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THE IGU PERIGLACIAL COMMISSION AND ITS ROLE FROM 1980 UNTIL 1996¹

Abstract

The activities and achievements of two IGU Commissions, 'The Significance of Periglacial Phenomena' (1980–1988) and 'Frost Action Environments' (1988–1996), are outlined. Their time period of operation saw an expansion of the international periglacial community, the continued growth of field studies in high latitude periglacial environments, a re-assessment of the significance of many Pleistocene periglacial phenomena, and the emergence of laboratory studies at Caen and elsewhere. During the same period, The International Permafrost Association (IPA) was founded, the *Biuletyn Peryglacjalny* experienced publication problems, and a new international journal *Permafrost and Periglacial Processes* was started.

Résumé des auteurs

On donne ici un aperçu des activités et des réalisations des deux Commissions de l'IGU: la signification des phénomènes périglaciaires (1980–1988) et les Milieux périglaciaires (1988–1996). Durant cette période il y a eu une expansion de la communauté périglaciaires internationale, une augmentation continue du nombre d'études de terrain aux hautes latitudes a environnements périglaciaires, une réinterprétation de la signification de nombreux phénomènes périglaciaires pléistocènes et l'émergence de recherches expérimentales à Caen et ailleurs. Pendant la même période, l'Association internationale du pergélisol (AIP) a été créée, le *Biuletyn Peryglacjalny* a connu des problèmes de publication et un nouveau journal international *Permafrost and Periglacial Processes* a été lancé.

INTRODUCTION

At the XXIV IGU Congress in Tokyo, Japan, in 1980, a carefully prepared submission to Council by ALBERT PISSART, to upgrade the 'Co-ordinating Committee for Periglacial Research' to the status of a Full Com-

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mission, was approved. The new Commission had the deliberately ambiguous title "The Significance of Periglacial Phenomena". This approval marked a most critical turning point in the development of periglacial geomorphology within the IGU.

During the previous eight years, it had become clear that the international periglacial community had expanded beyond the mainly European-oriented and Pleistocene interests of the earlier Commissions. In spite of links made in the 1960's between the Commission and both its sibling geomorphology Commissions in the IGU (e.g. see *Biuletyn Peryglacjalny*, no. 18; PISSART and MACAR, 1974) and with the INQUA loess and palaeo-geographical communities (e.g. see *Biuletyn Peryglacjalny*, no. 20; no. 23), a gap had developed between the Pleistocene periglacial community in Europe and the permafrost-dominated scientific communities in North America and the USSR. In these regions, Pleistocene periglacial studies were largely, but not exclusively, the preserve of Quaternary geologists. By contrast, in Western Europe the geographical tradition largely persisted. Moreover, with the exception of the Scandinavians, relatively few members of the European periglacial community had in-depth experience of the continental high latitudes, such as those that occur in Siberia, Alaska and northern Canada. This became very apparent at the Third International Conference on Permafrost, held in Edmonton, Canada, in 1978. As in earlier international permafrost conferences, this conference was dominated by North American and Soviet scientists. For example, of the total of over 160 papers published in the two Proceedings volumes from this conference (National Research Council of Canada, 1978), less than 20 were from outside these three countries. Very few non-North American delegates participated in the field excursions that were an integral part of the conference. Equally, only three North Americans had attended the 1975 Aberystwyth meeting (R. J. E. BROWN, O. J. FERRIANS, J. R., and H. M. FRENCH) and only four had attended the 1979 field excursion to northernmost Fennoscandia (O. J. FERRIANS, JR., H. M. FRENCH, P. GANGLOFF, S. A. HARRIS).

When these facts were considered, and in light of the significant advances demonstrated at the two earlier conferences in Lafayette (USA) in 1963 and Yakutsk (USSR) in 1973, it was clear that the previous 20 years had witnessed a most significant advance in the understanding of frost-action processes and permafrost terrain. There was an urgent need for communication between the two communities.

The objective of the new IGU Commission was to achieve this knowledge transfer. The deliberately ambiguous title was chosen in order to allow both Quaternary scientists working in mid-latitudes and those involved in high-latitude permafrost and periglacial investigations to jointly participate. On the one hand, the palaeo-environmental significance

of certain Pleistocene periglacial phenomena could be re-evaluated in the light of analogous present day occurrences and/or processes. On the other hand, the relevance of an understanding of the high latitudes, as regards resource exploitation, economic development and world politics, was an obvious stimulus for applied periglacial research.

THE COMMISSION ON THE SIGNIFICANCE OF PERIGLACIAL PHENOMENA 1980–1988

The President of the Commission that was established in Tokyo in 1980 was HUGH FRENCH (Ottawa, Canada) and the Secretary was JOHANNES KARTE (Bonn, Germany). The following were Full Members: JAN GOŹDZIK (Łódź, Poland), JEAN-PIERRE LAUTRIDOU (Caen, France), YUGO ONO (Sapporo, Japan), TROY PÉWÉ (Tempe, USA), ALBERT PISSART (Liège, Belgium) and ANDREJ VELICHKO (Moscow, USSR).

The Commission embarked on a program which involved the organization or sponsorship of meetings and symposia which, as prime ingredients, allowed for dialogue and field experience. To begin with, emphasis was placed upon problematic or poorly understood frost-action environments and the cold, continental higher latitudes.

The first significant activity was a small, well-organized field meeting to the highlands of central Iceland in late August 1982. This was led by EKKHARD SCHUNKE and KUNO PRIESNITZ and involved a total of 19 persons from 9 countries. A record of this meeting, and of the scientific paper session that was held in Reykjavik, is published in a special issue of *Polarforschung*. The names of the participants are listed in the frontispiece to this issue. In retrospect, this was an important meeting since it resulted in further discussions the following year, at Fairbanks, Alaska, especially during the B-3 extended field excursion to the Yukon and Mackenzie Delta regions of Canada (see below), and set the agenda for the special session at the XXV IGU Congress in Paris in 1984. The end result was a collection of in-depth state-of-the-art syntheses published in 1988 (CLARK, 1988).

This initial meeting in Iceland was followed by activities linked to the large Fourth International Conference on Permafrost, held in Fairbanks, Alaska, in July 1983. In contrast to earlier conferences, there was significant participation by non-North American, non-Soviet periglacial scientists. The Technical Program included several sessions dealing with Pleistocene periglacial issues. Approximately one half of the over 300 papers published in the Proceedings volume are of periglacial interest and, in the Proceedings Volume (National Academy of Sciences, 1983), they were grouped under the general headings of erosion, frost heave and susceptibility, ground ice, ground water and icings, hydrology, patterned

ground and frost features, permafrost history and weathering. A small sub-committee of the main Review Committee, consisting of TROY PÉWÉ, BOB BLACK and HUGH FRENCH, oversaw the review of all these papers and the formal inclusion of periglacial studies within the permafrost structure. A local field-trip, in the immediate vicinity of Fairbanks to observe permafrost phenomena first-hand, was available to all conference participants and 38 persons continued on the Commission's post-conference B-3 field excursion to the Yukon and Mackenzie Delta regions of Canada. This was led by HUGH FRENCH, and section leaders included STUART HARRIS, DAVID HARRY, ROBERT VAN EVERDINGEN, WAYNE POLLARD, ALAN HEGINBOTTOM, CHARLES TARNOCAI and J. ROSS MACKAY. There were other pre- and post-conference extended field excursions to different parts of Alaska. A guidebook for the B-3 field excursion was published (FRENCH and HEGINBOTTOM, 1983) and reports on the others, including names of participants, are also available (see National Academy of Sciences, 1984, p. 347-368).

The mandate of the Commission was renewed at the XXV IGU Congress in Paris, France, in late August, 1984. This was preceded by a symposium at Vars, Alpes Francaises, organized by JEAN-PIERRE LAUTRIDOU, and attended by 36 persons. Field excursions were organized jointly by the CNRS-Caen and Aix-en-Provence research groups (LAUTRIDOU, 1984). Alpine periglacial phenomena were examined in the Vanoise, the Tete Noire du Galibier, the Combe de Laurichard, the Massif de La Mortice, and the Massif de Chambeyron. Field leaders included BRIGITTE KAISER, ERIC CHALEUR, BERNARD FRANCOU, PIERRE GABERT, JEAN-PIERRE LAUTRIDOU, BRIGITTE VAN VLIET-LANOË, JEAN-CLAUDE OZOUF, MARTINE CLET, J.-P. COUTARD and ALBERT PISSART. Completion of this activity meant that seasonal frost, perennial frost, and alpine frost environments had all been examined within the first term of the Commission.

The intimate link between periglacial geomorphology and Quaternary studies aimed at palaeo-geographical reconstructions was investigated by the Commission during its second mandate.

In late September, 1985, in association with the inaugural meeting of the International Association of Geomorphologists, in Manchester, U.K., the Commission sponsored a symposium entitled 'Periglacial processes and landforms in Britain and Ireland'. This was followed by a weekend field excursion, attended by approximately 35 participants, to the English Lake District (BOARDMAN, 1985). Stratified scree and other slope deposits, presumed pingos scars, protalus ramparts and contemporary patterned ground (sorted stripes) were examined. The field excursion was organized jointly with the Quaternary Research Association (UK). At the Manchester meeting, the Commission resolved to maintain close links with the International Association of Geomorphologists. As a result, ALBERT PISSART

presented a plenary lecture at the Second International Conference on Geomorphology, in Frankfurt/Main in 1989 (PISSART, 1990).

In August 1986, the Commission sponsored a field meeting jointly with the INQUA Commission on Loess (Chairman: MARTON PEČSI). The objectives were to examine loess from the points of view of sedimentology and stratigraphy, to specify research methods for identifying loess and other periglacial deposits, and to assess the palaeo-geographic significance of their occurrence. This meeting, attended by over 50 persons and organized by JEAN-PIERRE LAUTRIDOU, DAVID KEEN and JEAN-LOUIS MONNIERE, took place in Normandy, Jersey, and Brittany (LAUTRIDOU *et al*, 1986).

A logical extension to the 1985 and 1986 meetings was provided by the XII INQUA Congress, held in Ottawa, Canada, in early August, 1987. The Commission sponsored a special session on the theme 'Comparative studies of active, inactive and Pleistocene periglacial phenomena'. Three paper sessions and one poster session were held and over 30 papers were presented in total. The organizers were HUGH FRENCH and EDUARD KOSTER. Special issues of the *Journal of Quaternary Science and Zeitschrift für Geomorphologie* were published as a result.

In addition to the organization or sponsorship of international meetings, a notable initiative of the Commission in its early years was its support of the formal establishment of a 'Nordic Group'. This group, under the dual leadership of ANDERS RAPP and HARALD SVENSSON, held its first 'Nordiskt Symposium i Frostmarksmorfologi' in southern Sweden (Lund-Bastad) in early September 1982. This was followed by a second meeting of the group at Ny-Alesund, Svalbard, in August 1987 organized by OLAV LIESTOL and JOHAN SOLLID. Again, special issues of *Geografisk Tidsskrift* and *Norsk Geografisk Tidsskrift* record these meetings.

In a similar fashion, the Commission supported the establishment of a South American group in Argentina under the leadership of A. CORTE. This group held meetings in Mendoza in 1983, in San Juan in 1984, and at Santa Cruz in 1986. Three publications record these meetings and the papers that were presented (IANIGLA, 1983, 1984, 1986).

The Commission saw no need to formally sponsor any activities at the Fifth International Conference on Permafrost, held in Trondheim, Norway, in August 1988. It was clear that there was substantial periglacial involvement in the meeting (see the participants list; Norwegian Committee on Permafrost, 1988, Volume Three, p. 77-86). However, the support provided to the Nordic Group undoubtedly assisted in the preparation of the pre- and post-conference excursions to Svalbard. As with the earlier conference in Fairbanks, a large number of periglacial papers were presented on a wide range of topics and were subsequently published in the Proceedings volumes (SENNESET, 1988). For the first time, there were a large number of periglacial papers submitted by Chinese scientists.

In practical terms, the Trondheim conference was the last time the Commission members formally met. Later that month, a proposal for a new Commission was presented, in absentia, at the XXVI IGU Congress in Sydney, Australia, under the title 'The Commission on Frost Action Environments'. This was subsequently approved.

Publications arising out of the work of the Commission are listed at the end of this paper. It is clear that the 1982 meeting in Iceland was pivotal. It was at this meeting, in a remote hut in the Highlands of Central Iceland, that members of the group discussed the 'significance' aspect of the Commission title. It was resolved to discuss the 'significance' of ambiguous periglacial phenomena at the IGU meeting in Paris in 1984; subsequently these presentations were published in 1988. The links with INQUA and the Quaternary interests of the Commission were maintained by field meetings in association with the INQUA Loess Commission and with the QRA (UK). At the same time, there was substantial participation in the Fourth and Fifth International Conferences on Permafrost, field meetings in the French Alps and Iceland, and the activities of the Nordic Group. In fact, by the time the Fifth International Conference on permafrost had ended, it was clear that there was excellent communication between the international periglacial, permafrost and Quaternary communities, and significant advances had been reported.

THE COMMISSION ON FROST ACTION ENVIRONMENTS 1988-1996

The Commission on Frost Action Environments was formally approved at the XXVI IGU Congress in Sydney, Australia, in late August 1986. The President of the Commission was JEAN-PIERRE LAUTRIDOU (Caen, France) and the Secretary was CHARLES HARRIS (Cardiff, U.K.). The following were Full Members: MICHEL ALLARD, Quebec, Canada), CUI ZHIJIU (Beijing, China), ANDREJ VELICHKO (Moscow, USSR), KEVIN HALL (Pietermaritzburg, South Africa), COLIN THORN (Urbana-Illinois, USA) and YUGO ONO (Sapporo, Japan).

While the intent was to continue the work of the earlier Commission, the new Commission was more focused. First, the primary aim was restricted to the study of the dynamics of the processes associated with frost action, not only in the field as in the earlier Commission, but also in the laboratory. Therefore, the scope of activities was twofold: 1) present geocryological processes and land forms, and 2) Pleistocene frost action phenomena and palaeogeographic reconstructions. A second difference related to the academic and administrative environments in which the new Commission operated. In 1988, at the Fifth International Conference on Permafrost, in Trondheim, Norway, the IPA had established two Working

Groups, one on Periglacial Environments (Chair: J-P. LAUTRIDOU) and the other on Mountain Permafrost (Chair: WILFRIED HAEBERLI). Both were intended to promote geomorphological research related to permafrost. It was natural that the IGU Commission and these two Working Groups should work closely together. A third difference was that a new international journal, *Permafrost and Periglacial Processes* (PPP), had been established in 1990. To some degree, the new journal was partly the result of the difficulties of publication experienced by the *Biuletyn Peryglacjalny* in the previous decade. But it was also in response to the increased pace of permafrost research, especially in mountain regions, that could not be accommodated within the 5 year intervals of the International Conferences on Permafrost. This journal was now available as a speedy outlet for the publication of periglacial research. In discussions between the editors of the two journals, it was agreed that the *Biuletyn Peryglacjalny* would continue to emphasize Pleistocene periglacial studies and that *Permafrost and Periglacial Processes* would emphasize permafrost and current periglacial processes, but that there would be a degree of overlap of interests.

The first informal meeting of members of the new Commission took place in Quebec City during the Fifth Canadian Permafrost Conference in 1990. This was followed by a meeting in Caen, France, in April 1991, organized under the auspices of the IGU Commission but also in collaboration with the IPA Working Group on Periglacial Environments. The theme of the meeting was the laboratory investigation of cryogenic weathering but other papers presented included regional studies, problems of field data acquisition and theoretical modeling. The Caen CNRS laboratory facilities and procedures were demonstrated to participants. A number of papers presented at this meeting were subsequently published (PPP, 2, 4). The organizers were KEVIN HALL and JEAN-PIERRE LAUTRIDOU.

During the XXVII IGU Congress in Washington, USA, in August 1992, the mandate of the Commission was renewed. Membership changed with NIKOLAI ROMANOVSKIJ (Moscow, Russia) replacing ANDREJ VELICHKO, ANTONI LEWKOWICZ (Ottawa, Canada) replacing MICHEL ALLARD, and NORIKAZU MATSUOKA (Tsukuba, Japan) replacing YUGO ONO. The Commission sponsored a special session, organized by COLIN THORN, and an excursion was organized by MICHAEL CLARK to examine the periglacial geomorphology of the Appalachians. This was attended by 20 persons from 8 countries.

During this period the Commission worked closely with the UNESCO International Geological Correlation Program (IGCP) 297, under the title: "Geocryology of the Americas". In early August 1992 it co-sponsored a meeting organized by WILLIAM WAYNE and BRAINARD MEARS on the periglacial features in the Northern Rocky Mountains of the USA. Then, in July 1993 it co-sponsored a second workshop in association with the

Sixth International Conference on Permafrost, held in Beijing, China. The latter resulted in ten papers being included in the Proceedings Volume of the conference (Chinese Organizing Committee, 1993). At the IPA Council meeting, ANTONI LEWKOWICZ was appointed Chair of the IPA Working Group on Periglacial Environments and CHARLES HARRIS was appointed as Secretary, thereby maintaining an essential communication between the Commission and the IPA Working Group.

A Business Meeting of the Commission was held in Hamilton, Ontario, Canada, in late August 1993, at the time of the Second Conference of the International Association of Geomorphologists, at which the Commission program for its final years was established. DIETRICH BARSCH, as President of the International Association of Geomorphologists, gave a plenary talk devoted to periglacial geomorphology (BARSCH, 1993).

In keeping with its mandate to investigate frost action environments, the Commission organized a specialized symposium and field excursion to examine the 'grézcs litées' (stratified slope deposits) of France. These had been identified, following the Iceland meeting of 1982, as being particularly problematic, both as regards the processes involved and their climatic significance. Co-sponsors were the IPA Working group on Periglacial Environments and the Association Française du Pergélisol (AFP). The meeting was in specific response to continued requests from the international periglacial community to first, clarify the meaning of this regional term and second, to identify the frost action processes responsible for this unusual periglacial slope deposit. Forty participants from twelve countries visited sites in southwestern France (Charente, Périgord) and northern France (Champagne and Lorraine). The field excursions were led by members of the Centre de Géomorphologie du CNRS -Caen, the Quaternary Institute, Bordeaux, and the universities of Reims and Nancy. A special issue of PPP (6, 2) contains ten papers that were presented at two symposiums in Nancy and Reims.

The need for concise international terminology has been a concern to many IGU Periglacial Commissions (e.g. see *Biuletyn Peryglacjalny*, 11, p. 149–163; 14, p. 111–132). For example, the need to translate the English-language volume 'Permafrost Terminology' (BROWN and KUPSCH, 1974) was discussed by participants at the 1975 Aberystwyth meeting of the Co-ordinating Committee for Periglacial Research, but no action was taken until the early 1980's. Then, unofficial translations were made into German (by J. KARTE), into Polish (by A. DYLIKOWA and J. GOŹDZIK) and into Russian (by E. D. SHTSHAPOVA and edited by V. N. KONISCHEV and A. I. POPOV). After a hiatus, these translations were eventually published in 1995 (see *Biuletyn Peryglacjalny*, no. 32). In the meantime, the 1988 publication of the bilingual 'Glossary of Permafrost and Related Ground-Ice Terms' (Associate Committee on Geotechnical Research, 1988), led the

IPA to establish a Permafrost Terminology Working Group. The objective was to prepare a multi-lingual glossary of permafrost and related ground-ice terms, building upon the bilingual Canadian glossary. Between 1990–1996, corresponding members of the Commission provided periglacial input to this difficult and tedious work, and a 12-language glossary is now available through the International Permafrost Association (VAN EVERDINGEN, 1998).

A final high-latitude activity of the 1980–1996 period was a six day field excursion to Ellesmere Island, Canadian High Arctic, led by ANTONI LEWKOWICZ, in July 1996. This was in collaboration with the IPA Working group on Periglacial Environments. Logistics dictated that the number of participants be limited to 8. The objective was to examine frost action processes in a high latitude environment and in particular, to examine active layer detachment failures. Then, at the XXX IGU Congress at The Hague, Netherlands, in August 1996, the Commission co-sponsored a workshop with GERTEC on Geomorphology and Environmental Change, organized by JEFF VANDENBERGHE.

By 1996, it was clear that periglacial geomorphology needed a more applied and global orientation. In particular, the importance of the cryosphere as one of the components of the ongoing global climate change debate was recognized. The Commission also realized the need to work closely not only with the IPA Working Group on Periglacial Processes and Environments but also with the IPA Working Groups on Global Change and Permafrost (Chair: FRITZ NELSON) and Mountain Permafrost (Chair: WILFRIED HAEBERLI). Accordingly, a proposal to renew the Commission was submitted to the XXX IGU Council at The Hague with the deliberately general title 'Climate change and periglacial environments'. Professor JEFF VANDENBERGHE (Amsterdam, Netherlands) was nominated as the President of the new Commission.

The intent of the new Commission was to provide a focus for research on the significance of climate to present-day periglacial processes. This emphasis upon climatic conditions will probably increase as issues regarding environmental protection and conservation of natural resources in periglacial regions will almost certainly accelerate in the early decades of the New Millennium.

ASSESSMENT OF THE PERIOD 1980–1996

The work of the two Commissions between 1980 and 1996, as outlined above, must be assessed within the broader context of 50 years of periglacial research within the IGU. It is obvious that there has been continual activity, change and growth. At least three phases can be recognized and a fourth is currently in progress.

Phase One, between 1949 and 1972, was the formative years for the Commission under the leadership of ANDRE CAILLEUX and JAN DYLIK. This was the period when the international periglacial community developed its identity, the *Biuletyn Peryglacjalny* flourished as the only international journal devoted to periglacial problems, and periglacial geomorphology was dominated by Quaternary palaeo-geographic reconstruction.

Phase Two, between 1972–1980, was a critical period of re-assessment and re-orientation. Under the leadership of ALBERT PISSART, the Co-ordinating Committee for Periglacial Research identified the need to integrate the growing interest in permafrost problems and process studies with traditional Pleistocene interests. The vital importance of this transition phase cannot be underestimated.

Phase Three, the period under discussion, was a time of expansion in periglacial studies. But it was complicated by the emergence of an international permafrost community, the formation of both the International Permafrost Association and the International Association of Geomorphologists, and uncertainty as to the future of the *Biuletyn Peryglacjalny*. During this period the two periglacial Commissions promoted the integration of legitimate periglacial interests with these more varied interests as well as maintained their traditional Quaternary links.

Phase Four, currently ongoing, sees periglacial studies develop a more applied orientation, particularly with respect to global climate change concerns and to environmental protection and conservation.

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- HUGH FRENCH: President, The IGU Commission on the Significance of Periglacial Phenomena, 1980–1988.
- JEAN-PIERRE LAUTRIDOU: President, The IGU Commission on Frost Action Environments, 1988–1996.



Pl. 1. Members of the IGU Commission on the Significance of Periglacial Phenomena at a reception in the house of DAVID and JENNIFER HARRY, XII INQUA Congress, Ottawa, Canada, August, 6, 1987. Left to right; JOHANNES KARTE, JEAN-PIERRE LAUTRIDOU, JAN GOZDZIK, HUGH FRENCH, ANDREJ VELICHKO, TROY PÉWÉ. Absent: ALBERT PISSART, YUGO ONO



Pl. 2. JEAN-PIERRE LAUTRIDOU, President of the IGU Commission on Frost action Environments, HUGH FRENCH, Vice-President, The International Permafrost Association, and TONI LEWKOWICZ, Chair of the IPA Working group on Periglacial Environments, drink champagne at a reception in Reims, France, during the IGU-sponsored Grézet-Litées Symposium and field excursion, September 7, 1994