A Cold, Soggy, Boggy Slog:

Ground Forces in Higher Latitude Combat

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There are apparently no spots on the planet that are so remote, so inhospitable, and so devoid of transport and infrastructure that man will not fight over the possession of them. Mountains, jungles, and deserts have all seen their share of combat. People have even fought in the Arctic and in proximity to the Antarctic — and not just the indigenous populations. The land areas approaching and within the Arctic and Antarctic Circles provide unique challenges to military operations. Terms to describe this combat have included northern warfare (a Western-centric term that excludes the areas near the Antarctic), arctic warfare (a term which excludes the Antarctic as well as those inhospitable areas south of the Arctic Circle), and cold weather combat (there are permanent ice and snow-covered areas, but much of this area is devoid of snow and cold during the summer thaw, and movement and combat during the thaw can be quite difficult and requires different techniques and equipment). Geographers refer to the sub-Arctic, Arctic, sub-Antarctic, and Antarctic belts. The sub-Arctic and sub-Antarctic belts do extend at places below 40 degrees northern and southern latitudes, however, so this is not particularly definitive. Higher-latitude combat generally occurs above 55 degrees northern and southern latitudes, understanding that blizzards, ice storms, and snowstorms do occur frequently and regularly below 55 degrees northern and southern latitudes. Sub-arctic combat is not necessarily easier than arctic combat, it just has different challenges.

Department of the Army photo

Troops hauling supplies forward to units fighting the Japanese on Attu in May 1943.

A Quick, Recent History of Higher Latitude Combat

Significant, large-scale combat has taken place in the higher latitudes. The terrain, weather, and limited infrastructure impose severe difficulties on untrained and non-acclimated soldiers. The prime concerns are mobility and shelter. Tactics and force structure require modifications and adjustments.[1] Equipment does not run as efficiently and may require special lubricants, garaging, fuels, and support. Everything takes more time. The past 100 years have witnessed some major confrontations in the higher latitudes. The future will undoubtedly see similar confrontations.

In 1918-1920, some 14,000 U.S. Army combat and support troops deployed near the ports of Murmansk and Archangel in northwestern Russia and near the port of Vladivostok in the Russian Far East. Their mission was to protect the quantities of war supplies that the allies had shipped to the armed forces of the Tsar during World War I. Civil war swept over Russia as the Whites [Russian counterrevolutionaries] fought the Reds [Bolshevik revolutionaries]. Japan, the British Empire, France, Italy, Poland, Serbia, Romania, China, and Greece also sent contingents to support the intervention.[2] About 50,000 Czech soldiers, originally with the Austro-Hungarian Army, were trapped inside Russia and trying to transit eastern Russia to the Pacific Ocean and then to sail to France and eventually join the allied forces fighting there. Japan and Britain were hardly neutral, and the U.S. Army was hard-pressed to maintain some form of neutral posture while acting with the allies. On occasion, the U.S. forces fought Bolsheviks along with other allied forces. The 27th Infantry Wolfhounds, in conjunction with a Japanese division, marched more than a thousand miles in pursuit of retreating communist soldiers. U.S. Soldiers guarded the ports and portions of a 2,000-mile stretch of the Trans-Siberian railroad. U.S. forces also maintained and enforced a truce of sorts between warring Russian factions.[3] Not all the allied intervention forces were involved in higher latitude combat, but enough were to realize that these regions require different training, tactics, equipment, and support.

On 30 November 1939, the Soviet Union attacked Finland in the Winter War that lasted until 20 March 1940. It was a short, brutal war that cost the Red Army 65,384 killed in action (KIA) or died of wounds, 14,142 missing in action (MIA), 186,584

wounded in action (WIA), 5,468 prisoners of war (POWs), and 9,614 cold-weather casualties.[4] Finnish casualties were lower (some 26,662 dead and 39,886 wounded), but Finnish forces were much smaller and the Soviets won the 105-day war. Some of the fighting occurred on the Kola Peninsula within the Arctic Circle, but the main fight occurred in south and central Finland.[5] The Finnish forces were able to withstand the Soviet onslaught for as long as they did due to their specialized training, acclimation, and familiarity with winter movement.

In May 1943, the U.S. 7th Infantry Division landed on Attu in the Aleutian Island chain to oust Japanese occupying forces. A few months later, a combined Canadian-7th Infantry Division force invaded the nearby island of Kiska. Expulsion of the 3,000-man Japanese force cost U.S. forces some 3,929 casualties of which 1,481 were deaths. More than half of the casualties resulted from the cold, wet environment; lack of proper cold-weather gear; and friendly fire incidents in the fogged-in terrain.[6]

In October 1944 the largest Arctic ground operation in history occurred in Northern Finland and Norway between the Soviet 14th Army and the German 20th Mountain Army. The 133,500 men of the Soviet Army, supported by the Soviet Northern Fleet, faced some 45,000 Wehrmacht and German allies. The Soviet Petsamo-Kirkenes offensive forced the German army to withdraw and captured the crucial Finnish nickel mines in Pechanga/Petsamo. The Soviets massed ski troops, naval infantry, artillery and tanks, supported by 30 engineer battalions, horse and reindeer transport companies, and significant airpower. The Soviet advance was successful but limited by the retreating German destruction of the meager road network.[7] Soviet losses were 21,233 (6,084 KIA and 15,149 WIA) in the 23 days of fighting.[8] Soviet sources estimate German losses at 18,000 KIA and 713 POW.[9]

On 2 April 1982, Argentina invaded the British Falkland Islands (Malvinas). The islands are some 300 miles east of the South American coastline and about the same southern latitude as the northern latitude of Attu Island in the Alaskan Aleutians. Britain responded with a naval and amphibious task force and on 21 May, British ground forces landed. On 14 June, Argentina surrendered. During the 74-day conflict, Britain lost 258 killed and 777 wounded in addition to two destroyers, two frigates, two auxiliary vessels, and 34 aircraft. Three Falkland Islands civilians (British citizens) were killed. Argentina lost 649 killed, 1,068 wounded, 11,313 captured in addition to losing a submarine, a light cruiser, and 98 fixed-wing aircraft.[10]

Climate and Terrain

The Arctic and sub-Arctic belts are not of uniform width, but bend, narrow, and expand due to prevailing winds and geographic features. The sub-Arctic belt generally falls between 50 and 70 degrees north latitude. The sub-Antarctic belt contains very little land mass other than the southern tips of Argentina and Chile plus some southern islands. The sub-Arctic characteristically has very cold winters and short cool or mild summers. Permafrost prevails in much of the area except along the southern border and in islands and areas bordering the ocean. Temperatures can range from -40 to +85 degrees Fahrenheit. Coniferous trees (pine and spruce) create large forests (taiga) in the Russian and Canadian sub-Arctic. These forests are home to bears, fox, wolves, wolverines, bobcats, moose, caribou, and rabbits.

The tundra climate is found between 60 and 75 degrees latitude and is normally along the coast of the Arctic Ocean. This climate has a very harsh winter and a cool summer. During the summer, much of the snow and ice melts to form marshes and bogs. However, some of the deeper parts of the soil remain frozen [permafrost] to a depth of three feet. Temperatures range from -50 to +50 degrees Fahrenheit. Trees do not survive in the tundra, but mosses, lichen, and algae do. The tundra is home to polar bears, musk ox, arctic foxes, caribou, and lemmings.

The ice cap climate is found over the north and south poles, much of Greenland, some northern islands, and at the top of the highest mountains. There, the temperature seldom climbs above freezing, no vegetation grows, and the animals (polar bears, seals, albatross, and penguins) are found along the sea coast but not in the interior. While Antarctica is a large landmass continent, there is no land mass beneath the ice of the North Pole. About 20 percent of the earth's land mass lies under ice cap. Antarctica is far colder than the Northern Polar Region. Temperature extremes of 6 to -129 degrees Fahrenheit have been recorded in Vostok, Antarctica.

The higher latitudes contain much of the world's land mass. The northern higher latitudes have long been occupied by native peoples, whereas the human population of the Antarctic is comprised of temporary residents working in research settlements and even more temporary tourists. Although military expeditions conducted much of the Antarctic exploration, the Antarctic Treaty, which came into effect on 23 June 1961, bans military activity in Antarctica while treating the continent as a scientific preserve with freedom of scientific investigation. By treaty, military personnel and equipment may only be used for scientific research and other peaceful purposes, such as transport and logistics, on the continent. Despite this and other treaties, seven countries retain claims on part of Antarctica while Russia and the United States have reserved the right to make future claims. Other treaties prohibit mineral and energy extractions in Antarctica; however, recent mineral and oil discoveries there might lead to exploitation and confrontation despite the existing treaties.

Mobility and Maneuver

Vast swampy tundra, mountains, rivers, large quantities of boulders, and limited roads complicate mobility and maneuver in the higher latitudes. It is a difficult region for even simple engineering projects, and in winter, deep snow drifts, the polar night, and low temperatures add to the difficulty. Weather is always a complicating factor, and radio communications are often interrupted by metrological conditions. The Russians consider March/April through October as the best time for maneuver in the north. Snowmelt starts in the spring, and the "white nights" allow for 24-hour observation. Military advances and retreats normally follow roads, rivers, beaches, and trails across the tundra. Military objectives are frequently villages, road intersections, defiles, isolated

Soldiers from the 3rd Squadron, 2nd Cavalry Regiment drive their Stryker in wintery conditions on their way to the Tapa Training Area to begin winter camp in Estonia on 15 February 2016.

Photo by SSG Steven M. Colvin

heights, mountain passes, river crossing sites, and water-landing points. Tracked vehicles are often optimum for movement, but they can tear up the rather delicate earth surface and create their own obstacles.[11]

The Germans who fought the Soviets in the Arctic had a different view. "The characteristics of terrain and climate in the Far North are such that winter is the more favorable season for offensive campaigns, while summer is more suitable for defensive operations. Early and late winter are particularly favorable for attack operations; midwinter with its deep snow is a less appropriate time for offensive warfare."[12]

The U.S. Army has a view somewhat similar to the Germans, but it has more affinity for midwinter. "The most suitable time for ground operations is from midwinter to early spring before the breakup period. The snow is 'settled,' giving well-trained and supported troops an excellent opportunity for oversnow mobility. During this period, operations are possible even in a roadless wilderness. Early winter, after the formation of ice, is also favorable; however, it does not afford well-trained troops the same oversnow and cross-country mobility as midwinter... In midwinter, the environmental factors — extreme cold and snow — may be used to advantage by leaders with initiative and ingenuity."[13]

Why the marked difference in opinion between Russia and Germany and the United States? Russia prefers the warmer weather with nearly 24-hour visibility, a reduced requirement for warming-up stations during operations, lessened chances of blizzards and other incapacitating weather for the trade-off of more difficult cross-country and road mobility. They build their wheeled and tracked vehicles with high clearances for use in their native terrain. Their track width is usually broader than similar U.S. tracked vehicles.

The Germans, who started World War II with narrow tracks on their tracked vehicles and low road clearances on their wheeled vehicles, were mired in the Russian spring thaw and autumnal heavy rains [распутица]. The frozen soil and frozen lakes and rivers of the severe Russian winter permitted cross-country mobility for German vehicles. However, the deep snows of midwinter, along with the debilitating cold, again limited mobility and maneuver. The Germans put wider tracks on their tracked vehicles and used a lot of captured Soviet wheeled vehicles but still were never as mobile on Russian terrain as the Soviets. Cold-weather casualties during the severe Russian winter plagued the German forces throughout the war.

> *In winter, variations in temperature and precipitation exert great influence on the nature of terrain and the mobility of troops. During the early part of winter, severe frosts (before snow begins to fall) make it possible to cross otherwise impassable terrain. Rivers and lakes freeze and may be crossed by vehicles, but swamps which are under a blanket of snow usually have only a thin and weak ice surface. The effect of snow and freezing temperatures varies with local conditions, but generally snow can immobilize wheeled and tracked vehicles of all kinds except on first class roads.*
>
> *Even a light snowfall, piled into snowdrifts by the wind, may lead to serious traffic difficulties. Drifts may begin to form early in winter and may pile very high, especially on the great steppes. Visibility is usually good in clear, frosty weather, and noises carry to great distances. An overcast sky makes observation difficult. Exact terrain appreciation and target designation may become impossible because elevations and depressions show up only slightly, and serious errors can occur in estimating distances.*[14]

The Americans prefer the hard, cold winter during almost continual night for maneuver. They prefer the deep snow of midwinter even though the HMMWV and Stryker are road-bound in more than a foot of snow.[15] So why the differences in opinion among these nations? The differences may be a result of the nations' perception of higher latitude warfare.

Winter wars are seldom limited to a single season, and the armies involved are there for the duration. The Russians are accustomed to living and working in the winter and have a long history of winter combat. They fought the Winter War with Finland entirely during the winter, launched their incursion into Afghanistan over the snow-covered Hindu Kush Mountains, and completed their withdrawal over those same mountains during the winter. The Russians consider snow as a normal combat condition and a prime design factor in building military vehicles. The Russian T90 tank has higher ground clearance, lower ground pressure, lower silhouette and considerably less total weight than the U.S. M1A2 tank and is the better snow vehicle. The Russian MT-LBV is an effective armored transport fielded in the 1980s that is still the premier winter tracked vehicle. But fighting in the winter is more than equipment. Fighting in extreme cold requires remarkable efforts in preventing cold-weather casualties and maintaining mobility.

In the northern sector during the Winter War and the Soviet-Finnish/German Continuation War (fought from 25 June 1941 – 19 September 1944), the fights were in the forests and on the tundra for possession of the few east-west roads in the region. Down south on the Karelian Peninsula, defensive lines were continuous and tied in. Further north, open flanks were common by necessity, and the fights were attempts to turn a flank while maintaining pressure along the road. Soldier survival was of paramount importance and, in winter, required nearby warming stations and living accommodations to keep soldiers alive. During the Continuation War, the Finnish efforts were directed to restoring territory lost to the Soviets during the Winter War, maintaining border integrity, and interdicting Soviet railroad lines. Railroad was the most reliable means of transport in the far north and, along with the roads and population centers, represented key terrain.

The U.S. has fought in cold weather. The Battle of Trenton and the Winter Campaigns against the Plains Indians were the most successful. Valley Forge, the Battle of the Bulge, and the retreat from the Yalu River were all crisis events that were compounded by cold weather and snow. In World War II, the U.S. Army suffered 84,000 cold-weather casualties.[16]

Amphibious landings and raids are often a major component of arctic ground maneuver.[17] During the spring and summer, rivers and lakes provide the ability to move and maneuver using shallow draft boats with low overhead clearance. However, navigation of glacier-fed waterways can be treacherous due to the shifting channels, sand or gravel bars, and other obstructions.

Perhaps the answer is that there is not a single optimum maneuver season for high-latitude combat, and even if there were, high-latitude combat is seldom settled over a single season. Simple tasks take longer in the higher latitudes, and complex tasks may become impossible. The primary concern of high-latitude combat is to keep one's soldiers alive, disciplined, and capable of coordinated combat. The optimum maneuver season will be a function of the mission, enemy, terrain, logistics, and weather.

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Staying Alive

The critical component of arctic and sub-arctic combat is keeping the force alive and motivated. Snow and cold dictate a heating plan, which includes establishing winter garrisons/warming stations and countering thermal/smoke detection sensors. Warming and maintaining warmth in normal tents requires inordinate amounts of fuel and are readily identifiable to heat sensors. Engineer support in constructing troop shelters is complicated by the cold and wind, reducing their effectiveness some 30-50 percent.[18]

Eating, drinking, field sanitation, and prevention of cold-weather injuries are difficult in the Arctic, particularly for soldiers not trained and accustomed to working there. Poor morale and psychotic behavior can also break out quickly. Aggressive small-unit leadership can prevent or mitigate problems in these areas, but ground units need to plan frequent rotation of ground units to keep them combat effective.[19]

High-Latitude Combat

North of the Arctic Circle, the conduct of operations is circumscribed by time and space elements unknown in temperate regions. The midnight sun of summer, the 24-hour night of winter, and the muddy transition periods of spring and autumn nullify conventional concepts of freedom of maneuver.

In the Arctic a military decision communicated by an order is irrevocable. Whatever forces have been committed, whatever course of action has been initiated, an interminable time elapses between original impulse and final effect. Once started, the chain reaction must run its course. To stop, to reverse, to change direction is to run the risk of losing the initiative. First, decisions must be correct. Command procedure must be adapted to the unorthodoxies of warfare in the north. Leaders at all levels, down to the squad, must make decisions far transcending the scope of their usual responsibilities.[20]

Ground combat in the Arctic often begins with the contending forces not in direct combat, and the depth of the objectives can be significant. This requires combined-arms task organization blending tanks, mobile infantry, mortars, artillery, and engineers. If the region has lakes, amphibious vehicles may be needed in the summer, whereas skis will do

as well in the winter. Flanking detachments frequently work with air assault forces to seize road junctions and bridges. Planning considerations for the scheme of maneuver include swamps, regions of deep snow pack, order of march, flank and rear security, and increased combat support. Movement across snow may require marking the way with dye, coal dust, or oil. Naturally, flank and rear attacks are better than frontal attacks. Ground combat may require movement during polar night, blizzards, fog, and snow storms. Most of this movement will be directed by compass azimuth or satellite signal. In many areas of the Arctic, compasses and satellite signals are not reliable. Keeping units warm, intact, and moving will be a challenge.[21]

"The ability to carry out a march in winter may be the basis for the successful outcome of a battle. If possible, the enemy must be surprised, and surprise is more likely if the troops avoid highways and roads and move across terrain which is considered impassable. Experience has shown that enemy resistance is weakest in terrain that he considers inaccessible, and that cross-country marches frequently permit envelopment of his position. The enemy is particularly susceptible to attack on his flanks and rear. A frontal attack is very difficult in deep snow, even when it is executed on skis."[22]

Eike Middeldorf fought the Red Army in World War II and in 1956 he published *Taktik im Russlandfeldzug: Erfahrungen Und Folgerungen*. This is an excellent examination of effective tactics of the Wehrmacht and Red Army. The following sections on offensive and defensive winter combat are extracted from Chapter 7 which deals with winter warfare.[23]

Offensive Winter Combat

Offensive winter operations are usually accompanied by significant losses in men and material. However, winter operations carried out during the worst winter conditions have often proven successful. It is difficult to conduct strong offensive action with decisive results in winter. The critical point of the attack is realized later than in a summer attack. The maneuver element is tied to the roads. Therefore, their formation becomes very compact and they may be cut off easily. Flanking a strong pocket of resistance takes a great deal of time and requires a great deal of effort by the force. In the majority of cases, a frontal attack over a deep snow cover is impractical. If these will not work, a double envelopment is necessary. Attacking at night or during fog or a snowstorm will facilitate a flanking attack. Every attack must be carefully prepared. Combat actions, as a rule, are conducted along narrow lines (for example, along a road or deployed for the seizure of a nearby inhabited area). The firing positions of the heavy weapons, antitank weapons and artillery, in the majority of cases, are positioned close to the road. A specially-trained ski unit may be used to expeditiously attack the flank or rear of the enemy.

Using a map to determine one's location in the winter leads to mistakes. Besides using the map, it is necessary to conduct a thorough physical reconnaissance, especially in areas of snow drift. If the weather or wind direction changes, it is necessary to again conduct a physical reconnaissance of the area. Aerial reconnaissance can provide information about the presence of roads through vehicle tracks. Moving and stationary forces can be detected by lights during the winter night. Preparation for an attack during winter requires more time than during summer. The assembly area is closer to the enemy and occupying it needs to be conducted quickly while using existing cover to get into it. Clearing the avenue of approach to the assembly area must be done at night. Prior to the attack, it is necessary to feed the troops hot rations and drinks, but under no circumstances should they be given alcohol.

Attack missions should not be too deep, for example seizing a village, a piece of forest or an important road. Heavy weapons need to be moved forward as much as possible to the forward line in order to avoid shifting positions at the start of combat as that takes a great deal of time. Special attention must be given to considering the difficulty of moving forces under winter conditions.

In the offensive, infantry must cross ravines and other terrain features during movement; however, these places may experience heavy snow drifting. Tanks must travel along elevated terrain, avoiding twisting slopes and hollows covered with snow drifts. They also have to bypass sections of open ground.

If the ground is frozen solid and the snow cover is not deep, the lethality of high explosive fragmentation rounds increases. Under such circumstances, try to disperse the force over a larger area. Winter advances, like advances in forests, are conducted along individual, important axes, requiring that forces be deeply echeloned. During the second stage of the advance, it is necessary to conduct feint attacks, reconnaissance by battle, artillery strikes and take other measures to mislead the enemy. It is important to remember that after beginning an advance, it is practically impossible to change its direction.

If the advance does not achieve its goals, it is best to transition to the defense along an advantageous line or even withdraw to an assembly area in order to reorganize and rest before resuming the attack.

Any winter advance makes major demands on the engaged forces. Winter combat requires battle-hardened forces that have experience in the conduct of winter combat.

Defensive Winter Combat

It goes without saying that winter defense is far easier to conduct than a winter advance. The main element of the modern advance is maneuver, especially over great distances while constrained by deep snow and limited daylight. Further, many winter nights are characterized by good visibility, supported by defensive possibilities of conducting effective fire. On the other hand, winter defense allows a defender to conduct a surprise attack without abandoning his defensive positions while destroying an unsupported enemy force that is unprepared for defense.

The main differences between a winter and a summer defense are as follows:

* When the ground is frozen solid, preparations of defensive positions and construction materials entails a great deal of time. During the fall, when the fighting is still in full swing, it is necessary to construct rear area defensive positions in time using combat formations and local inhabitants. Even after a successful advance, it may be more advantageous to withdraw forces into prepared positions than try to build positions under unfavorable circumstances and fight on suffering more casualties. The timely withdrawal of forces into prepared positions may limit the number of forces necessary for the defense;

* The selection of defensive positions will be different for a winter defense from a summer defense. For example, rivers, lakes, and swamps are no obstacles in the winter. Frozen rivers running into the depths of the defense often provide a ready and covered route through the forward defensive belt. Villages, which in the summer are often avoided, in the winter are unavoidably converted into important populated centers. Therefore, it is necessary to convert them into individual strong points, laid out for all-around defense. In the villages, it is necessary to reinforce underground basements with local building materials and use these as bunkers;

* The enemy will attempt to build fortifications in open areas in order to protect his forces. Open areas in the forward defenses may only be lightly held. No-man's land, particularly during the day, will only come under fire, but military security forces will not enter. At night it will be necessary to send reconnaissance groups and listening posts into no-man's land. It will be necessary to fully occupy those defensive areas where visibility is limited such as sections of forest, brush or broken terrain. This will prevent a surprise attack by an infiltrating enemy.

In the winter, as in the summer, it is necessary to pay particular attention to the layout of the anti-tank defenses. This is particularly important to positions located near rivers and swamps where a strong freeze can quickly convert these into 'tank country."

Trenches, dugouts, and separate weapons positions must be built to their proper dimensions, although the depth of these can be lessened by piling up snow, dirt, and ice to achieve the proper depth. Well-fortified observation posts are constructed side by side with the larger number of dug-in firing positions.

In the majority of cases, units and gun crews will only be able to construct one well-fortified primary fighting position. Therefore, it is necessary to prepare additional "snow positions" to the rear of the primary positions. These have snow walls up to 1.5 meters high and are used as alternate or separate positions or else to shelter subunits held in reserve.

If the enemy attacks through deep snow, his movement is constricted and the defender can open up on him earlier with all types of weapons. The enemy will be readily seen against the snow and present an excellent target. Further, the defender should strive to open fire earlier from his concealed positions, forcing the attacker into deep snow and exhausting his force. On the other hand, the concentrated fire of the attacking enemy is less dangerous than in the summer.

If the enemy advances over an open area (for example, on a frozen lake or a plain without ravines), it is better to let him advance closer to the forward edge of the battle area (FEBA) and then open up with surprise powerful fire.

During the conduct of a winter defense, the reserve is located significantly closer to the FEBA and is significantly larger than in the summer. From this it follows that the defender should maintain a smaller-than-usual force on the FEBA and a larger-than-usual force in the depths of the defense. In the winter, it is necessary to rotate frequently the subunits located on the FEBA. After the subunits have warmed up and rested, it is preferable to return them to the same sectors of the defense that they held earlier.

During the conduct of the defense in the winter, the forces must remain particularly determined since the slightest retreat may result in the loss of warming bunkers and a withdrawal into the unknown.

Soldiers with the 2nd Battalion, 503rd Infantry Regiment, 173rd Airborne Brigade, conduct cross-country ski training with Italian army soldiers from the 7th Alpine Regiment near Belluno, Italy, on 24 March 2015.

Photo by SGT A.M. LaVey

Conclusion

Soldiers and units cannot learn high-latitude and winter combat by merely reading books and articles. They have to learn by doing. If the unit does not have seasoned "sourdoughs," it takes much longer to train the unit. A soldier may learn the basics with a month of training in the environment, but it will take a winter to train a unit to a minimal level of effectiveness. Living in a cold clime does not create a winter warrior any more than living near a football stadium creates a great quarterback.[24]

Military history is filled with many examples of the tragic effects of conducting winter and high-latitude combat without proper training and equipment. The United States has not been involved in serious winter combat since the Korean War, and there are not enough units trained and equipped for winter and high-latitude combat in the force. The military requirement for potential commitment to high-latitude and cold-weather combat is growing and should be a concern for U.S. and allied leadership.

Notes

[1] Many senior leaders believe that Army doctrine is universal and can be applied to all AOs in all conditions. The climactic conditions in the Arctic (and assumedly in the Antarctic) require major modifications to tactics and, therefore, force structure.

[2] Japan sent the largest contingent of any of the major powers to the Far East. They originally deployed more than 70,000 troops and finally topped out at 250,000 prior to their total withdrawal in 1922.

[3] D. M. Giangreco, *United States Army: The Definitive Illustrated History* (NY: Fall River Press, 2011), 246-250.

[4] *Grif sekretnosti snyat: Poteri vooruzhennykyh sil SSSR v voynakh, boevykh deistviyakh I voennykh knofliktakh* [*The Secret Seal Is Lifted: Casualties of the Armed Forces of the USSR in War, Combat Actions, and Military Conflicts*] (Moscow: Voyenizdat, 1993), 99.

[5] Carl Van Dyke, *The Soviet Invasion of Finland 1939-1940* (London: Frank Cass, 1997) provides a good overview of the war, mostly from a Soviet perspective.

[6] Giangreco, 290. Much of this fighting was defensive, hopping from trench to trench. Future arctic combat may resemble this — establish a temporary defensive line, infiltrate/penetrate, take the next line, move logistics up, then start the whole process again.

[7] David M. Glantz and Jonathan M. House, *When Titans Clashed: How the Red Army Stopped Hitler* (Lawrence, KS: University Press of Kansas, 1998) provides a concise summation of this operation. James Gebhardt, *The Petsamo-Kirkenes Operation: Soviet Breakthrough and Pursuit in the Arctic, October 1944* (Fort Leavenworth, KS: Leavenworth Press, 1989) is the most comprehensive study of this operation in the English language.

[8] *Grif sekretnosti snyat*, 210.

[9] Kh. Khudalov, "Petsamo-Kirkenesskaia operatsiia" [Petsamo-Kirkenes Operation], *Voenno-istoricheskiy Zhyrnal [Military History Journal]*, No. 10 (October 1969): 116.

[10] The Falkland Islands conflict of 1982, http://www.falklandswar.org.uk, accessed 6 June 2014.

[11] V. Kuselev and I. Vorbyev, "Nastuplenie v severnykh rayonakh" [The Offensive in Northern Regions], *Armeiskiy sbornik [Army Digest]*, February 2013, 2-3. Repeated movement of tracked vehicles over the same arctic terrain will soon close the area to further movement. Ski movement of units works, but it is difficult to train a unit to minimum standards for ski maneuvers, let alone resupply.

[12] Department of the Army (DA) Pamphlet 20-292, *Warfare in the Far North*, October 1951, 7.

[13] FM 31-71, *Northern Operations*, June 1971, 1-4, para 1-9. The U.S. preference is based on having an ample amount of trained arctic warriors. Climbing and going down certain mountains in summer is much harder than glissading or skiing down in winter. But this is all contingent on knowing how to glissade and ski, plus keep yourself warm, move, eat, cook, camp and perform bodily functions in the arctic winter. The only personnel who have this training today work at AMWS, NWTC, some SOF units, or cultivate these skills on their own time. There aren't many of them. There are fewer fully trained units.

[14] *Army High Command*, *Taschenbuch für den Winterkrieg* (Berlin, 5 August 1942), translated and issued by Military Intelligence Division, German Winter Warfare, Special Series No. 18, War Department, Washington, D.C., 15 December 1943, 1. This manual, based on German experience of fighting in the Russian subarctic in 1941 and 1942, was captured by U.S. forces and translated for their use. Page numbers refer to the translation.

[15] Army Tactics, Techniques, and Procedures (ATTP) 3-97.11/Marine Corps Reference Publication (MCRP) 3-35.1D (FM 31-70 and FM 31-71) *Cold Region Operations*, January 2011, page 4-8, para 4-41.

[16] Ibid, page v.

[17] Viktor Leonov, *Blood on the Shores: Soviet Naval Commandos in World War II* (Annapolis, MD: Naval Institute Press, 1993), 63-127.

[18] V. K. Shamshurov, *Inzhenernoe Obespechenie boya v Osobykh Usloviyakh [Engineer Combat Support in Special Conditions]*, (Moscow: Voyenizdat, 1985), 193.

[19] Kuselev and Vorobyev, 3. This "belaya depressia," or white depression, is a common Russian phenomenon. Non-residents start to feel unsettled. After a few days, as one's body is eating itself to stay warm, people get really lethargic and just want to sit in the tent and eat.

[20] DA Pam 20-291, *Effects of Climate on Combat in European Russia*, February 1952, 63. This alludes to German aufragstaktik where junior leaders know the senior leader's intent and innovate and change orders to meet it. This requires a level of junior leader initiative and senior level trust that not always evident. Implicit here is that junior leaders have to understand arctic warfare. But it takes more than one rotation into the arctic to get it right.

[21] Kuselev and Vorobyev, 3.

[22] *Army High Command, Taschenbuch für den Winterkrieg*, 7.

[23] Eike Middeldorf, *Taktik im Russlandfeldzug: Erfahrungen Und Folgerungen* (Hamburg: E. S. Mittler & Sohn, 1956) translated into Russian and published as *Russkaya Kampaniya: Taktika i Vooryzhenie-SPB* (Moscow: Poligon, 2000). Since the German original was not available to this article's author, he used the Russian version accessed on 19 November 2014 at militeria.lib.ru/h/middeldorf/07. Eike Middeldorf was a company and field grade officer during World War II and rejoined the Bundeswehr in 1956. He retired as a major general with last posting as Chief of Staff of III Corps in Koblenz.

[24] Nathan Fry, "Survivability, Sustainability, and Maneuverability: The Need for Joint Unity of Effort in Implementing the DoD Arctic Strategy at the Tactical and Operational Levels," *Military Review* (November-December 2014) addresses many of the concerns and challenges involved in preparing a U.S. force for arctic combat.

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