

CORNELIA LÜDECKE

German-Soviet Cooperation in the Arctic during the Weimar Republic

Friedrich Schmidt-Ott's contribution

ABSTRACT Without Friedrich Schmidt-Ott, President of the Notgemeinschaft der Deutschen Wissenschaft/Emergency Association of German Science (today: Deutsche Forschungsgemeinschaft/German Science Foundation), and his good personal relations, favoured by the Treaty of Rapallo, German-Soviet-Russian cooperation in the Arctic would not have been conceivable in the early 1930s. It will be shown in this article how he helped to set up the International Study Association for the Exploration of the Arctic Region by Airship (in short: Aeroarctic), bringing researchers from Germany and the Soviet Union together again in an international research community while both countries were excluded from the International Research Council. The aim was to open up an Arctic transport route with airships. On the Soviet side, the polar researcher Rudolf Samoilovich played an important role in the preparation of the Arctic expedition of the LZ 127 *Graf Zeppelin*, which was planned by the Aeroarctic under Fridtjof Nansen and carried out after his death by Hugo Eckener together with the scientific director Samoilovich. In addition, Samoilovich facilitated the participation of German geophysicists in Soviet expeditions during the Second International Polar Year (1932–1933). Kurt Wölken carried out seismic ice thickness measurements on Novaya Zemlya, while Joachim Scholz determined air electricity and ultraviolet radiation on Franz Joseph Land and observed polar lights. In addition, both investigated sound propagation in the high atmosphere. Their different fates during the Third Reich are also revealed. It was not until 1998 that joint German-Russian research projects in the Arctic were resumed again.

KEYWORDS Trans-Arctic airline, northern sea routes, Aeroarctic, LZ 127 *Graf Zeppelin*, Arctic expedition, Second International Polar Year, Novaya Zemlya, Franz Josef Land, Rudolf Samoilovich, Joachim Scholz, Kurt Wölken

Introduction

On the evening of 27 July [1931] [...] we approached the southern coast of Franz Josef Land. Delicate light blue hues of the sky were reflected in the motionless sea, and the yellowish, cold rays of the sun glowed in dazzling brilliance on the snow cover of the continental ice. Then the so-called Silent Bay [Tikhaya Buchta] opened up in front of us, on the shore of which we had built a geophysical observatory and a radio station two years ago. The airship began to descend slowly and steadily until the keel of its gondola touched the lead-grey, cold water. A boat quickly approached from the ice-breaker "Malygin." There was the head of the station Ivanov, my young assistant, who had already spent a year and a half at this station as its head, there was General Nobile and others. [...] Fifteen minutes later we went up again to make a photogrammetric survey of the least known parts of the archipelago. [...] We found that the islands of [H]armsworth and Albert Eduard did not exist. But when we had finished taking the photographs and turned north across the British Channel, we discovered some new islands. (Samoilowitsch 1931: 566–567)

The airship expedition of the International Study Association for the Exploration of the Arctic Region by Airship explored the geographical and geodetic conditions of the Russian Arctic from 26 to 30 July 1931 on board the LZ 127 *Graf Zeppelin* after taking off from Leningrad (today: St. Petersburg) (Samoilowitsch 1933: 27–28). In particular it made a survey of the island world of Franz Joseph Land with a focus on Alexandra Land as well as Severnaya Zemlya and Novaya Zemlya. En route, meteorological, aerological and magnetic measurements were systematically carried out and aerophotogrammetric photographs were taken with series measuring cameras to produce maps. In the process, the airship, which flew at an altitude between 200 and 1,000 meters, proved to be an excellent research platform in the air. A distance of 10,700 kilometers was covered non-stop on the round trip in 105 hours and 17 minutes. This expedition represented the first German-Soviet-Russian cooperation in the Arctic, in which other nations were also involved.

What internal and external conditions promoted this international project? Which special political or scientific circumstances played a role and how did personal contacts and interests affect it? I do not want to go into deeper detail concerning internationalism in science between the Soviet Union and the western world after the First World War, but focus on German-Soviet projects.

The following section will describe in more detail how the Arctic voyage of the LZ 127 *Graf Zeppelin* came about as well as the research projects that followed on from it during the Second International Polar Year (1932–1933) and their further effects.

Planned Trans-Arctic Air Connections

During the First World War, the development of airships advanced rapidly. They could cover long distances and transport a reasonably great weight, which was far beyond the possibilities that planes offered, although they were faster. In consequence, ideas soon arose after the war to connect the major cities of the continents via suitable flight routes for airships. In 1919, the retired Berlin airship pilot Captain Walter Bruns (1889–1955) proposed a direct route across the Arctic, which would make it possible to fly on an ideal route from Berlin via Leningrad, the Russian Arctic and a hub on the easternmost Aleutian island of Unimak to Tokyo or San Francisco (Fritzsche 2018; Kohlschütter 1927). To prepare such a flight connection, however, a feasibility study was first to be carried out, as no one had ever dared to pilot airships far into the Arctic at that time.

The attempts of the American journalist Walter Wellman (1858–1934) to fly to the North Pole with a dirigible from Spitsbergen in 1906, 1907 and 1909 were not successful (Nelson 1993: 278–279). In the summer of 1910, a study trip of the German Arctic Zeppelin Expedition to the west coast of Spitsbergen had revealed that far too little was known about the weather conditions in the far north to plan a safe airship flight (Miethe & Hergesell [eds.] 1911). Count Ferdinand von Zeppelin (1838–1917) nevertheless had a clear vision after his return from Spitsbergen that it would be possible in the future to perform flights by zeppelins to explore the Arctic (Zeppelin 1911). In order to obtain the weather information from the high atmosphere necessary for the planning of such expeditions, a geophysical observatory was established in 1911 on Spitsbergen at Advent City (today: Longyearbyen) and in 1912 it was moved to Ebeltoftthamna on Mitrahalfvøya. The observatory was operating continuously with a new crew of observers each year (Hergesell [ed.] 1914).

At this first permanent Arctic observatory, aerological ascents were carried out as often as possible with tethered balloons and kites to which self-registering measuring instruments for air pressure, temperature and humidity were fixed. Wind direction and speed could be determined by observing so-called free-flying pilot balloons with theodolites. However, these investigations came to an end with the outbreak of the First World War (Dege 1962).

Bruns' activities were initially concentrated to Berlin, where, among others, the German-Russian polar researcher and polar chronologist Leonid Breitfuß (1864–1950) was living (Schennerlein 2018: 32–33; Lüdecke 2001; Kohlschütter 1927). Breitfuß was committed to Bruns' plan (Fig. 1). Before leaving Russia, Breitfuß had been head of the Murman Expeditions and the meteorological and oceanographic department at the Ministry of the Navy and thus he not only brought a lot of his Arctic experience to the table but also his contacts with Soviet scientists.

In 1922, Bruns finally succeeded in gathering Berlin scholars and aeronautical experts together in a committee that was to push the project further. The president of the *Notgemeinschaft der deutschen Wissenschaft* (Emergency Association of German Science, today: *Deutsche Forschungsgemeinschaft/German Science Foundation*) Friedrich Schmidt-Ott (1860–1956) also supported the committee with both advice and deeds.



Schmidt-Ott and German-Soviet Relations

Conducting a feasibility study in the Russian Arctic required scientific cooperation not

Fig. 1. Leonid Breitfuß in 1936. Source: Herrmann 1949: 3.

only at the international but also at the political level. The conditions for such cooperation were favourable before the First World War, as 21 academies based in 14 European nations and the USA were members of the International Association of Academies (Kevles 1971: 48). Especially prominent among the four German members was the Berlin Academy. All scientists were part of an international community. They met at conferences and exchanged publications. However, when Germany started the gas war and deployed submarines in 1915, the attitude toward German scientists changed abruptly and the end of international science was predicted.

After the First World War, every effort was made during the Weimar period to ensure that Germany and Russia could no longer build up military power and thus these nations were not included in the newly founded international scientific council, the so-called International Research Council (Forman 1973: 157–158, 161). Under no circumstances, would *Wehrkraft* ['military power'] and science, Germany's great flagships before the war, be allowed to gain strength again, especially science in the notion as a *Macht-Ersatz* ['power substitute']. As early as 1909, Schmidt-Ott (then called Schmidt), was of the opinion that a

decline in Germany's scientific prestige reacts upon Germany's national repute and national influence in all other fields, leaving entirely out of account the eminent importance for our economy of superiority in particular fields of science. (Schmidt cited in Forman 1973: 161–162)

Besides, German *Kulturpolitik* ['cultural policy'] was "one of the few instruments of an active foreign policy remaining to Germany" (Forman 1973: 166). Against this background, economic relations between Germany and the Soviet Union were initiated as early as 1920 (Zeidler 1994: 47).

Schmidt-Ott, who became the president of the German Society for the Study of Eastern Europe in February 1920, did everything in his power to continue the German-Russian scientific relations that had already been established before the First World War (Schmidt-Ott 1952: 169, 174 ff.). Not only did the Soviet government attach great importance to these scientific contacts, but Russian scholars also greatly welcomed the continuation of personal exchanges. Schmidt-Ott, who had also been appointed president of the Emergency Association of German Science at the end of October 1920, kept the promotion of German-Soviet relations in mind when he was given a budget of three million gold marks in 1924 to support young researchers and promising research projects. The combination of both offices in one person was to prove very beneficial for the projects that followed.

A promising economic start was made as early as 1921 with the founding of the German-Russian Air Transport Company (Deruluff), which consisted of a merger of the Aero-Union and the Soviet government (Pollog 1934: 50). Aero-Union was a merger between HAPAG (Hamburg-Amerikanische Packetfahrt-Aktien-Gesellschaft, Luftschiffbau Zeppelin and AEG (Allgemeine Elektrizitäts-Gesellschaft). After some preparations, the first scheduled flight to carry mail and official passengers between Königsberg in East Prussia, Smolensk and Moscow took place on 1 May 1922.

German-Soviet Russian relations were officially favoured by the Treaty of Rapallo, which was concluded between German and Soviet Russian representatives on 16 April 1922, on the sidelines of the unsuccessful World Economic Conference (Rapallo 1922). This marked the beginning of a new era of diplomatic relations between the two states on the basis of mutual equality. Reparations claims were cancelled in favor of supporting new economic relations. In addition, German-Soviet military relations were developed

in secret, leading to cooperation between the two nations' air forces beginning in 1924 (Zeidler 1994: 34–59, 64, 89–97). This was preceded by the establishment of a Junkers plant in Fili, a suburb of Moscow, aimed at reviving Russian aircraft production with the help of German know-how, namely, Junkers' metal construction methods. Scientific ties were also strengthened when, for example, the German Physical Society appointed physics professor Orest Chwolson (1852–1934) from Leningrad as its first honorary member in 1922 (Formann 1973: 167). It was also ensured that Russian articles appeared in German scientific journals.

The invitation to the celebration of the 200th anniversary of the Academy of Sciences in Leningrad in September 1925 provided Schmidt-Ott with an excellent opportunity to establish personal contacts with Soviet scientists on site (Schmidt-Ott 1952: 217 ff.). Especially valuable in this regard was a meeting with Trotsky's sister Olga Kamenev (1883–1941), the president of the Society for the Cultural Connection of the Soviet Union with Foreign Countries. She was very pleased with Schmidt-Ott's concern to promote mutual relations through publication exchange, invitations to lectures by specialized scholars, and mutual dialogues at congress events. Coincidentally, it also happened that Schmidt-Ott was able to explain the aims of the *Notgemeinschaft* to the Soviet head of state Mikhail Ivanovich Kalinin (1875–1945). Kalinin himself had already contemplated a beneficial residence in the Soviet Union for German scientists and technicians. Schmidt-Ott, however, propagated joint research projects for the benefit of both states from the very beginning. Following this exchange of ideas, he was able to discuss his proposals with representatives of the Soviet Academy of Sciences, and an agreement was reached on joint expeditions and the sending of Soviet fellows to German institutes. The first concrete action was the joint planning and implementation of the Alai-Pamir expedition led by Nikolai Petrovich Gorbunov (1892–1938), First Secretary of the Council of People's Commissars. The expedition consisted of eleven Soviet and eleven German members, who in 1928 would discover the *Notgemeinschaft* Glacier near the 77 kilometers long Fedchenko Glacier.

Further very good contacts were established in the course of time with the Director of the Institute for the Exploration of the North (in 1930 changed into Arctic Institute), Rudolf Samoïlovich (1881–1939) and his later successor at the Arctic Institute, geophysicist Otto Schmidt (1891–1956), who visited Schmidt-Ott several times in Berlin.¹ Samoïlovich had first studied at the Mining Academy in Freiberg/Saxony and then devoted himself to the exploration of the Russian Arctic. It was not only his knowledge of German that made him an extremely valuable partner in the airship project.

The deepening of German-Soviet cooperation happened especially in 1927 through personal encounters during the "Russian Explorer Week" in Berlin (Treue 1989: 236). During Schmidt-Ott's later visit to Georgia in 1928, a working partnership between Georgia and the *Notgemeinschaft* was agreed, in particular on the mutual secondment of young scientists to specialized institutes (Schmidt-Ott 1952: 242, 246). Overall, Schmidt-Ott's relations with the Soviet Union were considered particularly good, so his recommendations were gladly received.

Activities of the Aeroarctic

In 1924, Schmidt-Ott was visited by representatives of a Committee for the Exploration of the Arctic by Airship to discuss the concrete promotion of Zeppelin flights to the Arctic (Schmidt-Ott 1952: 307). A small scientific committee was formed, which Schmidt-Ott also asked the Zeppelin shipyard in Friedrichshafen, represented by its director Hugo

Eckener (1868–1954), to join. After the successful preliminary work of the committee, the International Study Association for the Exploration of the Arctic Region by Airship (from 1928: International Study Association for the Exploration of the Arctic Region by Aircraft), in short, Aeroarctic, was finally founded on 7 October 1924 (Studiengesellschaft 1924; Lüdecke 1995: 168–169). The presidency was offered to the old master of polar research, Fridtjof Nansen (1861–1930), who, through his work as the League of Nations Commissioner for Refugee Affairs, had campaigned for the repatriation of prisoners between the German Empire and Russia, as well as for aid measures for the Russian famine regions, and had been awarded the Nobel Peace Prize for this in 1922. Nansen's presidency was intended to signal to the global world that the association, as well as the planned airship expedition, was an extremely peaceful endeavour and by no means an illegal reconstruction of the German air force, which was shattered after the war.

Through previous targeted advertising, the founding memorandum "The Airship as a Means of Research in the Arctic" already listed 111 members from twelve countries, including the Soviet Union, Scandinavia, some European states, as well as Japan and the United States of America, among them the famous aircraft designer Hugo Junkers (1859–1935) from Dessau (Studiengesellschaft 1924: 16–20).

The memorandum outlined all the prerequisites for carrying out an exploratory flight to the Arctic. In assessing the most favorable time for an airship expedition, they could draw on the meteorological data from the German Observatory in Spitsbergen from the years 1911–1914.

Instead of the previous 29 travelling days on the Hamburg via San Francisco to Yokohama shipping route, the flight time via the trans-Arctic route to Yokohama would only be five and a half days and to San Francisco only six days, which was a tempting time saving compared to the ship journey. The fare, on the other hand, would only be 25 percent higher than that for a journey by steamer. This put Arctic air travel in a thoroughly realistic light.

On 12 October 1924, 432 years after Columbus disembarked in America, Eckener left Friedrichshafen on board LZ 126 (American name: ZR 3), the first zeppelin built after the war, to deliver it to the United States of America as part payment of the financial war reparations (Eckener & Italiander 1979: 25–30). The first trans-ocean flight of 3,800 kilometers between Europe and America was very successful and a huge, excited crowd awaited LZ 126's arrival in Lakehurst. This event proved, on the one hand, that the zeppelin could be used for long-distance flights and, on the other, that the flight was seen as a peace mission and a technical tour de force, as evidenced by the triumphant reception in New York.

Another event went through the world press the following year. On 21 May 1925, Roald Amundsen (1872–1928) took off from Spitsbergen with two Dornier-Wal flying boats in the direction of the North Pole (Amundsen 1925). However, one airplane had to make an emergency landing at 88 °N. Fortunately, with the help of the second airplane, all expedition members could be rescued. Long distance flights in the Arctic were still seen as dangerous for planes.

Although the ocean flight of ZR 3 was regarded as milestone in Germany, representatives of the government were very reluctant to finance the building of another airship as they favoured airplanes (Eckener & Italiander 1979: 39–47). "The main reason was that the airplane had great military value, while the airship had already played out its military role by the end of the First World War." (Eckener & Italiander 1979: 46). Thus, Eckener had to find other financial support for the construction of a new airship.

In order to further promote the Aeroarctic airship expedition to the Arctic, Schmidt-Ott took part in a promotional event organized by the Zeppelin shipyard at the Kurhotel in Friedrichshafen in August 1925 (Schmidt-Ott 1952: 307–308). On the occasion of the 25th anniversary of the first Zeppelin airship, a “People’s Zeppelin-Eckener Donation” was launched to provide the financial means needed to build a new airship (LZ 127) in Germany. Besides, this airship could be also used for Aeroarctic’s feasibility study. Schmidt-Ott held an “Appeal to the German People for the Implementation of the North Polar Plan” and also took over the sponsorship of the collection. Eckener and Schmidt-Ott hoped to generate interest in the project which could further strengthen the national pride after the successful flight of ZR 3.

In the run-up to the First Ordinary Assembly of the Aeroarctic in Berlin, Breitfuß considered it urgently necessary to establish a Soviet national group (Schennerlein 2018: 33–35). This only happened after Gorbunov had vehemently advocated for it even before leaving for the Pamir expedition and also suggested suitable scientists from the fields of meteorology, scientific technology and aeronautical engineering. During the meeting of the Aeroarctic, which, after a postponement, finally took place on 16 November 1926 at the Aeroclub von Deutschland in Berlin, four German and five Soviet participants discussed the necessary weather briefings for the research flight, which were to be provided primarily by the Russian side (Berson & Breitfuß 1927) (Fig. 2).



Fig. 2. Participants at the welcome evening of the first ordinary meeting of the Aeroarctic on 9 November 1926 at the Aeroclub, Berlin. Front row from left to right: Albrecht Penck, Johann Schütte, Fridtjof Nansen, Ernst Kohlschütter, Gustav Hellmann. Second row from left to right: Captain Krupp, Arthur Berson, Walter Bleistein, Captain Walter Bruns, Heinrich von Ficker, Georg Wegener, Major von Kehler. Source: Nicklas, Frankfurt.

Weather stations on Novaya Zemlya and Franz Joseph Land were already being planned and the then Director of the German Naval Observatory (Hamburg), Vice-Admiral Hugo Dominik (1872–1933), wanted to provide measuring equipment for these stations from his holdings. In this context, Breitfuß even suggested a repeat on an extended scale of the international Polar Year of 1882–1883, when twelve meteorological and magnetic stations

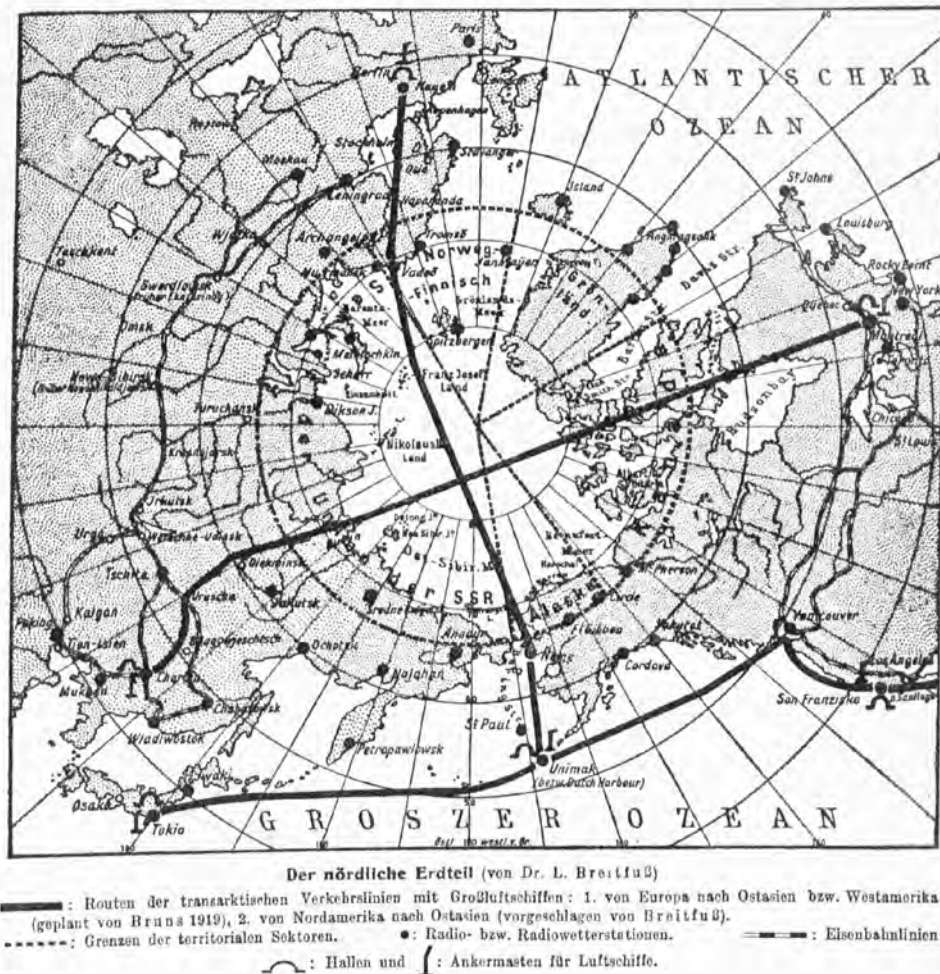


Fig. 3. Leonid Breitfuß's map of the Arctic with his proposed sector divisions, railway lines and planned routes of trans-Arctic transport lines by airship. 1) Brun's proposal from 1919: from Europe via Unimak to East Asia and the west coast of North America. 2) Breitfuß's proposal: from eastern North America to East Asia. The required anchor masts for airships and airship hangars are marked at the end points of these routes. The black dots indicate radio and radio weather stations. Source: Breitfuß 1928: 27.

had been set up around the Arctic for the duration of a year (Berson & Breitfuß 1927: 111–112). Dominik's colleague Johannes Georgi (1888–1972) supported Breitfuß and pleaded for the establishment of aerological stations around the Arctic Ocean to measure the meteorological conditions of the high atmosphere. This meeting was in fact the catalyst for the implementation of the Second International Polar Year 1932–1933, which was then successfully propagated by Dominik in relevant international organizations such as the World Meteorological Organization (Lüdecke & Lajus 2010: 141 f.).

Another interesting aspect is Aeroarctic's idea of to form "an international political-scientific union" in the League of Nations "for the permanent geophysical monitoring of the Arctic" (Nansen *et al.* 15 Sept. 1927: 165–166). The members of the union were to consist of the country chairmen of the Aeroarctic, who would be vested with powers by their governments. This would allow an Arctic observing network to be permanently financed and secured. However, this proposal could not be pursued.

In 1926, the Amundsen-Ellsworth-Nobile expedition proved that long-distance flights with airships were possible in the Arctic (Amundsen & Ellsworth 1927). Amund-

sen was indeed the first to cross the North Pole on his way from Spitsbergen to Alaska, accompanied by his financier Lincoln Ellsworth (1880–1951), the Italian officer and engineer Umberto Nobile (1885–1978), and the Italian-Norwegian crew on the airship *Norge* built by Nobile. Two years later, on 25 June 1928, Nobile's airship *Italia* crashed northeast of Northeast Land (Svalbard) on the way back from the North Pole with only eight of 16 participants surviving (Nobile *et al.* 1929).

Both events influenced the further planning of the Aeroarctic, which was discussed at the second meeting in Leningrad from 18–13 June 1928 (Lüdecke & Lajus 2010: 144–145). It was precisely the crash of the *Italia* and the rescue by the Soviet icebreaker *Krassin* in mid-July that supported the intensification of Arctic research in the Soviet Union, for which a special commission was established.

The subsequent Soviet five-year plan included the requirement to establish radio stations and meteorological-hydrographical stations along the northern sea coast and on remote Arctic islands with the aim of opening the northern sea route (Northeast Passage) to traffic. In this context, Breitfuß published a proposal for sector divisions in the Arctic as a “basis for internationally accepted demarcations,” first in Russian in 1927 and in 1928 in German (Breitfuß 1928: 27–28; Schennerlein 2018: 39) (Fig. 3).

The Airship Expedition of the LZ 127 *Graf Zeppelin* in July 1931

When Nansen, the president of the Aeroarctic and expedition leader, died unexpectedly of a heart attack on 13 May 1930, Eckener was asked to succeed him and lead the planned airship expedition to success in 1931 (Eckener & Italiander 1979: 165–188; Rackwitz 1958: 216–248). However, due to the postponement of the expedition, more money had to be collected to finance it. A bright idea for raising money again came to Eckener when he heard about a planned expedition of the icebreaker *Malygin*, which was to make a supply trip to the meanwhile established meteorological station on Franz Joseph Land in July 1931 and then explore the northern surroundings in more detail. The exchange of mail bags between the airship and the icebreaker would excite polar philatelists from all over the world and the fees charged for this would be an additional source of income.

The Soviet national group had long since grown to become the second strongest national group after Germany (Schennerlein 2018: 35). Samoilovich, who had led Nobile's rescue on board the icebreaker *Krassin* in 1928 and had since been regarded as an Arctic authority, was now entrusted with the scientific leadership of the Zeppelin flight, not only for reasons of parity and because a large part of the route went over Soviet territory, but also because it was hoped that he would successfully carry out a comprehensive research programme (Berson, Samoilowitsch & Weickmann [eds.] 1933; Felden 1986: 138). A total of six German scientists, two Americans, including the polar-experienced Ellsworth, three Soviet scientists and one Swede took part in the expedition. During the flight, the Russian meteorologist Pavel Molchanov (1893–1941) was responsible for carrying out aerological measurements with a radiosonde he had developed, the data of which were needed for current weather forecasts on board the LZ 127 *Graf Zeppelin*. The innovative radiosonde system, which was still being tested, consisted of a balloon filled with gas and an instrument attached underneath to measure air pressure, temperature and humidity, with the measuring data being sent by radio to a receiver on the airship. The special feature of the new measuring system was that a weight was attached to the radiosonde before launch. After being released through an opening in the hull of the

airship, the sonde first fell downwards until the weight was blown off by an automatic ignition. Then the actual radiosonde ascent began from close to the ground upwards, so to speak. In this way, it was even possible to measure meteorological data from the altitude range between the airship and the earth's surface before the balloon carried the measuring device beyond the airship into the stratosphere, where it then burst and the measurements were repeated until the measuring device hit the earth's surface (Fig. 4).



Fig. 4. Preparation for the balloon launch. On the left, the meteorologist Ludwig Weickmann and on the right, the developer of the radiosonde Pavel Molchanov. Source: Lüdecke Collection.

Three of the four radiosonde ascents reached an altitude of more than 16 kilometers into the stratosphere. Another scientific task of the expedition was to explore the region between Franz Joseph Land and Nordland (Nikolaus II Land), as it was thought that there were unknown islands in this area. In particular, the island archipelago of Severnaya Zemlya, which had been discovered by Russians as recently as 1913, was to be mapped aerophotographically. This was of particular importance with regard to Soviet claims of ownership (Schennerlein 2014; Schennerlein 2018: 38) (Fig. 5).

In Leningrad, everything that constitutes the “comfort” of the transport airship was left behind. From now on we eat from paper plates and sweep our cabins ourselves. All available space and all saved weight are used to carry the scientific apparatus for radio telegraphy, photography and film, geodesy, meteorology and magnetometry.

Soon after leaving Leningrad, we are hovering above forests, rafts drifting on rivers towards the White Sea, in places we can't see the river for the trees. Arkhangelsk is the most important timber stacking point. The Barents Sea is ice-free and still shimmers bottle-green through the bright Arctic night. For us newcomers, it is a strange feeling to see the sun in the middle of the night; it pours an unreal yellow light over the sea, which is increasingly covered with ice floes.

The Russian icebreaker *Malygin* is waiting for us off Franz Josef Land. We steer for it, supported by mutual radio direction finding. The evening sky, if you can call it

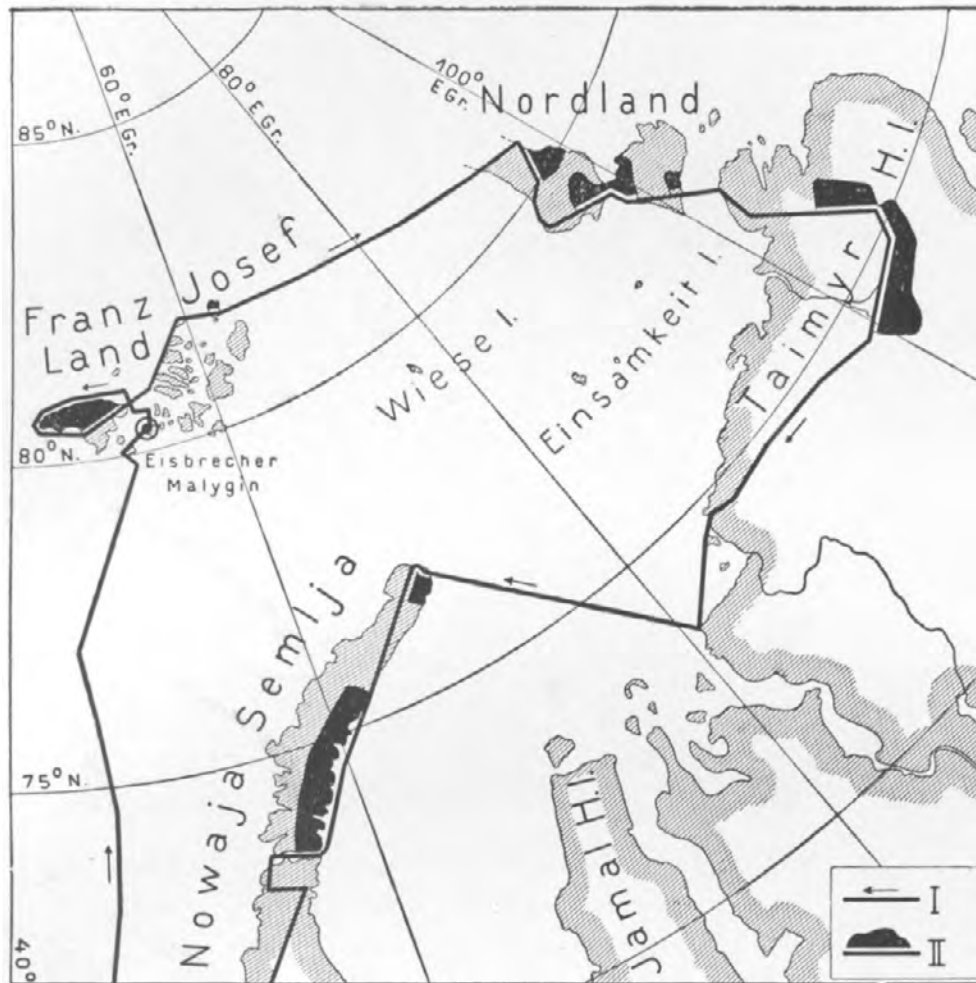


Fig. 5. Route of the LZ 127 *Graf Zeppelin* in the Russian Arctic (I) and areas mapped with the Zeiss Aerotopograph (II). Source: Berson, Samoilowitsch & Weickmann [eds.] 1933: Tf21, Fig. 5.

that, shows wonderful hues when we meet the Russian steamer in the late afternoon of 27 July in the Silent Bay of Hooker Island. As *Graf Zeppelin* slowly descends and then floats on its gondola buffers between floating ice floes, a boat detaches itself from the *Malygin*. A man in a fur hat stands tall in the stern, I recognize through the binoculars the unfortunate Nobile, whom fate had consigned to the Russians after the sinking of his second polar [air] ship *Italia*.

The boat lies alongside our guide gondola, we hand over the mailbags and photos destined for the steamer. One hand reaches out to Nobile: that of his polar companion Ellsworth, who is taking part in our research trip. Both are visibly moved, the rest of us also feel the tragedy of the Italian, with whom we had many a technical discussion in Friedrichshafen. [...]

The ice floes are about to approach curious polar bears, Eckener is getting restless because the buffer we are floating on can't take much strain. We bid a brief farewell to Nobile and the Russians and continue our journey along the coastal islands of Franz Josef Land. We discover that [H]armsworth Island and Albert Edward Island do not exist at all, despite all the maps. North of Franz Joseph Land, there is again nothing but pack ice. Professor Moltschanow, an excellent Russian scholar and a quiet, amiable man, eagerly sends his recording balloons into the stratosphere.

We turn east towards Nicholas II Land, now called Nordland. Glacier peaks almost a thousand meters tall rise above the sea of fog. Uncharted island territory is

spotted. Continuing the exploration is rendered impossible by the ever-thickening fog. We therefore head south to the Taimyr Peninsula, where herds of wild reindeer flee from us, survey Lake Taimyr and discover previously unknown mountains. Later we drop mail and newspaper packages over the Dickson radio station at the mouth of the Yenisei. The six men who make up the station stand in front of their modest huts and look longingly at us as we turn west, back to inhabited lands and their culture.

Graf Zeppelin crosses the Kara Sea, heading for the large double island of Novaya Zemlya, whose rocky mountains and glacial fractures drop a thousand meters into the sea, which is ice-free again here. Guillemots, similar to the penguins of the southern polar ocean, waddle on the cliffs and seagulls fill the air like snow flurries. Then we are back on the old route: Barents Sea, Arkhangelsk, Leningrad, Berlin, Friedrichshafen. We didn't need our sledges and weapons. (Lehmann 1936: 300–302)

The research voyage had gone smoothly thanks to the comprehensive weather briefings, so there had been no emergencies. Samoilovich summarized that the expedition had achieved a feat in about four and a half days which an icebreaker would need two to three years to complete (Felden 1986: 150 f.). The usefulness of airships for Arctic research was thus proven. In addition, the entire Alexandra Land in the west of Franz Josef Land as well as coastal areas of Novaya Zemlya and the still little explored Nordland were photogrammetrically recorded. The results of the research trip were published in 1933 and supplemented by new detailed maps of Novaya Zemlya and Severnaya Zemlya (Berson, Samoilowitsch & Weickmann [eds.] 1933). However, the evaluation of the entire material was prevented by a lack of financial means (Gruber 1933: 71). Although it had previously been stipulated that all results should also be handed over to the Soviet Union, the aerial photographs were probably withheld and not forwarded (Papanin 1981: 113–114; Schennerlein 2014: 79).

The seizure of power by the National Socialists and the change in research policy prevented the further pursuit of the planned trans-Arctic commercial airline. Finally, the crash of the "LZ 129 Hindenburg" on 6 May 1937 ended the era of airships.

German-Soviet Cooperation during the Second International Polar Year (1932–1933)

After their successful Arctic voyage, the expedition members gave numerous lectures about their experiences and results. When Samoilovich was invited to Freiburg/Breisgau in this context, he casually mentioned in his report that the Soviet Union was looking for German scientists for polar research (Mittelstraß 19 Nov. 1931). It was a good opportunity, because the repeat of the International Polar Year of 1882–1883 after 50 years, originally proposed by Breitfuß at the time, was indeed to be implemented with the support of the International Meteorological Organization (today the World Meteorological Organization) and the International Union of Geodesy and Geophysics from 1932–1933 (Lüdecke & Lajus 2010). Facilitated by international participation, meteorological and magnetic measuring stations were again to be set up in the Arctic. Their task was to investigate, using new kinds of measuring instruments, in particular the meteorological conditions in the high air layers and the air currents (jet streams) discovered there only a few years ago. Fourteen countries wanted to set up a total of 34 Arctic research stations. On the German side, no costly expeditions were planned for the Polar Year, apart from an increase in routine measurements, after the Notgemeinschaft under Schmidt-Ott had just financially supported Alfred Wegener's Greenland expeditions in 1929 and 1930–1931. The Soviet side, however, was planning the establishment of new polar stations, including a station

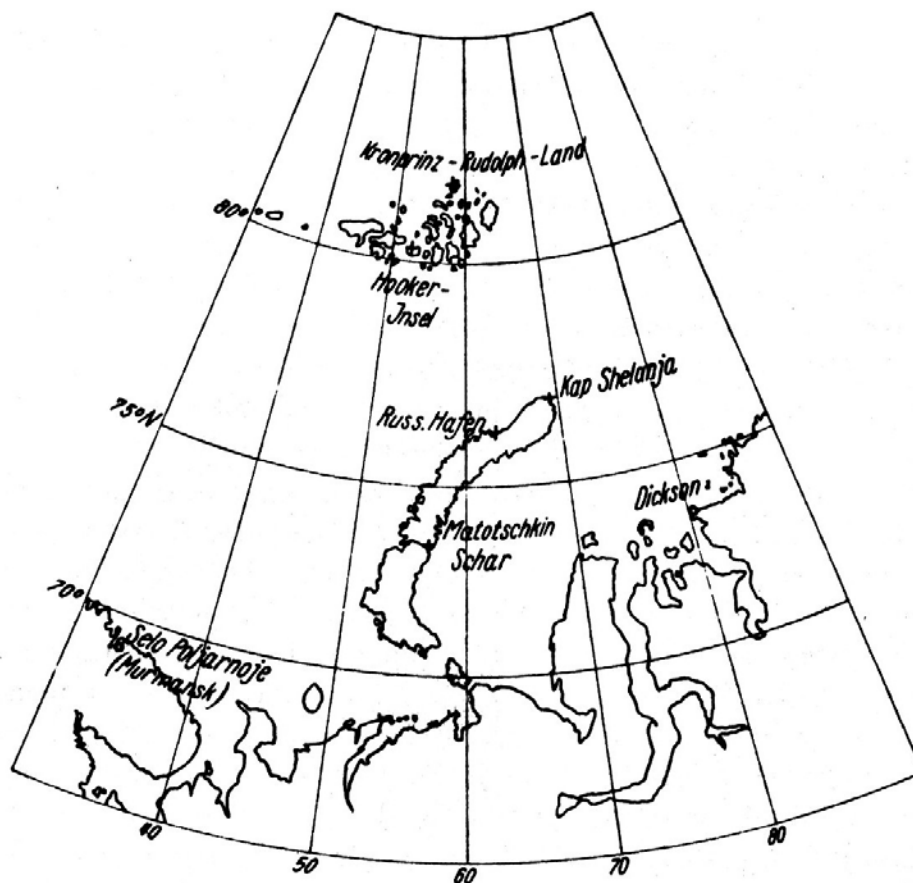


Fig. 6. General map of the Arctic with Novaya Zemlya in the south and Franz Josef Land in the north, including stations during the Second International Polar Year. Source: Wölken 1934b: 229.

on Prince Rudolf Island (in the Franz Josef Land archipelago) and a mountain station on Novaya Zemlya (Anonymous 1931: 109). In addition, the icebreaker *Malygin* was to carry out a research cruise along the North Siberian coast.

Apparently, an enquiry regarding the participation of German scientists in Soviet polar expeditions during the Second International Polar Year was forwarded via the Notgemeinschaft to the Aeroarctic, which had the best contacts with Samoilovich since the polar flight. At the beginning of February 1932, the latter was able to provide concrete information. Otto Schmidt, now head of the Arctic Institute in Leningrad, was looking for polar-experienced scientists who would work as “fully entitled members” of an expedition or polar station under the leadership of a Soviet polar researcher and under the same conditions as the Soviet members (Breitfuß 3 Feb. 1932). On the one hand, he offered wintering on the ice of the northern island of Novaya Zemlya between the Barents Islands and the Russian Harbour (Russkaya Gavan), which he considered the most interesting wintering. One group was to work on the west coast and the second, led by the young station manager Mikhail M. Yermolaev (1905–1991), a brother-in-law of Samoilovich, on the ice sheet in the middle of the island. On the other hand, wintering would also be possible on Hooker Island or Prince Rudolf Island (both in the Franz Josef Land archipelago), where a new station was to be built (Fig. 6). A third possibility would be to replace the four-person wintering crew of the station on Severnaya Zemlya.

However, as time was pressing, Breitfuß recommended that the Notgemeinschaft

contact Samoilovich at the Arctic Institute directly about the participation of German scientists. Finally, at the end of March, Samoilovich offered Schmidt-Ott two concrete places for German geophysicists in the Silent Bay (Tikhaya Buchta) on Hooker Island in the Franz Josef Land archipelago and on the ice sheet of Novaya Zemlya (Samoilovich 26 March 1932). He would come to Berlin at the beginning of April and would be happy to discuss further details with Schmidt-Ott personally.

The Soviets also contacted Reinhard Süring (1866–1950), director of the Meteorological and Magnetic Observatory Potsdam on Telegrafenberg, who had been a member of the German Commission for the Second International Polar Year (1932–1933) since 1930 where he was responsible for the fields of radiation and atmospheric electricity (Körber 1993: 28, 42). Samoilovich asked Süring to release a scientist for air-electric measurements on Hooker Island for the duration of the Polar Year. Only one was thought to be the right person for this task, namely Joachim Scholz (1903–1937), an assistant at Süring's observatory, who had already made a name for himself by developing a new nucleus counter ("Scholz'scher [condensation] nucleus counter") (Benndorf 1937*a*; Benndorf 1937*b*; Körber 1993: 42–43, 88), an optical instrument for counting small particles (aerosols) in the atmosphere which are the nuclei for condensation. Scholz had been at the observatory in Potsdam since November 1926 and had initially had a grant from the Notgemeinschaft to carry out air-electric studies and then spent a year in 1928–1929 as a fellow at the Physics Institute of the University in Graz under Professor Hans Benndorf (1870–1953), an authority in the field of air electricity and earthquake research. Scholz thus submitted at short notice a research programme for extensive air-electric measurements of various parameters in the Silent Bay on Hooker Island (Scholz no date *a*; Scholz no date *b*). Due to long-distance telegraphy and the unexplained long ranges of radio waves in special weather conditions, these investigations were of great interest for practical purposes to understand the influence of electricity within clouds on radio transmission. The necessary instruments were provided by the observatories in Potsdam and Lindenberg south-east of Berlin, as well as by the Notgemeinschaft (Körber 1993: 43).

The second scientist to apply was Kurt Wölken (1904–1992) of the Geophysical Institute, University of Göttingen, who had participated in the "German Greenland Expedition Alfred Wegener" in 1930–1931. On Novaya Zemlya he wanted to carry out sound measurements and work in the glaciological team at the base station at Russian Harbour in order to carry out ice thickness measurements on the glaciers in the surrounding area (Wölken 12 April 1932). The objective outlined in his work programme was to determine the thickness of the inland ice by serial measurements at four stations and to investigate the abnormal propagation of sound during the polar night in relation to solar radiation, the ozone layer and air movements in the upper stratosphere. For this purpose, two blasts were to be carried out on precisely defined dates at each of the three coastal stations in winter, spring and summer. The investigation of sound propagation in the atmosphere by determining the zone of silence in order to draw conclusions about the state of the atmosphere in high air layers above 30 kilometers, was at that time part of the research projects specially funded by the Notgemeinschaft (Notgemeinschaft der Deutschen Wissenschaft 1933: 19).

On 6 May 1932, a meeting took place between two representatives of the Notgemeinschaft and Samoilovich, the selected researchers Scholz and Wölken, as well as the renowned professors Süring, Albert Defant (1884–1974, director of the Museum and Institute of Marine Sciences in Berlin) and Heinrich von Ficker (1881–1957, director of the Prussian Meteorological Institute in Berlin). Interestingly, all three professors were

members of the Aeroarctic and also members of the German Polar Year Commission, which was headed by Dominik (Lüdecke 1995: A19; Lüdecke & Lajus 2010: 149). Besides, Dominik and Samoilovich had been members of the Aeroarctic board since 1928 (Wegener, Bruns & Berson 1928: 116). This unusually dense personal network, in which a few people acted in several bodies at the same time, was very conducive to the cause, since no German North Polar expeditions could be equipped during the Second International Polar Year due to the prevailing shortage of funding, but at least German participation in Soviet expeditions now seemed feasible.

The meeting concluded that all the necessary measuring equipment for the German participation would be provided and that the travel costs of the scientists to the Russian border would be covered by the German side. Samoilovich suggested that Scholz and Wölken should arrive in Leningrad in July, i.e. three to four weeks before the departure of the expedition ship, in order to familiarize themselves with the Soviet participants. Samoilovich left the processing of the scientific material after the expedition to the individual participants. However, the first publication of the results was to take place at the Soviet Arctic Institute and could be written in German. A total of six men were to be sent to Novaya Zemlya, distributed between a coastal station and an inland station 70 to 80 kilometers away. The observatory on Franz Joseph Land, where Scholz was to be housed, had been set up in 1929 and was manned by an average of 16 men. All stations were able to communicate with home via a small radio station.

Experiences of the German Participants of Soviet Expeditions (1932–1933)

During the familiarization period in Leningrad, the expedition participants got to know each other. After all preparations were completed on schedule, the ships set off for their Arctic destinations. The expedition to Franz Joseph Land to relieve the wintering crew was led by Ivan Papanin (1894–1986), who would winter there in the Arctic for the first time (Felden 1986: 132; Fritzsche 1991: 161–162). At 78° 48' N, an unusually large drift ice field stood in the way of the *Malygin* (Akademia 25 July 1932). Scholz reported that the icebreaker had to leave the planned route to sail around the ice masses in a south-easterly direction. As a result, the arrival at Franz Joseph land was uncertain. If the attempt to bypass failed, the ship would be stuck in the ice. However, since there was enough food on board for the wintering crew to last until autumn 1933, they would not have to go hungry for the time being.

In any case, the expedition work would be delayed. Finally, on 3 August 1932, the Notgemeinschaft received a telegram with the news that Scholz had finally arrived in Franz Joseph Land after his interesting journey (Deutsches Generalkonsulat 2 Aug. 1932).

The geophysicist Yevgeny Fedorov (1910–1981) had already made friends with Scholz in Leningrad even though his knowledge of English was poor (Fjodorow 1986: 49). In his eyes, Scholz represented the typical German: tall, blond, blue-eyed, and strong. Within six months, thanks to Fedorov's interpreting work, Scholz had learned enough Russian to be henceforth able to communicate in that language, and Fedorov had become fluent in English (Fig. 7).

They had built the air-electric laboratory next to the base station 100 meters up on a slope, where all instruments were housed away from any local influence from the station (Fjodorow 1986: 67). In mid-September, the air-electric house was completed, consisting of a measuring room and a sleeping room (Scholz 3 Oct. 1932). In winter, all necessary



Fig. 7. Joachim Scholz (left) and Yevgeny Fedorov (right), fetching snow for the drinking water supply at the station. Source: Fjodorow 1986: 272.

instruments were set up in the large room (Scholz 1935a: 113). In summer, the Dobson spectrograph was set up in the other room, where there was a folding bedstead and three consoles that could be used as worktables. On one of them was a telephone connecting the laboratory with the station. On the other consoles were accumulators and anode batteries (Eltax batteries), as well as spare parts for the measuring instruments.

In the beginning, Scholz still struggled with the isolation of the electrometers, but then he succeeded in achieving very interesting results (Scholz 1935a: 113). However, the measurements made with the Dobson spectrograph to determine the intensity of the UV radiation as an indicator of the total ozone content of the atmosphere were disappointing. The sun needed for the measurements only shone long enough on a few days and, in addition, the instrument did not function at low temperatures. Fortunately, Scholz had a quartz spectrograph on loan from the Astrophysical Observatory in Pulkovo, a suburb of Leningrad (now a district of St. Petersburg), with which he could make recordings of the lunar spectrum, at least in winter. Even though the house was heated, it was so cold in his laboratory that he did his measurements, which lasted up to twelve hours, dressed in fur clothes and smoking a cigar (Fjodorow 1986: 67). Benndorf, with whom Scholz had been in close contact, pointed out in his obituary of Scholz that

his friendly manner and sense of genuine comradeship [...] enabled him to master even very serious situations, although he had certainly had to prevail in the extreme conditions of a polar expedition under unavoidable factual and personal difficulties [...] completely on his own. (Benndorf 1937a: 222)

In order to eliminate the meteorological influence on the air-electric measurements caused by the local location of the laboratory on the southern slope of a plateau (80°19' N, 52°48' O), Scholz, with the help of his young assistant Yakov Lubin,² carried out parallel

air-electric measurements on the island of Skott-Kelty, eight kilometres from the Silent Bay, in March 1933 and on the island of Itteridge, 46 kilometers to the south in the following month (Fjodorow 1986; Scholz 1935*b*; Scholz 1935*e*).

Physicist Alexander Verigo (1893–1953) from the Vernadsky Radium Institute in Leningrad, who was engaged in the study of cosmic radiation (Harvey & Zakutnyaya 2011: 9) arrived on the second visit by the ice-breaker *Malygin* to be guided through the air-electric station (Scholz 3 Oct. 1932). After the tour, he was so enthusiastic about the German station that he wanted to submit an application to the Soviet government so that the Soviet Union could take over the air-electric equipment after the measurements were completed. Scholz informed Verigo that the decision on the placement of the instruments lay with the Notgemeinschaft and the Prussian Meteorological Institute. In this context, Scholz asked the Notgemeinschaft to inform him about the future placement of the instruments, otherwise he would return all the measuring instruments to Germany at the end of the Polar Year.

Due to reconstruction work at the radio station, Scholz did not get in touch with Germany until the beginning of February, when he reported on the problems and successes of the air-electric measurements so far (Scholz 4 Feb. 1933). He was in good health and the relationship with the other station members was good. He was supported in his work by a young Soviet student (Lubin). Overall, it turned out that the electrical elements were very dependent on the local climate of the island archipelago. In January, the weather was quite mild with temperatures above zero degrees and the sea was even ice-free in places. He registered the first sound measurements of blasts on Novaya Zemlya with the Kühl undograph as soon as the weather permitted. Samoilovich himself later sent more detailed information to Germany on the twelve sound measurements, which were carried out over seven days (Samoilovich 12 Feb. 1933).

During the wintering, Scholz was subjected to a “gradual political education” by his Soviet expedition mates in the course of many discussions through which he came to know and appreciate the Soviet promotion of science by the party and the government (Papanin 1981: 131–132; Fjodorow 1986: 122 ff.).

Then he learned of the National Socialists’ takeover of power in his homeland via German radio stations. Fuelled by radio propaganda, Scholz, who was described by his comrades as a German patriot, initially very much liked the idea that Germany would become strong again and that everything would change for the good of the common man. Now the political discussions on Franz Joseph Land fell silent. However, when a supply ship again brought newspapers and mail with reports of first-hand negative experiences from relatives and friends, Scholz’s positive opinion of the new politics back home changed abruptly.

To help him, Papanin even suggested that he stay with his new friends in the Soviet Union, but Scholz did not want to leave his mother behind alone and only wanted to move to the Soviet Union with her consent. Before the overwinterers were picked up, Scholz continued to observe the ion balance until 26 August 1933 and the intensity of the ultra-radiation using the ionisation chamber until September, according to Werner Kohlhörster (1887–1946), his colleague from the Potsdam Observatory (Scholz 1935*c*; Scholz 1935*f*).

At first, there was nothing unusual to report from Wölken’s expedition. Their destination was the northern island of Novaya Zemlya, which was covered by an ice cap about 400 kilometers long, 60 to 80 kilometers wide and almost 1,000 meters high. Having reached the base station Russkaya Gavan [‘Russian Harbour’] at 76°14’N and 62°39’ E

on the snow- and ice-free north-west coast, Wölken began seismic measurements of the permafrost at sea level (Wölken 1934 unpublished; Wölken 1961: 89). Furthermore, on the inland ice at a distance of 15 kilometers from the coast, he set up the stations *Barriere oben* ['upper barrier'] at a height of 380 meters and *Barriere unten* ['lower barrier'] at a height of 320 meters. The stations were only 1.5 kilometer apart (Wölken 1934 unpublished: 4).

Apparently, no problems were reported in communications with home at first. But in March 1933, there was concern about the expedition leader Yermolaev, who was missing together with Wölken on an expedition with the early type of snowmobile (Generalkonsulat 10 March 1933).

However, the Arctic Institute announced that there was no reason for serious concern, as the expedition members were experienced polar explorers and had enough food with them. The weather was now clearing and all rescue measures were in place. Two days later, Samoilovich announced that Wölken was safe (Generalkonsulat 12 March 1933). The snowmobile, which had failed due to the extreme cold, had been abandoned on the way and the expedition had continued on foot.

Due to overtiredness, Wölken had stayed behind in the tent 20 kilometers from Cape of Desire. He would now be picked up by sledge and was expected to arrive at the station soon. On 14 March it was finally reported that he had arrived at the camp (Generalkonsulat 14 March 1933). With the help of his comrades, he had returned in good health to Cape Zhelaniya on 13 March 1933 after a difficult three-week journey (Wölken 15 March 1933).

However, the continuation of his investigations in other places turned out to be very difficult.

The coincidence of various unfavourable circumstances for the expedition and the impossibility of taking enough provisions and the 200 kg of scientific material required for ice thickness measurements further into the interior on dog sledges or hand sledges over the melted needle ice in mid-July forced us to seek out a working area that could be reached on foot from the base station. We found such an area on the Chayev Glacier. (Wölken 1934 unpublished: 5)

At the end of the melting period, from 25 August to 19 September 1933, he surveyed a 5.4 kilometers long profile on the outflowing glacier 20 kilometers east of the base station, which was located at about 200 meters above sea level 8 kilometers above the glacier front in an east-west direction across the glacier movement (Wölken 1961: 89 f.). Because of the strong winds, they were only able to carry out work to determine the ice thicknesses at that place on seven days in seven weeks.

Results of the German Participants from the Russian Arctic

In the meantime, ever since the Reichstag elections on 5 March 1933, the political regime in Germany had changed a lot under the new order of the National Socialists. This also affected the future of the German scientists who had taken part in Soviet expeditions during the Second International Polar Year.

After completing their measurements, all expedition members returned safely from the Arctic to Leningrad. Wölken arrived on 17 October 1933 to report in person to the Arctic Institute (Wölken 18 Oct. 1933). Scholz had only just left Franz Joseph Land on the icebreaker *Taimyr* at this time and would also soon arrive in Leningrad. Wölken was very pleased with the preliminary scientific results.

28 sound measurements had shown that long-distance sound waves also exist during the polar night and that there is a difference between “winter sound” and “summer sound” in terms of the physical character of the waves. (Wölken 18 Oct. 1933)

The 43 ice thickness measurements had not worked out so well because Wölken, due to transport difficulties, had not been able to take measurements at the places that would have been the best. Ice thicknesses of between 60 meters and 450 meters were determined, with the bedrock up to 200 meters below sea level in many places.

A conference was scheduled for 19 October 1933 to discuss the processing of the results. Wölken assumed that he would probably need two months to collect all the data he needed for the evaluation and that he would therefore not be able to arrive back in Germany until December. It was agreed that Scholz would hand over his sound observations to Wölken for evaluation of the total material of the blasts, whose undograph stations were distributed in Novaya Zemlya on Cape Zhelaniya, Russian Harbour and Matochkin Shar (Scholz 1935a: 113; Hergesell 1933).

After Scholz had reported on his work on Franz Joseph Land to the Scientific Council of the Arctic Institute and other Leningrad institutions, he returned to the Potsdam Observatory at the end of 1933 because of his longing after his mother (Fjodorow 1986: 123 f.). Like a man possessed, he prepared all the material for printing within five months and then prepared the results for publication in the *Meteorologische Zeitschrift* and Gerland's *Beiträge zur Geophysik* by the end of 1934 (Scholz 1935a; Scholz 1935b; Scholz 1935c; Scholz 1935d; Scholz 1935e; Scholz 1935f; Benndorf 1937a: 222; Körber 1993: 43). Remarkably, in four of these articles, his affiliation was given as Staff of the Arctic Institute in Leningrad during the International Polar Year 1932–1933 (Scholz 1935a; Scholz 1935d; Scholz 1935e; Scholz 1935f), while in the papers on air-electric parallel measurements and measurements of ion numbers for which he used instruments from the Potsdam Observatory, his affiliation was simply given as “Potsdam” (Scholz 1935b; Scholz 1935c).

Schmidt-Ott was still president of the Notgemeinschaft, which had been known as the Deutsche Forschungsgemeinschaft since 1929 and was now subordinated to the Reich Ministry of Education in April 1933 (Schmidt-Ott 1952: 292–294). There were signs that future research would also involve national defense. On 23 June 1934, Schmidt-Ott was informed that he was to be replaced by the National Socialist supporter Johannes Nikolaus Stark (1874–1957), winner of the 1919 Nobel Prize in Physics and founder of the so-called German Physics, in order to bring the research community into line. Schmidt-Ott, who was almost 74 years old and a great promoter of science, immediately resigned from his post because he did not agree with Stark's political goals.

About a year after the expedition, Scholz sent a manuscript to Leningrad for publication in the Arctic Institute's series of publications. The manuscript with a Russian introduction appeared in 1936 (Scholz 1936; Israël-Köhler 1936). In January 1935 he fell seriously ill and finally met a “tragic end all too soon” in 1937 which saved him from further suffering, it was said (Benndorf 1937a: 222; Benndorf 1937b: 133). This was a great loss for science, because, with a longer life and favourable working conditions, his unusual diligence and his special ambition to “achieve something efficient” would have “produced many a valuable contribution to the solution of the numerous problems of air-electric research still remaining” (Benndorf 1937a: 222–223).

The former expedition comrades Papanin and Fedorov spoke in more detail about Scholz's death in their memoirs. In 1937, a postcard from the emergency community had arrived at the Arctic Institute to the effect that Dr. Scholz had succumbed on 19 January

1937 to bodily injuries that he had sustained on Franz Joseph Land, something that Papanin could not understand at all (Papanin 1981: 131–132). Fedorov also could not remember any such serious injuries, which would certainly not have gone unnoticed by him as he had shared a room with Scholz during the entire wintering period.

In May 1945, immediately after the German capitulation, Fedorov, now head of the Hydrometeorological Service of the Soviet Army, was tasked to put the German Meteorological Service in Soviet-occupied territory back into operation (Körber 1993: 49). In Potsdam, this brought him together with the almost 80-year-old Süring, who was then acting head of the observatory. On this occasion, Fedorov asked about his former work colleague Scholz in order to find out more about his death (Fjodorow 1986: 122 ff.). He learned that Scholz had gone somewhere around 1934 and was never seen again. His deaf mother, with whom he lived and to whom he was very attached, was left alone and had then died (Benndorf 1937b: 133; Fjodorow 1986: 125). Fedorov assumed that the political education during the joint wintering had done its work and that Scholz had perished in a concentration camp, but this was never confirmed by the German side (see e.g., Benndorf 1937a; Benndorf 1937b; Körber 1993: 82).

Wölken, on the other hand, did not publish so diligently after his return to the Geophysical Institute in Göttingen. In July 1934, he submitted the results of a comparison of the intensity of ultra-radiation over Greenland and Germany for publication in the *Zeitschrift für Geophysik* (Wölken 1934a). There he also published his only paper on the preliminary processing of the registrations of sound blasts during the Polar Year at three of four stations (Wölken 1934b). He analysed Scholz's measurements at Hooker Island, his own at Russian Harbour station and those of his colleague at Cape Zhelaniya, while the records at Matochkin Shar were not considered.

In the same year, Wölken transferred to the German Maritime Weather Service, where he was responsible for providing weather forecasts to the German South Atlantic flights until 1938 (Schneider 1990). He then went to Buenos Aires, where he held various managerial positions in the Argentine Office of Meteorology, Geophysics and Hydrology until 1976. In 1961, he also became a full professor of meteorology and climatology at the Universidad del Salvador in Buenos Aires. Perhaps it was then he finally wrote his paper on the results of his seismic ice thickness measurements on Novaya Zemlya, which was published in 1963 in the German journal *Polarforschung* for the year 1961, although he had already completed a manuscript in 1934 (Wölken 1934 unpublished; Wölken 1961). According to his first manuscript, Wölken wanted to publish his preliminary results within a year after his return, because he was prevented by his other assignments "from completing the detailed work in the near future" (Wölken 1934 unpublished: 1). In 1961, Wölken, without providing any details, mentioned that the material he had delivered to Leningrad had been lost during the war and that he had therefore not been able to fully evaluate the data due to the change of his workplace (Wölken 1961: 87 f.).

His results showed that the ice surface did not reflect the profile of the rocky subsoil in an attenuated form, as the differences in elevation were much greater in the rocky subsoil and, moreover, because most of the subsoil was below sea level. Wölken suspected that the transverse valleys, like the Matochkin Shar strait, connected the Karian Sea with the Barents Sea. Another observation was that in 1934 the ice sheet was in retreat (Wölken 1934 unpublished: 4).

Although little was known in Germany about his investigations on Novaya Zemlya, he received a commemorative medal from the Arctic and Antarctic Institute in Leningrad in 1970 in recognition of his achievements.

Current German-Russian Cooperation

After the Second World War, German-Russian relations were resumed in the German Democratic Republic (GDR) when a German-Soviet agreement on cultural and technical-economic exchange was signed on 30 May 1959 (BMBF 2011). On 22 July 1986, another German-Soviet intergovernmental agreement on scientific and technical cooperation was concluded, which entered into force on 7 July 1987. After the political turnaround in Germany and the reunification of East and West Germany, the Central Institute for Physics of the Earth (Zentralinstitut für Physik der Erde) was transformed into the Research Unit Potsdam of the Alfred Wegener Institute in Potsdam on Telegraphenberg in order to preserve the scientific potential of GDR polar research (Hempel 2010: 187–190). Finally, German-Russian cooperation in polar and marine research was agreed on 10 February 1995.

At the end of the twentieth century, scientists at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research in Bremerhaven began to take an interest in the impact of climate change in the Arctic. In 1998, as part of the renewed German-Russian cooperation, they began to expand the existing Russian research station Samoylov on Samoylov Island (72°22' N, 126°28' E) in the Lena Delta near the Laptev Sea in order to jointly conduct long-term studies of changes in the permafrost and in the carbon budget.³ In the same year, international drilling campaigns also began at Lake El'gygytyn in the Anadyr Plateau (Eastern Siberia), whose lake sediment contains a highly informative climate archive.⁴ In 2007–2011, German-Russian measuring campaigns were also conducted in the Laptev Sea Polynya with a view to investigating the birthplace of sea ice (Kassens & Volkmann-Lark [eds.] 2013). Finally, Jürgen Graeser (b. 1958) of the Alfred Wegener Institute observed meteorological conditions over the central Arctic for seven months in the winter of 2007/2008 on the North Pole Drift Expedition N-35, which was manned by twenty Russian scientists.⁵ The joint exploration of the Russian Arctic is becoming increasingly important in the context of making the Northeast Passage permanently usable as a result of the current climate change.

Conclusion

Based on the above, it could be shown that today's German-Soviet scientific cooperation in the Arctic had successful predecessor projects in the early 1930s, the foundations of which were laid in the 1920s. On the political level, they were made possible by the Rapallo Treaty and the secret military cooperation, especially with regard to the German air force. Schmidt-Ott, in his capacity as president of the *Notgemeinschaft der deutschen Wissenschaft* and later the *Deutsche Forschungsgemeinschaft*, was an outstanding mediator between the two countries in favour of joint research projects, which, among other things, led to an expedition to the Alai-Pamir. Support for cooperation in the Arctic also resulted from the personnel links between members of the Aeroarctic and the organisation of the Second International Polar Year (1932–1933).

The Aeroarctic and the expedition it carried out with the airship LZ 127 *Graf Zeppelin* in 1931 were also globally integrated through their international participation and served not least to connect Germany and the Soviet Union, who were not accepted into the official Research Council at the time, to the international research community. The participation of two German scientists in Soviet measurement campaigns in the Arctic during the Second International Polar Year yielded valuable results. However, the new political leadership in the Third Reich destroyed the promising start of German-Soviet

cooperation. Schmidt-Ott resigned, and one scientist, Scholz, died under unexplained circumstances while Wölken fled to South America.

ACKNOWLEDGEMENTS

This article is based on a presentation I gave at the conference “The Soviet Arctic: Exploration, Investigation, Representation,” hosted by the German Historical Institute in Moscow on 20–21 February 2014. The discussion with the participants and subsequent correspondence via email have rounded off the article. In particular, the useful comments by Barbara Schennerlein and Diedrich Fritzsche should be mentioned here. I would also like to thank Siegfried Nicklas, Frankfurt, for the group photo from the Aeroarctic meeting. I am also indebted to the reviewers for their valuable comments.

NOTES

- ¹ The Institute for the Exploration of the North was founded in 1925 and became the Arctic Institute in 1930. When research was extended to the southern polar region, the name of the institute was changed to the Arctic and Antarctic Institute (ARRI) in 1958 (see www.aari.ru/main.php?lg=1&id=54; access date 17 March 2021).
- ² Lubin succeeded Fedorov as director of the Arctic Institute in 1940 (Papanin 1981: 121).
- ³ See www.awi.de/expedition/stationen/insel-samoylov.html; access date 29 April 2021.
- ⁴ See www.elgygytgyn.uni-koeln.de; access date 29 March 2021.
- ⁵ See www.pro-physik.de/nachrichten/sieben-monate-auf-einer-treibenden-eisscholle; access date 29 March 2021.

REFERENCE

Unpublished Sources

- Akademia (25 July 1932). Internationale Polarjahr-Expedition von Treibeis umklammert. Akademia Sonderdienst. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 216.
- Breitfuß, L. (3 Feb. 1932). Brief an Stuchtey. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 191.
- Deutsches Generalkonsulat (2 Aug. 1932). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte .35, Bl. 213.
- Generalkonsulat (10 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 104.
- Generalkonsulat (12 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 101.
- Generalkonsulat (14 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 98.
- Mittelstraß, G. (19 Nov. 1931). Brief an Stuchtey. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 200.
- Nansen, v. Ficker, Bruns, Berson, Bleistein & Krell (15 Sept. 1927). Erläuterungen zum Arbeitsprogramm der “Aeroarctic” nach dem Stand vom 15.9.1927. Bundesarchiv Potsdam, 15.01, Nr. 26815, Bl. 154–166.
- Samoilovich, R. (26 March 1932). Brief an Schmidt-Ott. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 183.
- Samoilovich, R. (12 Feb. 1933). Brief an Hergesell. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 112–113.
- Scholz, J. (no date *a*). Programm für die luftelektrischen Messungen auf Franz-Josefs-Land. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 79–80.
- Scholz, J. (no date *b*). Programm für die Messungen auf Kaiser-Franz-Josephs-Land. Bundesarchiv Koblenz, R 73, Akte 234, Bl. 146.
- Scholz, J. (3 Oct. 1932). Brief an Professor. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 211–212.
- Scholz, J. (4 Feb. 1933). Radiomeldung für die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 163.
- Wölken, K. (12 April 1932). Brief an Samoilowitsch, Bundesarchiv Koblenz, R 73, Bl. 131–132, 135–138.
- Wölken, K. (15 March 1933). Telegramm an die Notgemeinschaft. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 95.

Wölken, K. (18 Oct. 1933). Brief an Professor. Bundesarchiv Koblenz, R 73, Akte 235, Bl. 230–231.
 Wölken, K. (1934). Vorläufiger Bericht über seismische Untersuchungen (Eisdickenmessungen in Nowaja Semlja). Unpublished manuscript. Archive Cornelia Lüdecke, Munich, to be handed over to the archive of the Alfred Wegener Institute for Polar and Marine Research at Bremerhaven.

Literature

- Amundsen, R. (1925). *Die Jagd nach dem Nordpol. Mit dem Flugzeug zum 88. Breitengrad*, Berlin: Ullstein.
 Amundsen, R. & Ellsworth, L. (1927). *Der erste Flug über das Nordpolarmeer*, Leipzig, Zürich: Grethlein.
 Anonymous (1931). "Neues aus den Polargebieten," *Arktis*, 4, pp. 109–110.
 Benndorf, H. (1937a). "Nachruf für J. Scholz," *Meteorologische Zeitschrift*, 54, pp. 222–223.
 Benndorf, H. (1937b). "Joachim Scholz zum Gedächtnis," *Gerlands Beiträge zur Geophysik*, 50, pp. 132–134.
 Berson, A. & Breitfuß, L. (1927). "Sitzung des Sonderausschusses am 16.11.1926," *Petermanns Geographische Mitteilungen*, Ergänzungsheft 191, pp. 110–113.
 Berson, A., Samoilowitsch, R.L. & Weickmann, L. (eds.) (1933). *Die Arktisfahrt des Luftschiffes "Graf Zeppelin."* *Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), Gotha: Justus Perthes.
 Breitfuß, L. (1928) "Die territoriale Sektoreneinteilung der Arktis im Zusammenhang mit dem zu erwartenden transarktischen Luftverkehr," *Petermanns Geographische Mitteilungen* 74, pp. 23–28.
 BMBF (2011). *Lebende Ausstellung. Brennpunkte der deutsch-russischen Zusammenarbeit auf dem Gebiet der Meeres- und Polarforschung*, flyer, Berlin: Bundesministerium für Bildung und Forschung.
 Dege, W. (1962). "Deutsches Observatorium Ebeltoftshafen – Spitzbergen. Zur 50. Wiederkehr der 1. Überwinterung 1912/13," *Polarforschung*, 32:1–2, pp. 136–140.
 Eckener, H. & Italiander, R. (1979). *Im Luftschiff über Länder und Meere*, München: Heyne.
 Felden, D. (1986). *Ein Leben für die Arktis. Die Nordpolarexpeditionen von Rudolf Samoilowitsch*, Leipzig: VEB F.A. Brockhaus.
 Fjodorow, J. (1986). *Aus meinen Polartagebüchern*, Leipzig: VEB F.A. Brockhaus; Moscow: Progress.
 Forman, P. (1973). "Scientific internationalism and the Weimar physicists. The ideology and its manipulation in Germany after World War I," *Isis* 64:2, pp. 150–180.
 Fritzsche, D. (1991). "Potsdamer Geowissenschaftler und ihr Einfluß auf die deutsche und internationale Polarforschung bis zum 2. Polarjahr 1932/33," *Polarforschung*, 61:2–3, pp. 153–162.
 Fritzsche, D. (2018). "Walter Bruns und die Aeroarctic," *Polarforschung*, 88:1, pp. 7–22.
 Gruber, O. von. (1933). "Die photogrammetrische Ausrüstung des 'Graf Zeppelin' auf der Arktisfahrt 1931, über die Auswertemethoden und die bisherigen Ergebnisse aus den gewonnenen Aufnahmematerial," in *Die Arktisfahrt des Luftschiffes 'Graf Zeppelin.'* *Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), eds. A. Berson, R.L. Samoilowitsch & L. Weickmann, pp. 68–77.
 Hempel, G. (2010). "Blühende Landschaften im Ewigen Eis," *Polarforschung*, 79:3, pp. 181–191.
 Harvey, B. & Zakutnyaya, O. (2011). *Russian Space Probes. Scientific Discoveries and Future Missions*, New York: Springer.
 Hergesell, H. (ed.). (1914). *Das Deutsche Observatorium in Spitzbergen. Beobachtungen und Ergebnisse 1* (Schriften der Wissenschaftlichen Gesellschaft in Straßburg 21), Strassburg: K.J. Trübner.
 Hergesell, H. (1933). "Kurze Bemerkungen über die arktischen Sprengungen während des Polarjahres," in *Rapport de la Commission Internationale de l'Année Polaire 1932–1933* (Secretariat de L'Organisation Meteorologique Internationale No. 16, III^e), Utrecht: Kemink en Zoon N.V., pp. 94–96.
 Herrmann, E. (1949). *Professor Dr. Leonid Breitfuß zu seinen 50jährigen Polarforschungs-Jubiläum (1898–1948) und seinem 85. Geburtstag (1864–1949)*, Kiel: Archiv für Polarforschung.
 Israël-Köhler, H. (1936). "Besprechung von Scholz, J., 1936, Luftelektrische Messungen auf Franz-Josefs-Land während des II. Internationalen Polarjahres 1932–33," *Meteorologische Zeitschrift*, 53:12, pp. 483–484.
 Kassens, H. & Volkmann-Lark, K. (eds.) (2013). *Russisch-Deutsche Zusammenarbeit System Laptev-See. System Laptev-See Polynja II, Eurasische Schelfmeere im Umbruch – Ozeanische Fronten und Polynjasysteme in der Laptev-See. Schlussbericht FKZ 03G0759*, Kiel: Sekretariat System Laptev-See.
 Kevles, D.J. (1971). "'Into 'hostile political camps.' The reorganization of international science in World War I," *Isis* 62:1, pp. 47–60.
 Kohlschütter, E. (1927). "Bericht über die Entstehung der Internationalen Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiffe und ihre bisherige Tätigkeit," *Petermanns Geographische Mitteilungen*, Ergänzungsheft 191, pp. 2–15.
 Körber, H.-G. (1993). *Die Geschichte des Meteorologischen Observatoriums Potsdam (Geschichte der Meteorologie in Deutschland 2)*, Offenbach am Main: Selbstverlag des Deutschen Wetterdiensts.
 Lehmann, E. (1936). *Auf Luftpatrouille und Weltfahrt. Erlebnisse eines Zeppelinführers in Krieg und Friede*, Berlin: Wegweiser-Verlag.

- Lüdecke, C. (1995). "Die deutsche Polarforschung seit der Jahrhundertwende und der Einfluß Erich von Drygalskis" (Berichte zur Polarforschung 158), diss., Bremerhaven: Alfred Wegener Institut für Polarforschung; <https://epic.awi.de/id/eprint/26336/>; access date 21 Dec. 2021.
- Lüdecke, C. (2001). "Leonid Ludwig Breitfuß (1864–1950) in Deutschland – Chronist der Polarforschung und die Umstände des Verkaufs seiner Bibliothek nach England," *Polarforschung*, 71:3, pp. 109–119; <https://epic.awi.de/id/eprint/28503/>; access date 21 Dec. 2021.
- Lüdecke, C. & Lajus, J. (2010). "Second International Polar Year (1932–1933)," in *The History of the International Polar Years (IPYs) (From Pole to Pole 1)*, eds. S. Barr & C. Lüdecke, Berlin, Heidelberg: Springer-Verlag, pp. 135–173.
- Miethe, A. & Hergesell, H. (eds.) (1911). *Mit Zeppelin nach Spitzbergen*, Berlin: Deutsches Verlagshaus Bong & Co.
- Nelson, S.B. (1993). "Airships in the Arctic," *Arctic*, 46:3, pp. 278–283
- Nobile, U. et al. (1929). *Die Vorbereitungen und die wissenschaftlichen Ergebnisse der Polarexpedition der 'Italia'* (Petermanns Geographische Mitteilungen, Ergänzungsheft 205), Gotha: Justus Perthes.
- Notgemeinschaft der Deutschen Wissenschaft (1933). *Zwölfter Bericht der Notgemeinschaft der Deutschen Wissenschaft (Deutsche Forschungsgemeinschaft) umfassend ihre Tätigkeit vom 1. April 1932 bis zum 31. März 1933*, Berlin: Karl Sigismund Verlag.
- Papanin, I. (1981). *Eis und Flamme. Erinnerungen*, Berlin: Dietz.
- Pollog, C.H. (1934). "Der Luftverkehr in Sowjetrußland," *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 1934, pp. 49–56, 145.
- Rackwitz, E. (1958). *Reisen und Abenteuer im Zeppelin. Nach Erlebnissen und Erinnerungen des Dr. Hugo Eckener*, Neuenhagen bei Berlin: Verlag Sport und Technik.
- Rapallo (1922). "Der deutsch-russische Vertrag (Rapallo-Vertrag)," 16. April 1922; www.1000dokumente.de/pdf/dok_0017_rap_de.pdf; access date 17 March 2021.
- Samoilowitsch, R. (1931). "Der Arktisflug des 'Graf Zeppelin,'" *Atlantis*, 3, pp. 563–572.
- Samoilowitsch, R. (1933). "Die Flüge in den Polargebieten," in *Die Arktisfahrt des Luftschiffes 'Graf Zeppelin'*. *Wissenschaftliche Ergebnisse* (Petermanns Geographische Mitteilungen, Ergänzungsheft 216), eds. A. Berson, R.L. Samoilowitsch & L. Weickmann, Gotha: Justus Perthes, pp. 9–32.
- Schennerlein, B. (2014). "Das aerophotographische Forschungsprogramm der Arktisfahrt des Luftschiffes 'Graf Zeppelin' LZ 127 im Juli 1931," *Polarforschung*, 84:2, pp. 67–92.
- Schennerlein, B. (2018). "Die Aeroarctic und die Arktisfahrt des Luftschiffes 'Graf Zeppelin' LZ 127 im Juli 1931 und die Fahrt des U-Boots 'Nautilus,'" *Polarforschung*, 88:1, pp. 31–48.
- Schmidt-Ott, F. (1952). *Erlebtes und Erstrebtes 1860–1950*, Wiesbaden: Franz Steiner.
- Schneider, O. (1990). "In memoriam Hermann Kurt Wölken," *Polarforschung*, 60:3, pp. 231–232.
- Scholz, J. (1935a). "Das luftelektrische Laboratorium auf Franz-Josefs-Land," *Meteorologische Zeitschrift*, 52:3, pp. 110–113.
- Scholz, J. (1935b). "Luftelektrische Parallelmessungen auf zwei 46 km voneinander entfernten arktischen Stationen," *Meteorologische Zeitschrift*, 52:2, pp. 54–57.
- Scholz, J. (1935c). "Messungen der Ionenzahlen auf Franz-Josephs-Land unter gleichzeitiger Bestimmung von Potentialgradient und vertikalem Leitungsstrom," *Gerlands Beiträge zur Geophysik*, 44, pp. 86–97.
- Scholz, J. (1935d). "Polarlichtuntersuchungen auf Franz-Josephs-Land," *Gerlands Beiträge zur Geophysik*, 44, pp. 145–156.
- Scholz, J. (1935e). "Die Ionenbilanz in der Arktis," *Gerlands Beiträge zur Geophysik*, 44, pp. 306–320.
- Scholz, J. (1935f). "Messungsergebnisse der Ultrastrahlung auf Franz-Josephs-Land," *Gerlands Beiträge zur Geophysik*, 44, pp. 377–380.
- Scholz, J. (1936). *Luftelektrische Messungen auf Franz-Josefs-Land während des II. Internationalen Polarjahres 1932–33* (Transactions of the Arctic Institute 16), Leningrad: Izd. Glavsemorputi. Studiengesellschaft (1924). *Das Luftschiff als Forschungsmittel in der Arktis. Eine Denkschrift*, Berlin: Internationale Studiengesellschaft zur Erforschung der Arktis mit dem Luftschiff.
- Treue, W. (1989). "Neue Wege der Forschung, ihrer Organisation und ihrer Förderung: Schmidt-Ott (4.5.1860–24.4.1956)," *Berichte zur Wissenschaftsgeschichte*, 12:3, pp. 229–238.
- Wegener, G., Bruns, W. & Berson, A. (1928). "Bericht über den Verlauf der 2. ordentlichen Generalversammlung der Aeroarctic vom 18. bis 23. Juni 1928 zu Leningrad," *Arktis*, 1, pp. 113–120.
- Wölken, K. (1934a). "Vergleich zwischen der Intensität der kosmischen Ultrastrahlung über Grönland und Deutschland," *Zeitschrift für Geophysik*, 10, pp. 300–307.
- Wölken, K. (1934b). "Schalluntersuchungen im Polargebiet," *Zeitschrift für Geophysik*, 10, pp. 222–234.
- Wölken, K. (1961). "Seismische Eisdickenmessungen auf Nowaja Semlja 1932/33," *Polarforschung*, 31:1–2, pp. 87–91.
- Zeidler, M. (1994). *Reichswehr und Rote Armee 1920–1933. Wege und Stationen einer ungewöhnlichen Zusammenarbeit* (Schriftenreihe des Militärgeschichtlichen Forschungsamtes 36), 2nd ed., München: R. Oldenbourg.
- Zeppelin, F. von (1911). "Hat unsere Expedition die Zweckmäßigkeit der Verwendung meiner Luftschiffe zur Erforschung der Arktis ergeben?" in *Mit Zeppelin nach Spitzbergen*, eds. A. Miethe & H. Hergesell, Berlin: Deutsches Verlagshaus Bong & Co., pp. 284–291.

AUTHOR

Prof. Dr. *Cornelia Lüdecke* is retired from the University of Hamburg. Her main research interest is the history of Polar research, history of geography since the nineteenth century and the history of meteorology. Among her publications are *The Third Reich in Antarctica. The German Antarctic Expedition 1938–39* (2012) and *Germans in the Antarctic* (2021).
c.luedecke@lrz.uni-muenchen.de