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## Polish Spitsbergen Bibliography: Quaternary geology

The Polish studies of the Quaternary geology in Spitsbergen have already a long-lasting tradition in the Polish polar research. They resulted in vast exploration and development of modern geological methodology for polar areas and the Pleistocene glacial phenomena in Poland. This research resulted in over a hundred of publications, listed here on the occasion of the 24th Polar Symposium in Warsaw in 1997.

A research of the Quaternary geology in Spitsbergen was initiated by polar expeditions. They provided a good educational experience for those, who were interested mostly in glacial sediments and landforms in the Polish territory. Among them, the most outstanding were Stefan Zbigniew Różycki and Bronisław Halicki, since the fifties the professors of the Faculty of Geology of the University of Warsaw. The former attended a scientific expedition in 1936, when the first geological map of the northwestern Torell Land in southern Spitsbergen was prepared (Fig. 1). His research of the pre-Quaternary geology, provided also with numerous interesting observations and experience, which could be applied later for the glacial Pleistocene in Poland. Halicki took part in the expedition to the western Oscar II Land in western Spitsbergen in 1938 (Fig. 1). He was interested in glacial geology, periglacial phenomena as well as marine and ice-dam lake deposition. These pioneer studies of the two were continued in 1958 during the expedition to the Van Keulen Fiord Region when a detailed topographic map of the forefield of the Penck Glacier was prepared, accompanied by a detailed analysis of landscape zonation dependent on distribution of the periglacial phenomena (S. Z. Różycki).

At the turn of the seventies and eighties, the Quaternary geological studies in Spitsbergen (Fig. 1) were considerably intensified during the scientific expeditions, organized by the Institute of Geophysics of the Polish Academy of Sciences. The

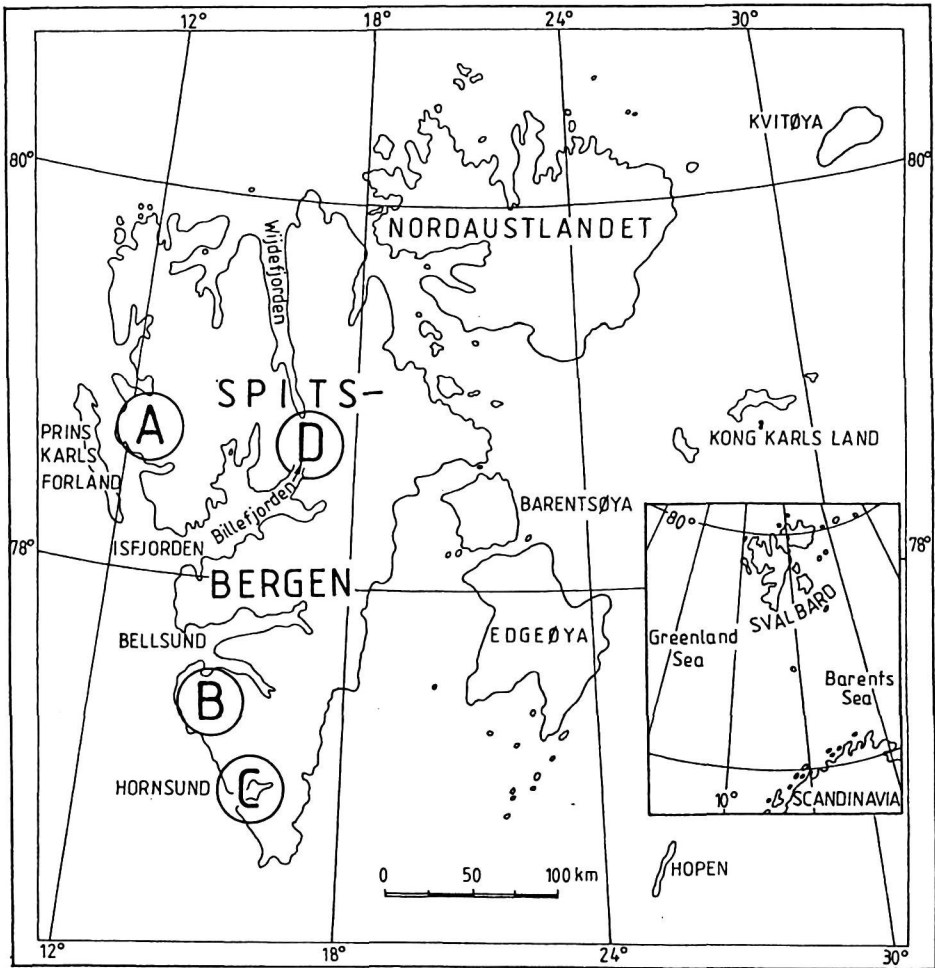


Fig. 1. Location of the main research regions in Spitsbergen. A – Oscar II Land, B – southern Bellsund Region, C – Hornsund Region, D – Petuniabukta Region

studies in the northern Hornsund Region in 1979 resulted in numerous publications on the origin of subslope ridges, raised marine beaches and the Late Holocene glacier advance in the Revdalen (A. Karczewski, A. Kostrzewski and L. Marks), and the last deglaciation of the Treskelen Peninsula (L. Marks). In 1980, the studies focused in the northwestern Sörkapp Land. They resulted in reconstruction of the Pleistocene and Holocene glaciers in the southern Hornsund Region, in the Slaklidalen and the morainal zone of the Bunge Glacier. Raised marine beaches of Kulmstranda and karst phenomena at the southern slope of Stupryggen were identified and described (P. Kłysz and L. Lindner). General geomorphological description of the northwestern Sörkapp Land was also presented (L. Andrzejewski, P. Kłysz, L. Lindner and W. Stankowski).

The data collected during these two expeditions have been published later. They were the first three photogeological maps in scale of 1 : 10,000, presenting the forefields of the Torell, Nann, Tone and Bunge Glaciers, and the Slaklidalen Region, together with their geomorphological-geological description (L. Lindner, L. Marks and S. Ostaficzuk). In the eighties the classification of rock glaciers, as well as evolution of landscape and age differentiation of raised marine beaches (L. Lindner and L. Marks) and the first stratigraphical subdivision of the Quaternary sediments in the Hornsund Region were presented (L. Lindner, L. Marks and K. Pękala),

A research was continued during the expedition to the Sörkapp Land in 1985 (R. Szczęsny), organized by the Institute of Geography of the Jagiellonian University. The results comprised description of aeolian deposition (P. Gębica and R. Szczęsny), Pleistocene evolution of the Wiederdalen, deformed marine sediments in Torrflya and the tectonic structure of Hilmarfjellet (R. Szczęsny). The next four photogeological maps in scale of 1 : 10,000 were prepared, including a geomorphological-geological description of the interlobal zone of the Torell Glacier (L. Lindner, L. Marks, K. Pękala and R. Szczęsny), the Hilmarfjellet Region, the Treskelen-Hyrnefjellet-Kruseryggen Region and the Hansbreen-Sofiekammen Region (L. Lindner, L. Marks and R. Szczęsny). Worth-mentioning is a geomorphological map of the Hornsund Region in scale of 1 : 75,000 (L. Andrzejewski, H. Chmal, J. Jania, A. Karczewski, P. Kłysz, A. Kostrzewski, L. Lindner, L. Marks, K. Pękala, M. Pulina, S. Rudowski, W. Stankowski, T. Szczypek and E. Wiśniewski). In the same time, the first thermoluminescence datings of the Pleistocene sediments in the Sörkapp Land (J. Butrym, L. Lindner, L. Marks and R. Szczęsny), the thermoluminescence and radiocarbon datings in the Bogstranda and the Treskelodden Region (L. Marks and K. Pękala), and outline of the Quaternary chronostratigraphy in southern Spitsbergen (L. Lindner, L. Marks and K. Pękala) were presented, together with methodological foundations for the accompanying photogrammetric works, basing on air photos of southern Spitsbergen (L. Lindner, L. Marks, S. Ostaficzuk, K. Pękala and R. Szczęsny).

The expedition to the northern Petuniabukta Region in 1984, organized by the Faculty of Geology of the University of Warsaw and the Quaternary Research Institute of the Adam Mickiewicz University in Poznań, made possible studies of the Quaternary geology in the western Olav V Land. Detailed geomorphological and geological mapping resulted in preparation of the map of the Quaternary landforms and sediments of the Ebbadalen-Nordenskiöldbreen Region in scale of 1 : 20,000 (P. Kłysz, L. Lindner, L. Marks and L. Wysokiński), and description of the Late Quaternary glacial episodes and changes of sea level at the northeastern seashores of the Billefjorden (P. Kłysz, L. Lindner, A. Makowska, L. Marks and L. Wysokiński). The Late Quaternary glacial advance in the Austfjorden Region (L. Marks and L. Wysokiński), the Late Quaternary solifluc-

tion phenomena in central Spitsbergen and evolution of the landscape in the western Olav V Land (P. Kłysz, L. Lindner, L. Marks and L. Wysokiński) were presented. Geomorphological map of the Billefjorden Region in scale of 1 : 40 000 was also prepared (M. Borówka, P. Gonera, L. Kasprzak, A. Karczewski, P. Kłysz, A. Kostrzewski, L. Lindner, L. Marks, W. Rygielski, W. Stankowski, A. Wojciechowski and L. Wysokiński).

Three expeditions in 1986, 1987 and 1988, organized by the Institute of Earth Sciences of the Maria Curie-Skłodowska University in Lublin to the southern Bellsund Region, resulted in numerous publications on the Quaternary landforms and sediments. First of all, the photogeological map of the forefield of Renard, Scott and Blomli Glaciers was prepared (J. Dzierżek, M. Harasimiuk, J. Nitychoruk, K. Pękala, J. Repelewska-Pękalowa and R. Szczęsny). A concept of supraglacial origin of a fluted moraine was proposed (T. Merta) and subglacial organic sediments with artifacts were found in a forefield of the Renard Glacier (J. Dzierżek, J. Nitychoruk and A. Rzętkowska).

The collected materials made possible a description of talus fans and rock glaciers in the Bellsund Region (J. Dzierżek and J. Nitychoruk), dynamics of deposition in flood lakes in forefields of the Scott and Blomli Glaciers (T. Merta), and a photogrammetric record of snout of the Scott Glacier (T. Merta, W. Ozimkowski and D. Osuch). Chemical weathering of carbonate rocks in periglacial conditions was preliminarily evaluated, mineralogy of outwash deposits in forefield of the Renard Glacier (R. Chlebowski), joints and neotectonic phenomena in the southern Bellsund Region (W. Ozimkowski) and the Quaternary evolution of the Tjörndalen (R. Szczęsny) were also described.

Numerous syntheses were published at the end of the eighties and the beginning of the nineties. They recapitulated the previously collected data on the Quaternary geology and geomorphology of Spitsbergen. Among others, a geodynamic aspect in the studies of the Quaternary inland deposits in southern Spitsbergen (L. Lindner and L. Marks), and a photogrammetric analysis of the Quaternary sediments of southern Spitsbergen based on analysis of air photos (R. Szczęsny) were presented. Separate publication recapitulated information on extents and age of the raised marine beaches in the northern Hornsund Region (L. Lindner, L. Marks, W. Roszczyńko and J. Semil). Finally, a detailed and complex evolution of the Hornsund Region during the Middle and Late Quaternary was reconstructed (L. Lindner and L. Marks). The oldest were found the marine sediments of the Torellkjegla Interglacial (about 400 ka), overlain by tills of the two glacial advances (about 300 ka and 200 ka) during the penultimate Wedel Jarlsberg Land Glaciation. The younger are the palaeosols and weathering traces of the Bogstranda Interglacial (about 100 ka). During the last Pleistocene Glaciation *i.e.* the Sörkapp Land Glaciation, the four glacial advances about 90 ka, 70 ka, 50 (Lisbetdalen Stadial) and 25 ka (Slaklidalen Stadial) occurred. General retreat of glaciers during the Holocene was interrupted with local ad-

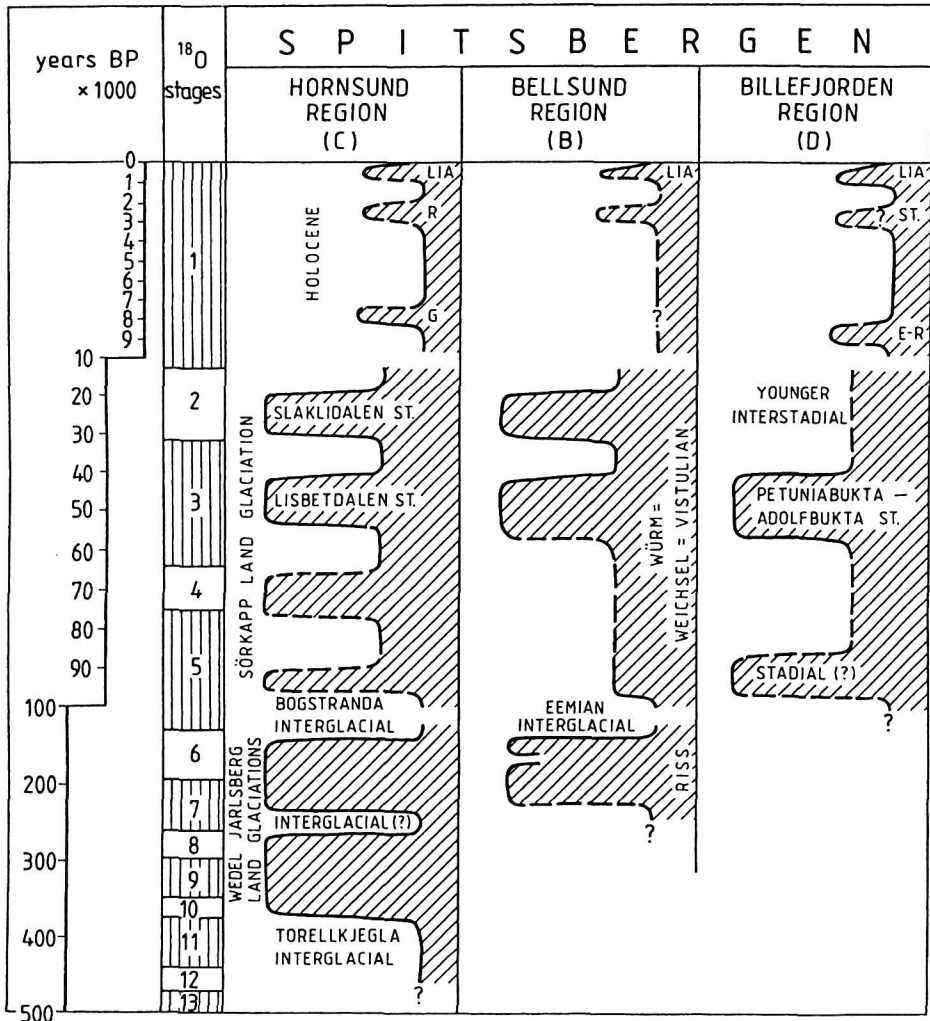


Fig. 2. Correlation of main glacial and deglacial episodes in the regions B–D (cf. Fig. 1) of Spitsbergen after L. Lindner and L. Marks (1990, *Geodynamic aspects of studies of Quaternary inland sediments in South Spitsbergen*, Pol. Polar Res., 11: 365–387), modified.

vances at 8 ka, 2.5 ka and the last 600 years (Little Ice Age). These glacial episodes and separating interglacial (interstadial) glacier retreats in the Hornsund Region were correlated with the ones in the Bellsund and Billefjorden Regions (Fig. 2).

Research of the Quaternary geology and geomorphology created the base for a synthetic approach to the evolution of Spitsbergen during the Middle and Late Quaternary, and stratigraphical correlation with such episodes in northwestern and central Europe, North America and Greenland (L. Lindner and L. Marks).

- KARCZEWSKI A., ANDRZEJEWSKI L., CHMAL H., JANIA J., KŁYSZ P., KOSTRZEWSKI A., LINDNER L., MARKS L., PEKALA K., PULINA M., RUDOWSKI S., STANKOWSKI W., SZCZYPEK T. and WIŚNIEWSKI E. 1984. Hornsund, Spitsbergen geomorphology, 1 : 75 000. — Silesian Univ., Katowice.
- KARCZEWSKI A., BORÓWKA M., GONERA P., KASPRZAK L., KŁYSZ P., KOSTRZEWSKI A., LINDNER L., MARKS L., RYGIELSKI W., STANKOWSKI W., WOJCIECHOWSKI A. and WYSOKIŃSKI L. 1990. Petuniabukta, Billefjorden, Spitsbergen geomorphology, 1 : 40,000. — OPGK, Poznań.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1980. Młodoholoceńskie zlodowacenie Revdalen (Vestspitsbergen). — VII Symp. Polarne, Kraków-Osieczany, Streszcz. ref.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1980. Morfogenezę wałów podstokowych obszaru położonego na północ od fiordu Hornsund (Spitsbergen). — VII Symp. Polarne, Kraków-Osieczany, Streszcz. ref.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1980. Podniesione tarasy morskie obszaru Hornsund (część północna). — VII Symp. Polarne, Kraków-Osieczany, Streszcz. ref.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1981. Late Holocene glacier advances in Revdalen, Spitsbergen. — Pol. Polar Res., 2 (1-2): 51-61.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. Morphogenetic of subslope ridges to the north of Hornsund, Spitsbergen. — Pol. Polar Res., 2 (1-2): 29-38.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1981. Raised marine terraces in the Hornsund area (northern part), Spitsbergen. — Pol. Polar Res., 2 (1-2): 39-50.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1983. Geomorfologia obszaru położonego na północ od fiordu Hornsund. — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 121-125.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1983. Morfogenezę wałów podstokowych obszaru położonego na północ od fiordu Hornsund (Spitsbergen). — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 115-121.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1983. Podniesione tarasy morskie obszaru Hornsund (część N), SW Spitsbergen. — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 109-115.
- KARCZEWSKI A., KOSTRZEWSKI A. and MARKS L. 1983. Zlodowacenie Revdalen, Hornsund (Spitsbergen Zachodni) w młodszym holocenie. — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 104-109.
- KASPRZAK L., KŁYSZ P., KOSTRZEWSKI A., LINDNER L., MARKS L., RYGIELSKI W., STANKOWSKI W. and WYSOKIŃSKI L. 1985. Morfogenezę obramowania Petuniabukta w pleni-Würmie i w holocenie. — XII Symp. Polarne, Szczecin, Mat.: 1-4.
- KŁYSZ P. and LINDNER L. 1981. Development of glaciers on the southern coast of Hornsund in Spitsbergen during the Würm (Vistulian) Glaciation. — Acta Geol. Polon., 31 (1-2): 139-146.
- KŁYSZ P. and LINDNER L. 1981. Würmskie i holocenijskie zlodowacenia NW Sörkapplandu na przykładzie doliny Slakli (Spitsbergen). — VIII Symp. Polarne, Sosnowiec, Mat. referaty i komunikaty, 1: 89-100.
- KŁYSZ P. and LINDNER L. 1981. Wyniesione tarasy morskie Kulmstrand (NW Sörkapp Land). — VIII Symp. Polarne, Sosnowiec, Mat. referaty i komunikaty, 1: 113-118.
- KŁYSZ P. and LINDNER L. 1982. Evolution of the marginal zone and the forefield of the Bunge Glacier, Spitsbergen. — Acta Geol. Polon., 32 (3-4): 253-266.
- KŁYSZ P. and LINDNER L. 1983. Z badań nad morfogenezą dolny Slakli (NW Sörkapp, Spitsbergen). — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 148-152.
- KŁYSZ P. and LINDNER L. 1983. Koncepcja glacialnego pochodzenia rzeźby NW Sörkapplandu. — Spraw. Pozn. Tow. Przyj. Nauk, 97-99: 192-195.
- KŁYSZ P., LINDNER L., MARKS L. and WYSOKIŃSKI L. 1987. Map of Quaternary landforms and sediments of the Ebbadalen-Nordenskiöldbreen region (Olav V Land, Spitsbergen), scale 1 : 20 000. — Wyd. Geol., Warszawa.
- KŁYSZ P., LINDNER L., MAKOWSKA A., MARKS L. and WYSOKIŃSKI L. 1988. Late Quaternary glacial episodes and sea level changes in the northeastern Billefjorden region, central Spitsbergen. — Acta Geol. Polon., 38 (1-4): 107-123.

- KŁYSZ P., LINDNER L., MARKS L. and WYSOKIŃSKI L. 1988. Late Quaternary solifluction in central Spitsbergen. — 5th Intern. Conf. on Permafrost, Trondheim, Proc.: 84–88.
- KŁYSZ P., LINDNER L., MARKS L. and WYSOKIŃSKI L. 1988. Rzeźba i osady czwartorzędowe wschodniego obramowania Petuniabukta (Olav V Land, Spitsbergen). — XV Symp. Polarne, Wrocław, Mat.: 45–52.
- KŁYSZ P., LINDNER L., MARKS L. and WYSOKIŃSKI L. 1989. Late Pleistocene and Holocene relief remodelling in the Ebbadalen-Nordenskiöldbreen region in Olav V Land, central Spitsbergen. — Pol. Polar Res., 10 (3): 277–301.
- KŁYSZ P., LINDNER L., MARKS L. and WYSOKIŃSKI L. 1989. Zarys chronostratygrafii młodszego czwartorzędu w rejonie północnego obramowania Billefjorden (Olav V Land, Spitsbergen). — Sesja Polarna *Badania środowiska naturalnego zachodniego Spitsbergenu*, Lublin, Mat.: 171–177.
- LINDNER L. and KŁYSZ P. 1983. Powierzchniowe formy krasowe na południowym zboczu Stupryggen (Sörkapp Land, Spitsbergen). — Kras i Speleologia, 6 (15): 58–65.
- LINDNER L. and MARKS L. 1983. Geologiczne i geomorfologiczne ślady würmskich i holocenijskich zlodowaceń w rejonie Hornsundu, Spitsbergen. — Rozpr. UMK: 140–149.
- LINDNER L. and MARKS L. 1985. Types of debris slope accumulations and rock glaciers in South Spitsbergen. — Boreas, 14: 139–153.
- LINDNER L. and MARKS L. 1985. Typy współczesnych form akumulacji podstokowej na przykładzie Spitsbergenu. — Ogólnopol. Zjazd PTGeogr., Opole, Mat.: 59.
- LINDNER L. and MARKS L. 1986. Quaternary of the Hornsund Region (Spitsbergen) in research of the Institute of Geology, Warsaw University, in 1981–85. — Pol. Polar Res., 7 (4): 417–425.
- LINDNER L. and MARKS L. 1989. Impact of icebergs on relief development of marine beaches in Spitsbergen. — Quaest. Geogr., spec. issue, 2: 11–119.
- LINDNER L. and MARKS L. 1989. Zagłębienia po górach lodowych jako wskaźnik klimatostratygraficzny rozwoju teras morskich południowego Spitsbergenu. — Sesja Polarna *Badania środowiska naturalnego zachodniego Spitsbergenu*, Lublin, Mat.: 179–183.
- LINDNER L. and MARKS L. 1990. Approach to Late Quaternary stratigraphy of sediments of South and Central Spitsbergen. — European Science Foundation Workshop, Abstr., PONAM, Ghent.
- LINDNER L. and MARKS L. 1990. Geodynamic aspects of studies of Quaternary inland sediments in South Spitsbergen (attempt to synthesis). — Pol. Polar Res., 11 (3–4): 365–387.
- LINDNER L. and MARKS L. 1990. Role of icebergs in the interpretation of the Late Pleistocene chronology of Spitsbergen. — IGCP Project 253, Field Conf., Excursion and abstr.: 117–119. Geol. Surv., Finland, Espoo.
- LINDNER L. and MARKS L. 1991. Osady czwartorzędowe południowego Spitsbergenu. — Przegl. Geol., 2: 61–68.
- LINDNER L. and MARKS L. 1991. Outline of stratigraphy of the Pleistocene and the Holocene in South and Central Spitsbergen. — Bull. Pol. Ac.: Earth Sci., 39 (2): 165–172.
- LINDNER L. and MARKS L. 1993. Quaternary of Spitsbergen. — Pol. Polar Res., 14 (3): 219.
- LINDNER L. and MARKS L. 1993. Middle and Late Quaternary evolution of Spitsbergen against global changes. — Pol. Polar Res., 14 (3): 221–241.
- LINDNER L. and MARKS L. 1993. Middle and Late Quaternary evolution of the Hornsund Region, South Spitsbergen. — Pol. Polar Res., 14 (3): 275–292.
- LINDNER L., MARKS L. and OSTAFICZUK S. 1980. Analiza fotogeologiczna przedpola lodowca Nana (Ziemia Wedel Jarlsberga, Vestspitsbergen). — VII Symp. Polarne, Kraków-Osieczany, Streszcz. ref.
- LINDNER L., MARKS L. and OSTAFICZUK S. 1982. Evolution of the marginal zone and the forefield of the Torell, Nann and Tone glaciers in Spitsbergen. — Acta Geol. Polon., 32 (3–4): 267–278.
- LINDNER L., MARKS L. and OSTAFICZUK S. 1984. Photogeological analysis of the forefield of the Bunge Glacier (Sörkapp Land, Spitsbergen). — Quatern. Studies, Poland, 5: 81–97.

- LINDNER L., MARKS L. and OSTAFICZUK S. 1986. Quaternary landforms and sediments, and morphogenetic evolution of the Slaklidalen region (Sörkapp Land, Spitsbergen). — *Studia Geol. Polon.*, 89: 51–62.
- LINDNER L., MARKS L., OSTAFICZUK S., SZCZĘSNY R. and PEKALA K. 1984. Spitsbergen — zdjęcia lotnicze — rzeźba i osady. — *Ogólnopol. Konf. Fotointerpr.*, Warszawa, Streszcz. ref.: 74–76.
- LINDNER L., MARKS L., OSTAFICZUK S., PEKALA K. and SZCZĘSNY R. 1984. Method of a photogeological analysis of glacier forefields in South Spitsbergen, Norway. — *Symp. Spitsbergen 84*, Dziekanów Leśny, Streszcz. ref., 20.
- LINDNER L., MARKS L., OSTAFICZUK S., PEKALA K. and SZCZĘSNY R. 1985. Application of photogeological mapping to studies of glacial history of South Spitsbergen. — *Earth Surf. Processes and Landf.*, 10 (4): 387–399.
- LINDNER L., MARKS L., OSTAFICZUK S., PEKALA K. and SZCZĘSNY R. 1986. Nowe opracowania fotogeologiczne południowego Spitsbergenu. — XIII Symp. Polarne, Gdańsk, Mat.
- LINDNER L., MARKS L., OSTAFICZUK S., SZCZĘSNY R. and PEKALA K. 1987. Spitsbergen: photogeological maps of Quaternary deposits. — 12th INQUA Congress, Ottawa, Abstr.: 212.
- LINDNER L., MARKS L., OSTAFICZUK S., PEKALA K. and SZCZĘSNY R. 1990. Metodyka wykonywania map fotogeologicznych południowego Spitsbergenu. — *Fotointerpr. w Geografii*, 10 (20): 41–50.
- LINDNER L., MARKS L., OSTAFICZUK S., SZCZĘSNY R. and PEKALA K. 1992. Photogeological analysis of Quaternary deposits in South Spitsbergen. — *Landscape, Life, World and Man in High Arctic*: 27–34. *Inst. Ecology, Polish Acad. Sci.*, Warszawa.
- LINDNER L., MARKS L. and PEKALA K. 1983. Quaternary glaciations of South Spitsbergen and their correlation with Scandinavian glaciations of Poland. — *Acta Geol. Polon.*, 33 (1–2): 169–182.
- LINDNER L., MARKS L. and PEKALA K. 1984. Late Quaternary glacial episodes in the Hornsund Region of Spitsbergen. — *Boreas*, 13: 35–47.
- LINDNER L., MARKS L. and PEKALA K. 1986. Outline of Quaternary chronostratigraphy of the northern Hornsund area, southern Spitsbergen. — *Bull. Pol. Ac.: Earth Sc.*, 34 (4): 427–436.
- LINDNER L., MARKS L. and PEKALA K. 1987. Quaternary chronostratigraphy of South Spitsbergen. — *Polar Res.*, 5 n.s.: 273–274.
- LINDNER L., MARKS L. and PEKALA K. 1987. Quaternary glaciations and interglacials of South Spitsbergen. — 12th INQUA Congress, Ottawa, Abstr.: 212.
- LINDNER L., MARKS L. and PEKALA K. 1987. Quaternary chronostratigraphy of South Spitsbergen. *Workshop Late Cenozoic paleoenvironments and geology of the Arctic*. Spitsbergseter Fjellstue, Abstr.: 13.
- LINDNER L., MARKS L., ROSZCZYŃKO W. and SEMIL J. 1991. Age of raised marine beaches of northern Hornsund Region, South Spitsbergen. — *Pol. Polar Res.* 12 (2): 161–182.
- LINDNER L., MARKS L. and SZCZĘSNY R. 1985. Zjawiska neotektoniczne w otoczeniu lodowca Bunge, południowy Spitsbergen. — XII Symp. Polarne, Toruń, Mat.: 7–11.
- LINDNER L., MARKS L. and SZCZĘSNY R. 1986. Late Quaternary tectonics in western Sörkapp Land Spitsbergen. — *Acta Geol. Polon.*, 36 (1–3): 281–288.
- LINDNER L., MARKS L. and SZCZĘSNY R. 1987. Wyniki analizy fotogeologicznej rejonu Hilmarfjellet (Sörkapp Land, Spitsbergen). — *Zesz. Nauk. UJ, Prace Geogr.*, 81: 65–78.
- LINDNER L., MARKS L. and SZCZĘSNY R. 1990. Quaternary landforms and sediments, and morphogenetic evolution of Treskelen-Hymefjellet-Kruseryggen area, Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.*, 11 (3–4): 389–400.
- LINDNER L., MARKS L. and SZCZĘSNY R. 1992. Quaternary landforms, sediments and morphogenetic evolution of Hansbreen-Sofiekammen region, Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.*, 13 (2): 91–101.
- MARKS L., 1981. Przebieg ostatniej deglacjacji na półwyspie Treskelen (Hornsund, Spitsbergen). — VIII Symp. Polarne, Sosnowiec, Mat., 1, Mat. ref., komunikaty: 129–138.
- MARKS L., 1983. Late Holocene evolution of the Treskelen Peninsula (Hornsund, Spitsbergen). — *Acta Geol. Polon.* 33 (1–2): 159–168.



- MARKS L. and PEKALA K. 1986. New datings of Quaternary sediments from Bogstranda and Treskelodden, southern Spitsbergen. — *Bull. Pol. Ac.: Earth Sc.*, 34 (4): 419–425.
- MARKS L. and WYSOKIŃSKI L. 1986. Early Holocene glacier advance in the Austfjorden Region, northern Spitsbergen. — *Bull. Pol. Ac.: Earth Sc.*, 34 (4): 437–446.
- MERTA T. 1988. Dynamika sedymentacji w proglacialnym rozlewisku na przedpolu lodowca Scotta (Spitsbergen). — *Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.*: 183–189.
- MERTA T. 1988. Cykliczność sedymentacji w rozlewisku u czoła lodowca Blomli. — *Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.*: 191–196.
- MERTA T. 1988. Elementy kierunkowe w morenie typu “fluted” na przedpolu lodowca Renarda (Spitsbergen). — *XV Symp. Polarne, Wrocław, Mat.*: 76–81.
- MERTA T. 1989. Sedimentation of fluted moraine in forefields of glaciers in Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.*, 10 (1): 3–29.
- MERTA T. 1993. Współczesna auto- i allocykliczna sedymentacja w Zatoce Josephbukta (Wedel Jarlsberg Land, Spitsbergen). — *Przegl. Geol.*, 1: 331–332.
- MERTA T., OZIMKOWSKI W. and OSUCH D. 1990. Evolution of changes at the forefield of the Scott Glacier based on the photogrammetric data. — *Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.*: 51–58.
- NITYCHORUK J. and DZIERZEK J. 1988. Morphogenetic features of talus cones in northwestern Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.* 9 (1): 73–85.
- NITYCHORUK J. and DZIERZEK J. 1988. Metody pomiarów ruchów masowych na zboczach maszywów górskich w NW części Ziemi Wedela Jarlsberga, Spitsbergen. — *XV Symp. Polarne, Wrocław: 68–70.*
- NITYCHORUK J. and DZIERZEK J. 1988. Annual mass movements in northwestern Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.*, 9 (4): 461–474.
- NITYCHORUK J. and DZIERZEK J. 1994. Probable occurrence of allochthonous rocks in Calypsostranda (Bellsund). — *XXI Symp. Polarne, Warszawa, Mat.*: 159–162.
- NITYCHORUK J., OZIMKOWSKI W. and SZCZĘSNY R. 1988. Metodyka profilowania wyniesionych tarasów morskich (na przykładzie Zachodniego Spitsbergenu). — *XV Symp. Polarne, Wrocław, Mat.*: 71–75.
- NITYCHORUK J., OZIMKOWSKI W. and SZCZĘSNY R. 1989. Preparing of morphological profiles of raised marine beaches on Spitsbergen. — *Pol. Polar Res.*, 10 (1): 73–80.
- OSTAFICZUK S., MARKS L. and LINDNER L. 1980. Mapa fotogeologiczna przedpola lodowców Nann i Torella (Spitsbergen Zachodni) w skali 1 : 10 000. — *Państw. Przeds. Wyd. Kartograf., Warszawa.*
- OSTAFICZUK S., LINDNER L. and MARKS L. 1982. Photogeological map of the Bungebreen forefield (West Spitsbergen), scale 1 : 10,000. — *Wyd. Geol., Warszawa.*
- OSTAFICZUK S., LINDNER L. and MARKS L. 1986. Photogeological map of the Slaklidalen region (Sörkapp Land, Spitsbergen), scale 1 : 10,000. — *Wyd. Geol., Warszawa.*
- OZIMKOWSKI W. 1988. Wstępne wyniki geologicznej interpretacji zdjęć lotniczych północno-zachodniej części Ziemi Wedela Jarlsberga (Zachodni Spitsbergen). — *Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.*: 209–212.
- OZIMKOWSKI W. 1988. Kierunki spękań ciosowych a neotektonika południowego wybrzeża Bellsundu (komunikat). — *XV Symp. Polarne, Wrocław, Mat.*: 5–7.
- OZIMKOWSKI W. 1989. Joint fractures on the southern shore of Bellsund, Spitsbergen. — *Pol. Polar Res.*, 10 (1): 81–89.
- OZIMKOWSKI W. and MERTA T. 1988. Sprawozdanie z prac fotogrametrycznych w rejonie Bellsundu (Spitsbergen). — *Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.*: 213–214.
- PEKALA K., LINDNER L., MARKS L. and SZCZĘSNY R. 1985. Evolution of the interlobal zone of the Torell Glacier (Torellbreen), Spitsbergen. — *Ann. UMCS, B*, 40: 1–19.
- RÓŻYCKI S.Z. 1957. Strefowość rzeźby i zjawiska peryglacialne na Ziemi Torella, Spitsbergen. — *Biul. Perygl.*, 5: 51–87, 187–224, 315–339.

- RÓŻYCKI S.Z. 1957. Peryglacjalne deformacje kości długich niedźwiedzia. — *Biul. Perygl.*, 5: 105–108, 237–239.
- RZĘTKOWSKA A. 1987. Wstępna charakterystyka roślinności rejonu Calypsostranda (Wedel Jarlsberg Land, Spitsbergen). — XIV Symp. Polarne, Lublin, Mat.: 218–220.
- RZĘTKOWSKA A. 1987. Vegetation of Calypsostranda in Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.* 8 (3): 251–260.
- SEMIL J. and ROSZCZYŃKO W. 1990. Przebieg i problematyka badawcza wyprawy spitsbergeńskiej Instytutu Geologii Podstawowej Uniwersytetu Warszawskiego "Hornsund 1988". — Sesja Polarna, Wypr. Geogr. na Spitsbergen, Lublin, Mat.: 209–210.
- SZCZĘSNY R. 1986. Late Quaternary evolution of the Wieder Valley (South Spitsbergen). — *Bull. Pol. Ac. Sci.*, 34: 447–454.
- SZCZĘSNY R. 1987. Rzeźba i osady czwartorzędowe Doliny Tjörn (Wedel Jarlsberg Land, Spitsbergen). — XIV Symp. Polarne, Lublin, Mat.: 88–91.
- SZCZĘSNY R. 1987. Late Quaternary evolution of the Tjörn Valley, Wedel Jarlsberg Land, Spitsbergen. — *Pol. Polar Res.*, 8: 243–250.
- SZCZĘSNY R. 1988. Budowa tektoniczna Hilmarfjellet (Spitsbergen). — XV Symp. Polarne, Wrocław, Mat.: 8–11.
- SZCZĘSNY R. 1989. Interpretacja profilu zaburzonych osadów morskich na Törrflya, Spitsbergen. — Sesja Polarna *Badania środowiska naturalnego Zachodniego Spitsbergenu*, Lublin, Mat.: 185–189.
- SZCZĘSNY R. 1989. Możliwości i ograniczenia geologicznej interpretacji zdjęć lotniczych obszarów polarnych na przykładzie Spitsbergenu. — XIII Ogólnopol. Konf. Fotointerpretacji, Toruń, Mat.: 73–75.
- SZCZĘSNY R. 1990. Szczegółowa mapa fotogeologiczna Spitsbergenu. — *Polski Przegl. Kartograf.*, 22/3: 79–80.
- SZCZĘSNY R. 1991. Quaternary landforms and deposits in southern Spitsbergen on the ground of photointerpretation. — *Pol. Polar Res.*, 12/3: 289–343.
- SZCZĘSNY R. 1993. Differentiation of neotectonic movements in western Sörkapp Land (Spitsbergen) on the ground of photointerpretation. — XX Symp. Polarne, Lublin, Mat.: 441–448.
- SZCZĘSNY R., DZIERŻEK J., HARASIMIUK M., NITYCHORUK J., PEKALA K. and REPELEWSKA-PEKALOWA J. 1989. Photogeological map of the Renardbreen, Scottbreen and Blomlibreen forefield (Wedel Jarlsberg Land, Spitsbergen), scale 1 : 10, 000. — *Wyd. Geol.*, Warszawa.
- SZCZĘSNY R., DZIERŻEK J., NITYCHORUK J., REPELEWSKA-PEKALOWA J., HARASIMIUK M. and PEKALA K. 1987. Mapa rzeźby przedpola lodowców Blomli, Scotta i Renarda (NW Ziemia Wedel Jarlsberga, Spitsbergen) w skali 1 : 10 000. — XIV Symp. Polarne, Lublin, Ref., spraw., koment.: 277.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1987. Mapa fotogeologiczna rejonu Hilmarfjellet (Sörkapp Land, Spitsbergen) w skali 1 : 10 000. — XIV Symp. Polarne, Lublin, Ref., spraw., koment.: 278.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1987. Photogeological map of the Hilmarfjellet region (Sörkapp Land, Spitsbergen), scale 1 : 10,000. — *Wyd. Geol.*, Warszawa.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1989. Nowe mapy fotogeologiczne południowego Spitsbergenu. — 13 Ogólnopol. Konf. Fotointerpr., Toruń, Mat.: 75–78.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1989. Wyniki analizy fotogeologicznej rejonu Treskelen-Hymefjellet-Kruseryggen na Spitsbergenie. — Sesja Polarna *Badania środowiska naturalnego zachodniego Spitsbergenu*, Lublin, Mat.: 205–208.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1989. Photogeological map of the Treskelen-Hymefjellet-Kruseryggen area (Wedel Jarlsberg Land, Spitsbergen), scale 1 : 10,000. — *Wyd. Geol.*, Warszawa.
- SZCZĘSNY R., LINDNER L. and MARKS L. 1991. Photogeological map of Hansbreen-Sofiekammen Region (Wedel Jarlsberg Land, Spitsbergen), scale 1 : 10,000. — *Wyd. Geol.*, Warszawa.

- SZCZĘŚNY R., LINDNER L. and MARKS L. 1994. Detailed photogeological maps of southern Spitsbergen. — XXI Symp. Polarnie, Warszawa, Mat.: 91.
- SZCZĘŚNY R., LINDNER L. and MARKS L. 1994 Photogeological mapping of southern Spitsbergen. — 5th PONAM Workshop, Programme, Randsvangen, Norway.
- SZCZĘŚNY R., LINDNER L., MARKS L. and PEKALA K. 1985. Photogeological map of the interlobal zone of Torellbreen (West Spitsbergen), scale 1 : 10,000. — Wyd. Geol., Warszawa.

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