison, C.E., Francey, R.J., Langenfelds, R.L., Steele, P.L., Trudinger, C.M., Spencer, D.A., Curran, M.A.J., van Ommen, T.D., Smith, A.M., 2018. Revised records of atmospheric trace gases CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O and δ<sup>13</sup>C<sub>2</sub>O<sub>2</sub> over the last 2000 years from Law Dome, Antarctica. *Earth Syst. Sci. Data Discuss.* 2018, 1-30.
9. Yan, Y., Bender, M.L., Brook, E.J., Clifford, H.M., Kemeny, P.C., Kurbatov, A.V., Mackay, S., Mayewski, P.A., Ng, J., Severinghaus, J.P., Higgins, J.A., 2019. Two-million-year-old snapshots of atmospheric gases from Antarctic ice. *Nature* 574, 663-666.

### **Direct support from outside organisations received for your activities**

*(Numbered list with values indicated if direct cash support. Please restrict in-kind support to substantive in-kind support only)*

PAGES has supported travel grants of early career scientists and from developing programs/nations for the upcoming Open Science Conference – total USD10,000.

### **Major collaborations your Science Group has with other SCAR groups and with organisations/groups beyond SCAR**

*(Numbered list of substantive collaborations)*

#### **Within SCAR**

1. ACCE

#### **Outside SCAR**

1. PAGES

### **Outreach, communication and capacity-building activities**

*Brief highlights of any activities undertaken since the SCAR Delegates meeting in 2018.*

During 2018 IPICS reached agreement from EGU for a special issue in the form of collected papers on the theme “Oldest Ice: finding and interpreting climate proxies in ice older than 700 000 years”. This special issue is a continuing inter-journal collection across three EGU journals (TC/CP/ESSD). Another joint special issue has been agreed upon with TC and CP summarizing the results of the IPICS OSC in 2021.

Organization of the IPICS Open Science Conference and of the ICYS Early Career Researcher (ECR) workshop in Crans Montana, Switzerland, in October 2021 is advance, although now delayed from its original 2020 timing. The scientific committee has defined an attractive science program and invited keynote speakers (<https://indico.psi.ch/event/6697/>). Abstract submission is now open until end of April 2020. The Local Organizing committee has secured the venue, hotels as well as financial support, among others with the gratefully acknowledged support of travel grants for ECRs from less favoured regions by PAGES.

### **SCAR fellowship reviewers**

*Please list one or more people (name and email address) from your group who would be willing to serve as reviewers for the next few years, along with 1-3 keywords on their principal expertise.*

<b>First Name</b>	<b>Last Name</b>	<b>Email</b>	<b>Principal Expertise</b>
<b>Tas</b>	van Ommen	As above	Ice core sciences, mass balance, glaciology
<b>Hubertus</b>	Fischer	As above	Ice core sciences, palaeoclimate generally

In addition we suggest that other members of IPICS would be open to approaches by SCAR. Past co-chairs Eric Wolff and Ed Brook would be almost certain acceptances.