Great Historical Events That Were Significantly Affected by the Weather: Part 8, Germany’s War on the Soviet Union, 1941–45. II. Some Important Weather Forecasts, 1942–45

Abstract

Short- to medium-range weather forecasts were prepared by Soviet meteorologists for the Battle of Stalingrad. These included forecasts for days suitable for massing troops and equipment and for starting the Soviet offensive in November 1942 that resulted in the encirclement of the German 6th Army. Another forecast was connected with the operation of artificial thickening of the ice cover of the Volga River in the Stalingrad area that made it possible to drive tanks from the east bank to the west bank of the river (width: about 1 km).

In January 1943 a German Panzer army had to be withdrawn from the Caucasus. To accelerate the retreat, light elements of that army crossed some 42 km of the ice cover of the Gulf of Taman (Sea of Azov). The crossing was authorized after a meteorologist proved his estimate of the ice-cover thickness by landing in a light plane on the ice.

In January 1945 weather forecasts played an important role in the major Soviet (2 200 000 troops and 5 000 warplanes) Oder-Vistula offensive. Marshal Konev writes with appreciation of the correct weather forecasts.

In the Appendix, considerations that led German meteorologists to formulate a forecast for a minimum of five days of fog or low clouds from the Ardennes to southern England are reviewed. This forecast was used by the German High Command for the start of the Battle of the Bulge in December 1944.

1. Introduction

In Chapter I, Part 8 (“Germany’s War on the Soviet Union, 1941–45. I. Long-range weather forecasts for 1941–42 and climatological studies.”, Neumann and Flohn, 1987) of this series, long-range weather forecasts for the 1941–42 phase of the war of Germany on the Soviet Union as well as some German climatological studies made shortly before and shortly after Germany’s attack (22 June 1941) were reviewed. Some important short-range and medium-range weather forecasts for the remaining years of World War II are presented here.

2. The Battle of Stalingrad

Zhidikov (1945, p. 9, also quoted in Chapter I) states that medium-range weather forecasts were taken into account in the selection of 19 November 1942 as the day to begin the Soviet counteroffensive in the Stalingrad area against the German forces and their allies (Hungarians, Italians and Rumanians). These forecasts had to predict the date that the weather would be suitable for concentrating troops and equipment and combining air-force and tank-force operations.

An article by A. V. Kostyuchenko and V. N. Lisodet (1985) titled, “Meteorological Services to Fighting Operations of the Military Air Forces in the Great Patriotic War,” contains passages on the Battle of Stalingrad. After mentioning tributes paid by several high-ranking officers of Fronts to the meteorological services rendered during the winter of 1941–42, the authors state that medals were given to some meteorological officers for cloud predictions made during the Battle of Stalingrad. These cloud forecasts were vital as frequent cases of low clouds (bases between 50 and 150 m are cited) interfered with air support for ground operations. Incidentally, these very same low clouds prevented the German Air Force from dropping supplies to the German 6th Army, which from the third decade of November was completely encircled in the Stalingrad pocket by the pincer-like movement of the Soviet forces. Thus, low clouds had a small share of their own in sealing the fate of Colonel-General Paulus’ army, the 6th Army, of about 250 000 men.

Both Zhidikov and Kostyuchenko and Lisodet failed to go...
3. Testing the reliability of an ice-thickness estimate—Sea of Azov, January 1943

A weather-forecast verification of an unusual type occurred in January 1943 in an area held by the German army close to the Gulf of Taganrog in the Sea of Azov (see Fig. 1, which is a map showing the Stalingrad, Rostov, Taganrog and Gulf of Taganrog, etc. areas). Before describing the unusual way of

* Source of data: Deutscher Wetterdienst, Offenbach/M.
** Only the minimum temperatures are recorded.

Note: The temperatures in open fields in statically stable conditions of winter may have been several degrees lower than what is indicated by meteorological stations situated in built-up locations, see Neumann and Pflon (1987, Section 2).
verification of a weather forecast, first we will sketch the military background.

In the autumn of 1942 two German army groups were operating in the south of the European Soviet Union. Army Group A held parts of the Caucasus (see Fig. 1) and parts of the Transcaucasus as far as a little beyond the Terek River. This very large force was assigned the capture of the oil fields of that region. The main lines of communication of Army Group A with the rest of the German army in the Soviet Union were either via Rostov (Rostov on the Don), or via the Strait of Kerch, the Kerch Peninsula and the Crimea (Fig. 1). In effect, the Rostov area formed a kind of a bottleneck for the German army group, squeezed as it was between the Sea of Azov to the Southwest and the Soviet forces in the area of Stalingrad

some 70 km to the Northeast. Army Group B was in the area of Stalingrad, to the West of the Volga. Part of Army Group B was the Sixth Army of Colonel-General Paulus, that had fought its way into a large part of the City of Stalingrad.

Between 19 and 22 November 1942 the Soviets succeeded in encircling the Sixth Army (the Stalingrad "pocket"). Hitler rejected the repeated recommendations of many of his high-ranking officers that the Sixth should be permitted to break out of the pocket; almost without exception he refused to authorize the surrender of captured positions even when his staff judged that it was completely hopeless to hold the positions and that clinging to them would lead to heavy losses of men and of equipment. Instead of authorizing a breakout, Hitler sent Field-Marshall Manstein to the area to form a new army group there, Army Group of the Don, and mandated him to extricate Paulus' forces. In December when von Manstein's army group failed to break through the iron ring around the pocket (see Fig. 2 showing the outline of the Stalingrad pocket immediately after its formation and the two "sub-pockets" to which the pocket was reduced by the Soviets toward the end of January 1943), it became all-too-apparent that annihilation of the Sixth Army was possible. The Soviets were expected to push toward Rostov and, together with their other forces operating to the South of Army Group A, could close the Rostov bottleneck and trap the large German army group in the Caucasus. Moreover, even before the Stalingrad pocket surrendered (31 January to 2 February) the Soviets were pressing from the west side of the pocket. This push threatened the German positions in the Donets Basin (Fig. 1) to the west of the Don. As both Army Group B and Army Group of the Don were greatly understrength and underequipped, and as it was imperative to extricate a good part of the forces in the Caucasus and transfer them to the defense of the Donets Basin area, Colonel-General Zeitlinger, Chief-of-Staff of the German Army, was able to persuade Hitler toward the end of December (1942) to authorize the withdrawal of a major part of Army Group A. Priority was assigned to the withdrawal of the 1st Panzer Army which was nearly up to strength and up to equipment standard.

The authorization was granted on 28 December and the pull back of the Panzer Army began on 1 January. It would reassemble in the Taganrog area, North of the Gulf of the same name of the Sea of Azov. It took the army a full month to march the 600 km in retreat. The retreat was impeded by attacks of Soviet forces and by the abominable state of the roads. When parts of the army were approaching the Gulf of Taganrog, it was decided to let the lighter elements of the force cross the ice-bound Gulf. This served a double purpose. It accelerated the rate of withdrawal, and it freed the roads for the slow heavy vehicles, tanks, and guns. The crossing of the ice-covered Gulf took place on 31 January 1943. On that very same day, the

10 Paulus became Field-Marshall in January 1943, just about the time when the German pocket surrendered to the Soviets.

11 Several authorities believe von Manstein was perhaps the greatest German general of the war.

12 The Donets Basin possessed rich mineral resources, the control of which was vitally important to the Third Reich which suffered from shortages of raw materials. Moreover, Hitler hoped that winning the basin from the Soviets would gravely damage the Soviet war effort.

13 Zeitlinger was the Chief-of-Staff of the German Army since September 1942 when his predecessor, Colonel-General Halder, resigned because of "differences" with Hitler.
northern sub-pocket of the split-up Stalingrad pocket (see Fig. 2) surrendered.

The Gulf of Taganrog freezes over every winter (Hydrographic Office, U.S. Navy, 1946, p. 67) but the thickness, strength, and duration of ice cover vary from year to year. Fortunately for the retiring forces, a cold outbreak occurred between 25 and 27 January, as is recorded in Table 2, the data of which were taken by the German armed forces meteorological station at Kerch-Bagerovo (45°24'N, 36°17'E). It is likely that this cold wave increased the thickness of ice. Even so, there were some weak spots in the cover that caused the ice to cave in under some light vehicles. A few details of the march were described in Carell (1966, pp. 124-125), the meteorological conditions of the day were discussed by Lindgren and Neumann (1982, pp. 88-91) who also provided a sketch map of the area.

There were those who opposed the plan of crossing the ice of the Gulf fearing that the ice would give way. One of the influential opponents was Colonel-General von Richthofen, commander-in-chief of the German 4th Air Fleet. As the highest-ranking air-force officer, he was the supreme commander of the professional meteorologists serving the Army Group. The meteorologists in charge in the 4th Air Fleet was Meteorologist-Colonel, Dr. W. Kopp, an experienced pilot. It was Kopp who was questioned by von Richthofen concerning his estimate of thickness of the ice cover of the Gulf. Kopp asked the colonel-general to let him have a light plane so that he could check the ice thickness by landing on it. This landing was without a mishap; the ice was sufficiently thick for the planned operation. Kopp's daring feat much improved the reputation of meteorologists within the circle of high-ranking officers.

A reference to the Daily Series, Synoptic Weather Maps, Part I, Northern Hemisphere, Sea Level, U.S. Weather Bureau 1943, indicates that on 28 January, a shallow depression (1005 mb) crossed the Black Sea. From 29 January to 2 February an anticyclone covered a major part of the European Soviet Union, including the Sea of Azov area. On the day of crossing, 31 January, the pressure reached 1030 mb over the Gulf. These rather stable weather conditions facilitated the passage. There was some snowfall in the afternoon but this was light as were the winds. According to Carell (1966, p. 125), the sky cleared somewhat for a short time about midday. This partial and temporary clearing of the sky was exploited by Soviet pilots who strafed the retreating columns from a height of about 50 m.

Pages of the reconstructed Kriegstagebuch der 1. Panzerarmee (the original was lost) describe the activities of the Pioneer units of the 1st Panzer Army. This war diary contains a map which shows the routes considered for the crossing of the ice cover as matters stood on 26 January 1946. Two of the routes led directly to Taganrog (the city), the third was to the West and was marked schlecht (poor). Figure 3 is a copy of the map from the war diary.

In Zhidikov's (1985) article there was a passage in which the role of a medium-range weather forecast was mentioned in the context of one of the greatest military operations of the war. The passage reads: "High-level military leaders acknowledged the importance of hydrometeorological forecasts in connection with the execution of military operations. In his memoirs, Marshal of the Soviet Union L. S. Konev points out that the Oder-Vistula offensive of January 1945 was planned with due consideration to the weather forecast. This forecast proved to be correct."

In his memoir Year of Victory Marshal Konev (1984, pp. 8-9 and 15-19) wrote that the Oder-Vistula Operation was to be launched on 20 January 1945 by decision of the Stavka. A very large force had been assembled for this operation. How-
ever, in December 1944 the Anglo-American forces were under great pressure in the Battle of the Bulge and there was a danger that the Germans might break through the Allies' lines. Urgent requests were sent to the Soviets by the Allies' High Command to launch their Oder-Vistula offensive earlier than planned and thus force the Germans to transfer some of their units from the Bulge. The Stavka agreed and changed the start date from 20 January to 12 January and this despite the fact that the forecast indicated that the weather in the third decade of the month would have been more suitable for the combined operations of the ground and air forces. Nevertheless, the offensive was launched on the 12th, with the sole support of artillery and tanks, that is, without the use of the massive air force (5000 planes assigned, see footnote 17). In view of the very large number of warplanes readied for the operation, grounding of the air force must have been a most-significant decision. It appears from Konev's recollections and from Zhidikov's article that the forecast proved fully correct.

Two passages from Konev's memoirs are quoted here (from pp. 15 and 19 of the English translation). Konev wrote the following (on p. 15):

Apart from all other considerations we did not particularly rejoice at the change in the date of the offensive because of the weather forecast, which was most favourable for the third decade of January [see footnote 19]. Now that we were preparing to launch our offensive on January 12, we had to face the fact that, because of the forecast bad weather, we would have to neutralise the German defences with artillery alone, without using our air arm.

Konev wrote as follows (on p. 19):

The weather forecasts were more than confirmed. Not only in the dark, when the artillery preparation started, but also later, after daybreak, visibility was actually zero. It snowed heavily and it looked as though the weather had taken special pains to provide us with additional camouflage. Several hours later, when Rybalko's tank army was entering the gap, the tanks were so camouflaged by the snow that they could be distinguished from the terrain because they were moving... Of course, such weather had its drawback. What was good for camouflage was bad for observations...

Appendix: Medium-range forecasting in Germany, 1940–45

In Section 4 the Oder-Vistula offensive of the Soviet forces in January 1945 was discussed and, in that context, passages from Marshal Konev's memoirs were cited. In one of the passages quoted, the Marshal stated that the date of the offensive was moved back following a request of the Western Allies in order to compel the German High Command to transfer units from the Battle of the Ardennes (Battle of the Bulge) to the Oder-Vistula front and thus relieve the Allies' forces in Belgium.

Werner Schwertfeger, then chief of the Central Weather Group of the German Air Force from autumn 1943, wrote in Weather recently that in preparation for the German counter-offensive in the Ardennes area, he was given a "mission impossible," namely:

Two days before the occurrence in the coming month of December, you have to forecast the date of a period of five days or more, in which fog or low clouds will continuously cover a wide area of the Rhine River north of the 50th parallel, approximately, including the region of the Ardennes and southern England.

The forecast turned out right and in recognition of this, Schwertfeger was promoted to Colonel and O. Schuster (CWG's Liaison Officer to the German High Command) to Lieutenant-Colonel.

The following is a brief account of the ideas behind medium-range forecasting in Germany in 1940–45, which were used for the CWG's Ardennes forecast.

In the 1930s and 1940s the useful limit of synoptic forecasting was estimated to be about 36 hours. This had been verified with limited testing using Scherhag's method, which was based on the displacement of the 24-hr isallobars with the 500-mb flow pattern (Scherhag, 1948, pp. 324–325). Forecasts for two to five days were called medium-range then, in contrast to long-range predictions for a month or for a season. Experiments by Baur's group at Bad Homburg with analogues or large-scale contingency tables proved to be of limited success.

For want of better methods, two approaches proposed by German University institutes were used at the CWG: a search for regularity of events (as investigated in the form of two-dimensional maps, by L. Weickmann and his students at Leipzig), and the occurrence of statistical coincidences of synoptic-scale events on selected calendar days [singularities: A. Schmauss (1938, 1940) in Munich]; originally, the latter was based on folklore. Experience indicated that during the winter half-year, blocking anticyclones at 500 mb, with quasi-stationary troughs on both flanks, occurred rather often in the area of the United Kingdom, the North Sea, and Finnoscandia, in a quasi-periodic way, with periods frequently in the range 15 to 33 days. This was monitored on a longitude-time diagram, which had been in use at least since 1941. At the time the concept was an irregular, quasi-periodic shift between meridional circulation (blocking highs, low index) and zonal circulation (high index). Usually such quasi-periodic features developed during November and December and were hardly stable enough before the end of December; they tended to disappear rather abruptly sooner or later during the second half of the winter. Apparently, they were also responsible for the anticyclonic peaks of the "European singularities" during winter (Flohn, 1950).

In contrast to these quasi-periodic features, Weickmann's concept of symmetry points was met with some reluctance (see also Haurwitz 1985, pp. 630–631). Nevertheless, such a quasi-periodic repetition of blocking anticyclones often was observed, more or less symmetrically about a day in late December.

11 There were major air bases in southern England.

21 For example, before it would be called a Hovmöller diagram.
A catalogue of such days in the 29 years between 1913-14 and 1948-49 (Flohn, 1950) indicated at least the occurrence of "dominating rhythms." Later investigations, based on graphical two-dimensional field analyses, indicated the center of such process developed frequently over the North Sea area and the United Kingdom. Experience had taught caution, however, in using them for forecasting purposes: it had proved impossible to find any sign for their disappearance. They tended to end as abruptly as they began. Nowadays, this could be conceived as a "chaotic" behavior of a nonlinear stochastic (or deterministic) system.

This was the situation when the CWG was asked early in December 1944 to forecast two days in advance, the inception of a five or more day period of fog or low clouds in the Ardennes area. A search was made for "analogue" weather situations, parallel to an effort to find at a quite early date any kind of periodic behavior. Indeed, the CWG found some hints, and at the first sign of an (at least transient) blocking anticyclone over the British Isles, Schwerdtfeger gave, with due precaution, on December 11 a forecast of 3–4 days of calm weather with fog to begin on 15 December in the United Kingdom. The forecast proved to be correct in substance and the Ardennes offensive of the German forces was launched accordingly (Schwerdtfeger, 1986).

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References


