

POLISH POLAR RESEARCH (POL. POLAR RES.) POLSKIE BADANIA POLARNE	6	4	583—593	1985
--	---	---	---------	------

Stanisław RUDOWSKI

Department of Polar and Maritime Research Institute
of Geophysics, Polish Academy of Sciences
ul. Pasteura 3. 00-973 Warszawa

Report on the activities of the Research Expedition of the Polish Academy of Sciences to Spitsbergen 1982/83

ABSTRACT: The successive fifth whole-year research expedition stayed at the polar station of the Institute of Geophysics, Polish Academy of Sciences, in the Hornsund fiord from July 1982 to August 1983. Continuous observations as well as seismologic, magnetic and meteorological records, constituting continuation of the investigations started in summer 1978, were carried out by the wintering group of 8 men. Also separate research programmes: physics of atmosphere and ionosphere, sedimentology-oceanological, geomorphological and medical investigations, including observations of white bears, were realized. Many technical works, repairs and adaptations were carried out as well.

KEY WORDS: Arctic, report on the polar expedition, Institute of Geophysics, Polish Academy of Sciences, 1982/83, Hornsund, Spitsbergen

Introduction

The expedition was organized by the Institute of Geophysics, Polish Academy of Sciences, within the framework of Interbranch Problem MR.-I. 29. "Research of maritime and continental polar regions as a basis of rational utilization of resources and their environment protection". The principal aim of the expedition was to continue permanent programmes of observations (magnetic, seismic and meteorological) carried out in the Hornsund fiord region by previous successive expeditions beginning from the season of 1978/79 as well as to realize special programmes (meteorological, sedimento-oceanographical, geomorphological). A basic technical task of the expedition was to keep the station in appropriate order, carry out repair, maintenance and adaptational works without taking up investment tasks. The topics of the scientific and technical programmes had been realized to a full extent owing to exceedingly self-sacrificing work of the expedition participants.

This required a considerable personal involvement, diligence, consciousness and collegial assistance, the more that the composition of the wintering group was, for the reasons beyond possibilities of the organizers, reduced to 8 instead of 10 people provided by the plan. During the whole duration of the expedition we encountered many times with proofs of great friendliness and help, far exceeding valid norms, on the part of Mr. Carl A. Wendt, Governor of Spitsbergen and workers of the Governor's Office as well as of Mr. D. M. Petrov, Vice Consul of USSR in Spitsbergen, workers of the Consulate and of the Direction of the "Arctic Ugol" Trust. It is my pleasant duty to express in this place them all our most hearty thanks.

1. Expedition members

1.1. Wintering group

Stanisław Rudowski D. Sc. Leader of the expedition (geologist, sedimentologist),

Andrzej Zbroszczyk Eng. Deputy Leader for technical affairs (mechanic, energeticist),

Adam Broda, physical,

Waldemar Stepko M. Sc. (meteorologist, oceanologist),

Jan Rodzik M. Sc. (meteorologist, geomorphologist),

Wiesław Wierzbicki (magneticist, seismologist, electronics specialist).

Krzysztof Görlich D. Sc. (geologist, oceanologist),

Józef Ignasiak, radio operator,

Andrzej Mikiński (seismologist, returned home in November 1982 in connection with injuries sustained in the casualty in mountains).

1.2. Summer group, of repairs

Andrzej Mieszczański, Leader of the group,

Jerzy Suchcicki, M. Sc., electronics specialist,

Marek Górski M. Sc., seismologist,

Zygmunt Wójcicki, specialist of high-pressure engines.

1.3. Regional and cruise groups

Organised irrespective of the central expedition, with which they cooperated carrying out investigations during the anchorage of the ship in Hornsund in summer 1982.

Geophysical expedition of the Institute of Geophysics, Polish Academy of Sciences, for seismologic examination of the bottom sediments,

Maciej Zalewski D. Sc., Leader of the expedition,

Eugeniusz Pawłowicz M. Sc., geophysicist,

Eng. Jerzy Manisz, geophysicist.

Geodetic expedition of the Society of Polish Geodesists, for photogrammetric registration of the position of glacier forefields:

Jan Cisak D. Sc., Leader of the expedition,

Cezary Lipert D. Sc., photogrammetry specialist,

Seweryn Mroczek D. Sc., geodesist.

2. Records of the expedition

July 28, 1982. The expedition sails from Gdynia on the board of the d/e Perkun.

August 3, 1982. The d/e Perkun entered Hornsund; taking over the Station from the previous group under the leadership of W. Mizerski D. Sc., debarkation and embarkation of the ship, repair works at the assistance of specialists from the ship, geodetical and geophysical research works in the Hornsund fiord carried out by regional and cruise groups.

August 16, 1982. The d/e Perkun sailed from Hornsund back to Poland with members of the previous expedition and of regional and cruise groups.

September 9, 1982. During the area investigations on the Wienertinden slope J. Rodzik, M. Górski, K. Görlich and A. Mikiński were caught by avalanche. The life-saving action was performed quickly and efficiently owing to the help on the part of a Norwegian helicopter. J. Rodzik was able to remain at the Station under the medical care of the expedition physician, the other injured were transferred to the hospital at Longyearbyen.

September 28, 1982. Return to the Station from hospital of sufferers in the accident.

October 28, 1982. The d/e Perkun entered Hornsund with the winter supply. In view of bad weather conditions — wind, high wave, ice, debarkation of the ship in Hornsund was impossible. The ship was debarked at Barentsburg. Thanks to a considerable help on the part of Mr. D. P. Petrov, Vice Consul of USSR in Spitsbergen, the supply was forwarded gratuitously to the Station by Soviet helicopters. Mr. Carl A. Wendt, Governor of Spitsbergen, gave over cost-free to the disposal of the Station a helicopter for transfer from the Station to Longyearbyen, for embarking the ship, the group of repair workers and Mr. A. Mikiński, who returned home, since the injuries sustained by him in the avalanche accident could not be properly cured under the Station conditions.

November 4, 1982. The d/e Perkun sailed from Spitsbergen back to Poland. In both cruises the ship was commanded by the Captain Ziemowit Kłos.

July 24, 1983. The d/e Perkun under the command of Captain Jan Krauze enters the Hornsund with the members of the next expedition under the leadership of Jan Cisak D. Sc. Giving over the station, debarkation and embarkation of the ship.

August 4, 1983. The d/e Perkun sailed back to Poland.

August 13, 1983. The ship entered Gdynia.

August 28, 1983. Medical control examinations. End of the expedition.

During our stay in Hornsund many official and social visits of Polish and foreign guests were paid to us. The Station was visited, among others, by Mr. Wenche Sellag, D. Sc., Minister of Environment Protection of Norway, Mr. Hans I. Østgaard, Director of the Norwegian Polar Department in the Ministry of Justice of Norway, Mr. Tom Gjelsvik, Director of the Norwegian Polar Institute, Mr. Carl A. Wendt, Governor of Spitsbergen, workers of the Governor's Office, inhabitants of Longyearbyen, Messrs. D. Petrov and J. Serebryakov, Vice Consuls of USSR in Spitsbergen, workers of the Consulate and the "Arctic Ugol" Trust, members of the Soviet geological and hydrological working groups. Our guests were also Prof. S. Siedlecki and participants of the regional expeditions of the Cracow Jagiellonian University, Academy of Mining and Metallurgy in Cracow, Silesian University.

3. Realization of the research programme

The research programme comprised two main groups of activity: continuation of permanent observations and special programmes.

3.1. Continuation of permanent observations

3.1.1. Magnetic programme

A continuous recording of the elements of the earth magnetic pole (H, D, Z) using the portable magnetic station and the proton magnetometer was carried out. Recording was performed at application of the Polish apparatus set (transmitting currently the results obtained to the Institute of Geophysics, Polish Academy of Sciences) and of the Finnish apparatus (Logger-Geodalo; upon establishing the apparatus the cassettes were sent to Finland). Apart from current repair and maintenance works, among

other things, repairs of recorders, steering systems and feeding of Logger damaged during transport, its mounting and calibration, thermostatics of the magnetic station, etc. were carried out.

3.1.2. Seismologic programme

A continuous recording of the seismic activity and tremors connected with the dynamics of the Hans glacier was carried out. The apparatus of the Górnik type with automatic recording, the seismograph with galvanoscopic recording on the photosensitive paper were applied. The tremors were transmitted from 4 stands established by previous expedition in the environs of the Station. The data obtained were currently transmitted to the Institute of Physical Geography, Polish Academy of Sciences. Current repairs and works on maintenance of the equipment were carried out. In the course of winter thrice exchange of cables damaged by bears took place.

3.1.3. Meteorological programme

The first task was to bring the Station to its full efficiency since for reasons of economy very shortened programme could be realized by the previous expedition. New implements and self-recording instruments were established. The standard programme for synoptics with measurements at 3-hour intervals was realized. Thrice a day the data were transmitted to the Norwegian Meteorological Service Centre. Once a day the data for the meteorological service of the helicopter landing place at Barentsburg were transmitted according to the wish of the meteorological service. Information for the attendance of planes, helicopters and ships was transmitted periodically. Current repair and maintenance works were carried out. The material collected was given over to the Institute of Meteorology and Water Management, Maritime Department in Gdynia.

3.2. Special programmes

3.2.1. Meteorological programme

Analogous recording of momentary wind velocity at the level of 10 m, continuous recording of mean wind velocity at the level of 2 m and 50 cm, continuous analogous recording of the air temperature course (at the levels of 0,50 cm, 2 m, and 10 m) and soil temperature (at the horizons of 5, 20, 50 and 100 cm) as well as catathermometric measurements thrice a day were performed.

3.2.2. Programme of the atmospheric and ionospheric physics research

Observations of VLF radiation using the Finnish and Norwegian rhyometer were carried out. The data obtained were currently transmitted to the Space Research Centre, Polish Academy of Sciences and to Dr. Jan Holtet from the Oslo University. Observations on aurora borealis were carried out using the Finnish implement of All-sky camera. The films exposed were sent to Finland. The ozone content measurements (11 series of measurements) were carried out using the M-3 type ozonometer and the results were sent to the Institute of Physical Geography, Polish Academy of Sciences.

3.2.3. Sedimentology-oceanological programme

Oceanographic background of the processes, layout of types of bottom sediments, reach of transport of the glacial material at the forefield of glaciers, sedimentation character in bays without any contact with glacier front, shore processes were studied. After technical preparation of the equipment, choice and establishment of hydrological stations, water samples from different depth at 125 spots and sediment samples at 60 spots were taken. Laboratory analyses of salinity and pH of over 200 water samples were performed. Maritime aerosol samples from the superficial membrane were taken. Stationary, photogrammetric observations of changes of the gravel beach and cliff shore were carried out. Changes in the ice cover in the Isbjørnhamna bay were recorded.

3.2.4. Geomorphological programme

The effect of nival processes in the runoff development was studied while taking samples of water, snow and soil in the Fugleberget catchment area while carrying out measurements by the ground photogrammetry method. Changes in the Hans Glacier front position were determined periodically by the method of photogrammetry of stabilized basic spots (240 series of surveys); the respective materials were worked out by the Centre of the Karst Geomorphology, Silesian University. Photogrammetric surveys from the bases on Høfferpynten at the foot of Rasstupet, Bauten, Gnoall, were performed for topographic map of Hornsund in the scale of 1:25000. Working out in the Institute of Geodesy and Cartography. Investigations on shore types (zoning) of Hornsund for the geomorphological map in the scale of 1:75000 of Hornsund prepared under the guidance of Prof. A. Karczewski from the Poznań University were carried out.



Fig. 1. Isbjørhamna (White Bear) Bay in the winter cover, March 1983.
On the foreground — the Station's "Bonzo". Photo. S. Rudowski

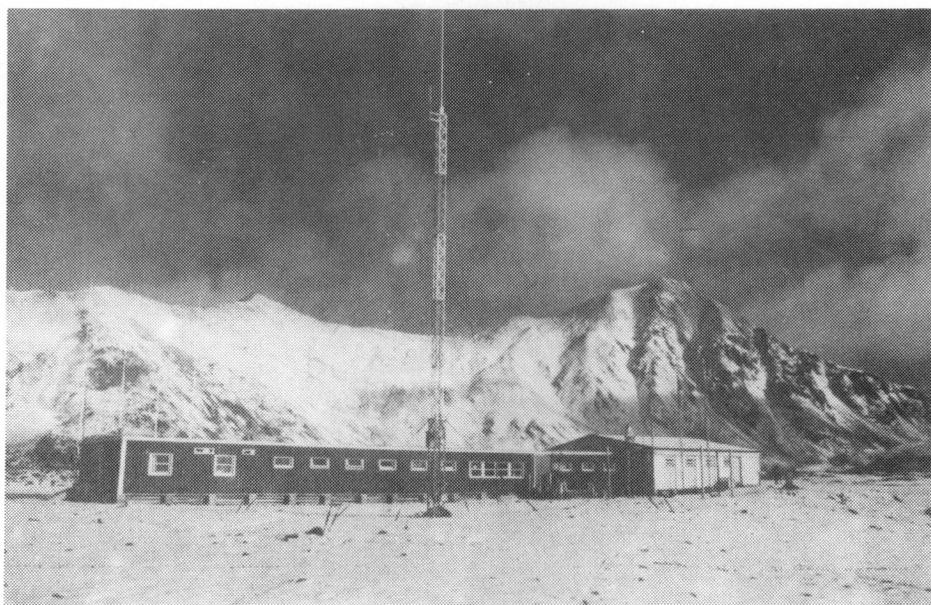


Fig. 2. Building of the Scientific Polar Station of the Institute of Geophysics, Polish Academy
of Sciences, in the autumn season, September 1982. Phot. L. Kolondra



Fig. 3. Encounter during the area investigations: Norwegian helicopter and Nansen's sleigh our transport mean in winter. Phot. K. Görlich

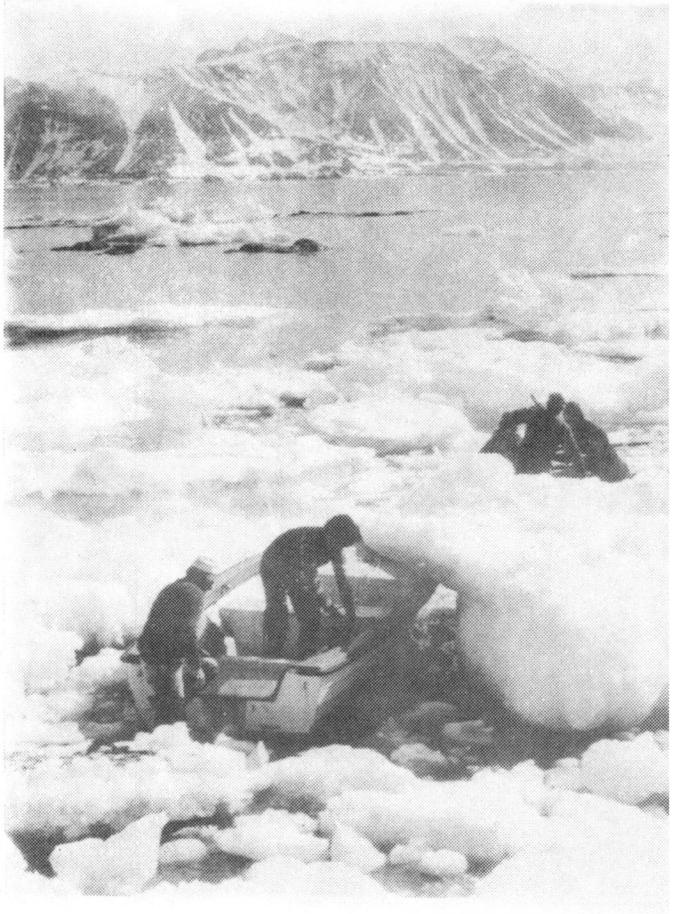


Fig. 4. Floating conditions over the fiord in summer 1983. Phot. S. Rudowski

3.2.5. Medical programme

Efficiency of organisms was estimated with particular regard to the polar night conditions as well as psychological observations and investigations concerning isolation of small group of people under specific environmental conditions were carried out. The material collected was worked out in the Military Institute of Aerial Medicine.

3.2.6. Observations of bears

Observations of bears were performed for the request and in accordance with the instruction of Dr. Thor Larssen from the Norwegian Polar Institute in Oslo, to whom current reports were sent. During stay of the expedition 211 various bears, the highest number of 53 bears in February 1983, were observed. The first spots of bears were detected on September 12, 1982; the first bear visited the Station in October 1, 1982, the last — on May 28, 1983. It was necessary many times to frighten bears with signal rockets and petards, as they came to near distance (10 m) to men, research implements and building doors. Excellently behave the dog Bonzo, which skilfully concentrated the interest of bears upon itself, and then shrewdly leading them aside. Only once it was necessary to use firearms: on April 5. during the works on the icefield of the Isbjørnhamna bay two scientists carrying out observations were attacked by a hungry young bear, which, rockets and petards being ineffective, was shot the distance of about 6 m,

3.2.7. Popular-scientific programme

During stay of the expedition once a week or sometimes more often seminars were run systematically, at which lectures were delivered and talks concerning various topics, both of scientific and adventurous character, were held by the expedition participants, member of other Polish working groups and foreign guests. In the period from early November to late April regular English language lessons for all wintering expedition members were given.

4. Realization of technical programme

4.1. Debarkation works

In cooperation with the members of the Expedition IV (of 1982) and VI (of 1983) as well as with colleagues from the regional working

groups, debarkation of the ship in summer 1982 and 1983 was accomplished while bringing to shore in small boats outfit and equipment of the new expedition and embarking the research outfit and equipment of home-returning expedition. In 1982 and 1983 each time by 100 tons of fuel in 200-liter barrels were debarked. In 1983 96 tons of rubbish (275 barrels) from time of the Expeditions III, IV and V were embarked and disposed off Spitsbergen.

4.2. Repair works

Beside current and periodical overhauls, works on maintenance and repair of apparatus sets, implements and rooms, also overhaul and repair of electric, water supply and canalisation network of the Station were carried out alarm signalization of the work of current-generating aggregates was improved, the lighting system of area of the Station, meteorological plot and power plant was reconstructed. Moreover, repairs of cooling devices were carried out, repair and bringing ready to motion conveyances of the Station (except GAZ car, in view of a lack of spare parts), repair of boat-attached engines (8) and of boats (3), repair and preparation for winter of trapper huts on Treskelodden, Gnålodden, in Hyttevika and in Gøshamna were carried out. The state of huts in winter was checked several times while removing damages caused by bears and using the huts as subbases in area investigations.

4.3. Orderly works

Surroundings of the Station and all rooms were put in order while liquidating scrap and gathering refuse and rubbish into barrels after fuel with the aim to dispose them off Spitsbergen; the fuel storeroom in open was put in order, the management of material was regulated while collecting from the area of the base and buildings various materials and arranging them according to assortments; inventory and calibration of the Station's property elements were done.

4.4. Instructing works

Training in the scope of safety and hygiene of work, of using firearms, applying first aid, attendance of boats and engines, principles of behaviour in mountains, was carried out. Successors of the attendance of current-generating aggregates, radio station and scientific apparatus sets were trained.

4.5. Fuel management

In the whole period of the expedition (358 days) 70.000 l of fuel oil for aggregates, which work amounted in this period in total to 8753 engine-hours, were used.

4.6. Radio station and radio operator activity

Beside current overhauls and maintenance works, many repairs, among other things, of damaged EKV and EGD receivers, antenna duplexer of the Mewa radio station, automatic transmitter, T 53, feeder UŁ 272, antennae FM 315, amplifier DSK, were executed. Many improvements and adaptations of the radio apparatus, antennae and electric appliances of the Station were accomplished, relief radio station with the energy source was prepared and established in a nearby trapper's hut on Wilczekodden.

Beside systematic telex contact occurring twice a week and of the phonia with the country for transmittance of the data of scientific observations, 961 synoptical telegrams were despatched, among other things, to Longyearbyen and 207 to Barentsburg.

5. Conclusions

5.1. The Station of the Institute of Geophysics, Polish Academy of Sciences, in Hornsund is accomplishing, on the whole, well its tasks. The supply with equipment, food, clothing, etc. is sufficient. The apparatus sets in disposal of the Station, althout not always of the modern type, fulfil basic requirements, enabling realization of assumed many-year research programmes. However, modernization of the equipment is needed. It is also necessary to ensure winter transport means (e.g. snow scooters) and efficient and reliable beat engines. Detailed remarks have been given over after returning home to the people dealing with organization of expeditions to Spitsbergen.

5.2. The members of the Hornsund Expedition V in 1982/83 deserved for their attitude, consciousness and high level of professional knowledge as well as for exemplary comradeship the greatest acknowledgment. The state of the Station at the moment of its giving over to the next expedition was estimated as good, whereas the rich scientific material collected will find its reflection in many publications being now under preparation.

5.3. The health state of members of the expedition was good throughout the whole stay, as it followed from medical every-month examinations at the Station and medical control examinations after return home. The persons who suffered in the accident in mountains and remained at the Station quickly regained their health; the process of treatment and rehabilitation of the members who returned home in autumn 1982 ended happily as well.

6. Резюме

В период с июля 1982 г. по август 1983 г. пребывала в станции Института геофизики Польской Академии Наук на Шпицбергене очередная, пятая круглогодовая научная экспедиция. В составе этой экспедиции руководимой д-ром С. Рудовским и подготовленной Институтом геофизики ПАН, было 8 человек зимней группы и 4 человека ремонтной летней группы (ее возвращение на родину состоялось в ноябре 1982 г.). В связи с несчастным случаем во время работ в горах вызванным лавиной, один из участников зимующей группы был принужден вернуться на родину в ноябре 1982 г., поскольку станция не располагала соответствующими приборами для его полной реабилитации. В конечном итоге здоровые как его так и других потерпевших лиц, которые остались на зимовку на станции, было полностью восстановлено.

Экспедицией была реализована научная программа по продолжению систематических наблюдений и регистраций сейсмологических, магнетических и метеорологических, начатых летом 1978 г. Сверх того проводились исследования в области физики атмосферы и ионосферы, седиментологические, океанологические, геоморфологические и медицинские исследования, а также наблюдения за полярными медведями.

В рамках технической программы экспедицией было проведено много работ по ремонтах и содержанию, а также приспособленческих и порядковых работ.

Задачи научной и технической программы экспедиции были полностью реализованы. Состояние здоровья участников, независимо от несчастного случая в горах, было на протяжении всего времени пребывания хорошим, что подтвердили медицинские контрольные обследования всех членов экспедиции.

7. Streszczenie

W okresie od lipca 1982 r. do sierpnia 1983 r. przebywała w stacji Instytutu Geofizyki Polskiej Akademii Nauk, kolejna, piąta, całoroczna wyprawa naukowa. W skład tej wyprawy, kierowanej przez dr S. Rudowskiego i zorganizowanej przez Instytut Geofizyki Polskiej Akademii Nauk wchodziło 8 osób grupy zimowej i 4 osoby grupy remontowej-lętnej (powrót do kraju w listopadzie 1982 r.). W wyniku wypadku w czasie prac terenowych (lawina) jeden z uczestników grupy zimowej musiał powrócić do kraju w listopadzie 1982 r. gdyż na stacji nie było odpowiednich warunków dla pełnej jego rehabilitacji. Zarówno on jak i poszkodowani w wypadku i pozostali na zimę w stacji w pełni wrócili do zdrowia.

Wyprawa realizowała program naukowy dotyczący kontynuacji stałych obserwacji i rejestracji sejsmologicznych, magnetycznych i meteorologicznych, zapoczątkowanych w lecie 1978 r. Ponadto prowadzono badania z dziedziny fizyki atmosfery i jonosfery, badania sedymentologiczno-oceanologiczne, geomorfologiczne, medyczne oraz obserwacje niedźwiedzi polarnych.

W programie technicznym wyprawa wykonała wiele prac remontowych, konserwacyjnych, adaptacyjnych i porządkowych.

Założenia programu naukowego i technicznego wyprawy zostały w pełni zrealizowane. Stan zdrowia uczestników, poza sprawą wypadku w górach, był cały czas dobry i po zakończeniu wyprawy w sierpniu 1983 r. badania kontrolne potwierdziły to u wszystkich biorących udział w wyprawie.

Paper received 1985 May 13