

50th Anniversary of the First International Conference on Permafrost

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Guest Editorial

The 50th Anniversary of the First International Conference on Permafrost and Beyond

This year marks the 50th anniversary of the First International Conference on Permafrost (ICOP), held at Purdue University's School of Civil Engineering in West Lafayette, Indiana, USA, 11–15 November 1963 (Woods and Leonard, 1964). The conference was a historic event in that it brought together, for the first time, leading researchers and practitioners from North America and other countries with diverse interests and activities in the study and applications of perennially frozen ground, cold regions engineering and related laboratory investigations. The 285 registered participants represented engineers, researchers, manufacturers and builders from the USA (231), Canada (42), the USSR (5), Sweden (3) and Argentina, Austria, Great Britain, Japan, Norway, Poland, Switzerland and West Germany.

The conference was organised by the Building Research Advisory Board of the US National Academy of Sciences–National Research Council (NAS-NRC). The carefully edited volume, published in 1966 by the NAS, is considered to be the first multinational, English-language collection of papers devoted entirely to permafrost topics. In addition, a special book prepared in the USSR containing 26 papers organised into nine topical themes.

Unlike most conferences, there were only plenary sessions, however, individual papers were not presented by the authors; instead, panels of experts discussed each paper, which was followed by audience responses. Preprints of papers were available. The 100 published papers followed closely the actual conference programme and panel discussions:

- soils and vegetation (9)
- massive ground ice (10)
- geomorphology (16)
- phase equilibrium and transition (8)
- thermal aspects (8)
- physico-mechanical properties (7)
- exploration and site selection (11)
- sanitary and hydraulic engineering (14)
- earthwork and foundations (17)

The closing session included summary reports by the panel moderators. These reports and discussions, published in the *Proceedings*, reflected the relevant issues of that period. Many of these are pertinent today and are recommended reading for

students, young researchers and established professionals. Although the original printed *Proceedings* volume may no longer be readily available for purchase, it is accessible in many university and government libraries, and it is obtainable via the ICOP DVD (IARC, 2008) and on several permafrost web sites. Organisational details of the conference are available in the archives of the US National Academy of Sciences and include correspondence provided from the personal files of Troy L. Péwé, a co-chair of the panel on massive ground ice.

Participation of USSR delegates in the Purdue conference was among the first post-World War II contacts between permafrost researchers from the former eastern and western blocs, and was based on a formal 1962 letter of invitation by President Seitz of the US National Academy of Sciences–National Research Council to President Keldysh of the Academy of Sciences of the USSR (Brown, 2012). Three prominent USSR permafrost researchers participated: P.I. Melnikov, S.S. Vyalov and N.A. Tsytovich. The *Proceedings* included additional papers by well-known USSR authors who did not attend, including Baronov, Kudravtsev, Dostovalov, Nerseova, Popov, Shumskiy and Vtyurin.

The conference's resolutions recommended that a second international conference be planned and held with the objectives of further interdisciplinary support and participation. The Purdue conference essentially broke the 'ice' between East and West permafrost researchers and set the stage for the Second ICOP. That conference, organised by P.I. Melnikov (Director of the Permafrost Institute in Yakutsk), was convened in 1973 and represented the first large international conference held in this restricted area of Siberia, and followed a smaller conference in 1969 (Brown, 2012). These achievements were the result of Academician Melnikov's vision and leadership.

All subsequent permafrost conferences maintained the interdisciplinary principles set forth at the Purdue meeting, and had both plenary and special thematic sessions, but the review papers were not always published in the conference *Proceedings*. These conferences included two more in the USA (Fairbanks 1983, 2008), two in Canada (Edmonton 1978, Yellowknife 1998), one each in Trondheim, Norway (1988), Beijing, China (1993) and Zurich, Switzerland (2003), and a second conference in Russia (Salekhard 2012) (Table 1). Following the formation of the International Permafrost Association at the 1983 ICOP, subsequent conferences

Table 1 Statistics for the ten international conferences on permafrost and publications.

Conference	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Year	1963	1973	1978	1983	1988	1993	1998	2003	2008	2012
Location	USA	USSR	Canada	USA	Norway	China	Canada	Switzerland	USA	Russia
Registrants	285	400	452	851	305	275	268	296	685	550
Countries represented	9	16	13	24	19	21	25	24	33	24
Plenary sessions ^a	All	All	8	6	8	3	2	6	5	7
Proceedings volumes	1	2 ^b	2	2	3	2	1	2	2	5
Pages	563	1649	1202 (428) ^c	1937	1620	1360	1276	1322	2100	1047 ^d
Papers	104	87 (190) ^e	147	276	289	189	188	230	358	194
Abstract volume(s)	1	1	1		1	1	1	2	2	2 ^d
Extended Abstracts [pages]								96 [194]	187 [372]	374 [688]

^aTechnical plenary sessions not including opening and closing ceremonies.

^bEight, hard-covered volumes were published in Russian and papers subsequently translated and published by the US National Academy of Sciences.

^cNRCC volume of translated papers that appear in Russian and French in the Proceedings volumes.

^dDoes not include the two volumes of papers and extended abstracts in Russian.

^eTranslated Russian volume includes some abstracts.

were coordinated under the auspices of the IPA. A review of the first eight conferences is available (Brown and Walker, 2007) and in a NICOP (ICOP 9) brochure published in celebration of the 25th anniversary of IPA and commemoration of the Fourth International Polar Year (Walker and Brown, 2008). Starting with the NICOP conference, the Permafrost Young Researchers Network (PYRN) participated in and contributed to conference activities.

Because plenary papers and thematic reviews hold special importance as temporal benchmarks illustrating the state of the science at the time of their appearance, it is worth reviewing approaches employed for each conference and the corresponding topics, and if these presentations were actually published in the *Proceedings*. Table 2 contains a summary of the actual topics presented in plenary, special or topical sessions for all ten conferences. For most conferences these presentations were published as part of the conference publications. Several topics appear in a number of conferences, including ground ice, thermal conditions, mountain permafrost and select engineering topics, including pipelines and other linear construction. More recently reviews related to coastal, subsea and mountain permafrost, carbon, climate change, planetary and Southern Hemisphere permafrost were presented and published. Interest in the subject of ground ice remains relevant as discussions increase on the topics of climate change, thermokarst and carbon content of permafrost terrains. For NICOP a special issue of this journal was available at the conference and contained seven review papers (Lewkowicz, 2008), in addition to the 17 plenary papers published in the *Proceedings*.

Throughout the 50-year history of International Conferences on Permafrost, publication of *Proceedings* has been the major legacy of each conference. Although the publishers and editors for each *Proceedings* differed between conferences, standards were generally maintained in terms of scientific rigour, originality and format, requiring two formal peer reviews per paper, and a limit of six pages. The period from submission, through review, to actual presentation varied from 9 months to 1.5 years, depending on procedures utilised by the hosting country and, more recently, on use of electronic resources and the Internet to replace conventional publishing procedures and postal services. Over the course of the 50 years more than 2000 papers in English were published in the ICOP *Proceedings*, involving the efforts of many hundreds of reviewers (Table 1). Each *Proceedings* had one or more dedicated editors and a responsible organisation. Beginning with the Eighth ICOP, a second form of publication was initiated involving *Extended Abstracts*. One of the rationales for the *Extended Abstracts* was to make available timely results that would not have been available in the multiyear publication process. These abstracts were limited to two pages, were generally submitted within 6 months of the conference and did not undergo outside technical review.

For the most recent conference (TICOP), a third form of publication was proposed and appeared as the *Transactions of the IPA* in the April 2013 issue of this journal (Burn, 2013). At

Table 2 Conference topics for plenary, special and/or theme sessions and related papers published in the Proceedings.

First (1963-USA)	Second (1973-USSR)	Third (1978-Canada)	Fourth (1983-USA)	Fifth (1988-Norway)	Sixth (1993-China)
Plenary Sessions	Topical Sessions	Theme Papers	Panel Sessions	Special Sessions	Special Sessions
N America permafrost Permafrost problems Soils/vegetation Ground ice Geomorphology Phase change Thermal aspects Physico-mechanical Exploration Sanitary/hydraulic Earthwork/foundations	N America reviews Thermal Distribution Ground ice Physics/mechanics Groundwater Mapping Construction USSR Reviews	Ground ice Hydrogeology E. Siberia Vegetation/reevegetation Disturbance/protection Geophysics Structures Dams Alaska pipeline	Foundations/embankments Heave/ice segregation Subsea permafrost Pipelines Environmental protection Climate/geothermal	Temperature/climate Climate change Svalbard Coasts North America Coastal processes Railway Canada Airfields Alaska Yamal development also published in <i>Frost I Jord No. 27</i>	Changing climate Human changes Degradation QTH Periglacial/mountain Mountains N America Mountains Europe Mountains Asia Linear construction Frost damage China
Seventh (1998-Canada)	Eighth (2003-Switzerland)	Ninth (2008-USA)	Tenth (2012-Russia)		
Plenary Lectures	Plenary Lectures	Plenary Sessions	Plenary Lectures		
Field investigations NA Geothermal/engineering Living with frozen ground	Lowlands permafrost Mountain permafrost Ice age permafrost Subsea permafrost Southern Hemisphere Planetary/astrobiology Plenary Reviews (12) Exploraton (2) Interactions (2) Properties Infrastructure (3) Slopes Modelling Warming Monitoring	Living in Alaska Climate simulations Thermal state TAPS design Thermokarst Thermal State Russia Europe Active layer Central Asia Engineering Design Geotechnics Russian approaches Qinghai-Tibet railway	(Ninth Plenary cont'd) Processes Hydrology* Trace gas budget Heat-water transfer Subglacial freezing* Washburn tribute Antarctic periglacial Alpine perspective Polar periglacial Mass movement* PPP Special Issue* Remote sensing Modelling Geophysical Past permafrost Frost weathering Lowland periglacial	Carbon budget* Engineering guidelines Coastal/subsea* Engineering advances* Map Russia* Mountain permafrost* Thermokarst* Monitoring (Norway) Antarctic* PPP Transactions* Coasts Carbon Mountain permafrost Geophysics Coastal/subsea Thermokarst	

*Not in Proceedings.

the IPA Council meetings in Svalbard in June 2010, following lengthy discussions about *Proceedings* publications, C.R. Burn proposed that the IPA initiate a 'Transactions' intended to summarise developments in various subfields of geocryology through the publication of review papers. The *Transactions* also would be available at the time of the each ICOP and ideally a lead author would present a summary in a plenary session, as has been the case with review papers at many ICOPs. Presumably, the *Transactions* also would be available electronically to all conference participants and serve as a permanent record of each ICOP.

Six review papers were published in this first *Transactions* and are downloadable free of charge. These papers cover several major permafrost topics: coasts, carbon, mountains, geophysics, geochemistry and thermokarst. The nine TICOP plenary presentations included the following topics (Table 2): engineering guidelines, recent advances in engineering and mountain permafrost, carbon budget, coastal and subsea permafrost, thermokarst and three regional topics (Russian mapping, Norwegian thermal monitoring and Antarctic permafrost). Thus, four topics were common to both the *Transactions* and plenary presentations, with only one topic (mountain permafrost) presented by the same lead author. For the record, the TICOP *Proceedings* and *Extended Abstract* volumes were available in both paper and digital format at the conference (Drozdov, 2012; Hinkel, 2012; Melnikov *et al.*, 2012).

The production of this first *Transactions* admittedly was more challenging than originally anticipated, and therefore the publication was not available for the TICOP. As reported by Burn (2013), important lessons were learned and this experience needs to be codified for future productions. The current *Transactions* partially fulfilled the precedents for conference state-of-the-art reviews, but lacked engineering topics. In the future, the *Transactions* reviews, presented in ICOP plenary sessions, ideally would continue to follow the heritage and recommendation of the 1963 ICOP to convene 'interdisciplinary' conferences, and thus cover both permafrost science and engineering. This would require coordination between the *Transactions*' editor(s) and the conference organisers so that plenary presentations reflect the main topics of the *Transactions* and *vice versa*. Such a process would require planning of 2 years or more in advance of the actual conference. As *Transactions* become more sustained, one would expect that the title of each volume would be readily identified with the actual numbered ICOP.

There still remains some discussion as to whether or not the *Transactions* and *Extended Abstracts* volume adequately replace the production and benefits of the more traditional, peer-reviewed *Proceedings*. Although the majority of IPA member countries prefer not to have peer-reviewed *Proceedings*, any future host country may presumably still have the option as to the type of publications it produces. Although many among the younger generation prefer journal publications over traditional *Proceedings*, the engineering community among other researchers favours *Proceedings* as a form of professional recognition and distribution of peer-reviewed

results. For example, publications of engineering papers in proceedings are included for recent conferences in Calgary (GEO, 2010) and in Anchorage, Alaska, in June 2013; the 10th International Symposium on Cold Region Development (ISCORD) with the *Proceedings* produced by the American Society of Civil Engineers as the host organisers (Zufelt, 2013).

The International Permafrost Association remains the lead permafrost organisation, representing collectively both the international permafrost scientific and engineering communities. Preparation of internationally, peer-reviewed conference publications would continue to enhance this unique leadership and ensure comprehensive and timely reporting on a regular 4-year basis. As the character of our science and engineering evolves, I urge the members of IPA to reconsider the values of the more traditional, peer-reviewed *Proceedings*.

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