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REVIEW

ON THE IMPORTANCE OF MILITARY GEOSCIENCE

In 2022, the Swiss branch of the international publishing house Springer published a book, a collection of papers entitled ***Military Geoscience: A Multifaceted Approach to the Study of Warfare***. It consists of selected contributions by international researchers in the field of military geoscience, presented at the 13th International Conference on Military Geosciences, held in Padua in June 2019.

The first paper is by the editors, Aldin Bondesan and Judy Ehlen, and provides a brief overview of understanding the concept of military geoscience as an application of geology and geography to the military domain, and the historical development of the discipline. It should also be pointed out that the International Conferences on Military Geosciences (ICMG), which organises this biennial international conference, has over the past two decades also covered other aspects, such as conflict archaeology.

The publication is further divided into three parts. The first part comprises three contributions covering military geoscience up to the 20th century. The first paper, by Chris Fuhriman and Jason Ridgeway, provides an insights into the Battle of Marathon through topography visualisation. The geography of the Marathon field, the valley between Mt. Cotroni and Mt. Agrieliki, allowed the Greek defenders to nullify the advantage of the Persian cavalry and archers, who were unable to develop their full potential.

This is followed by a paper by Judy Ehlen, who explores the geological background of the Anglo-British coastal fortification system along the English Channel, focusing on the Portsmouth area of Hampshire. The author thus points out that changes in artillery technology and naval tactics between the 16th and 19th centuries necessitated changes in the construction of coastal fortifications, both in terms of the form of the

fortifications and the method of construction, including the choice of basic building materials, as well as the siting of the fortifications in space.

The next article is then dedicated to the Monte Baldo Fortress in north-eastern Italy, between Lake Garda and the Adige River. In his article, Francesco Premi analyses the presence of the fortress in the transition area between the Germanic world and the Mediterranean, and the importance of this part of Italy (at the southernmost part of the pre-Alpine mountains) in military history, as reflected in the large number of important military and war relics and monuments.

The second part of the book, which is the most comprehensive, focuses on the two World Wars and consists of nine papers. The first paper in this part provides an analysis of the operation of trench warfare training camps in the Aube region of France. The group of authors, Jérôme Brenot, Yves Desfossés, Robin Perarnau, Marc Lozano and Alain Devos, initially note that static warfare training camps have not received much attention so far. Using aerial photography of the region dating from 1948 and surviving World War II photographic material, they identified some 20 sites where soldiers of the Entente forces were trained for front-line service in trenches. Combined archaeological and sociological fieldwork followed, confirming the presence of these camps, both through preserved remains and the collective memory.

The second paper in this volume also concerns the survey on trenches, located in northern Italy in the Venezia Tridentina Veneto area in northern Italy. The authors Luigi Magnini, Giulia Rovera, Armando De Guio and Giovanni Azzalin thus use digital classification methods and archaeology to determine how Italian and Austro-Hungarian First World War trenches have been preserved or, in case they have disappeared, why this was the case, both from the point of view of the natural features as well as from the anthropological point of view of the restoration of the pre-war settings.

The next paper, by Paolo Macini and Paolo Sammuri, analyses the activities of the miners and pioneers of the Italian Corps of Engineers during the First World War, in particular with regard to innovative approaches to underground mine warfare. In the Dolomites, the Italian engineers, using various listening devices, drilling machinery and geophysical methods, developed a system for drilling underground mine chambers, which they intended to use and actually used to destroy parts of Austro-Hungarian positions.

The paper by Elena Dai Prà, Nicola Gabellieri and Matteo Boschian Bailo concerns the Italian Army's operations during the First World War. It focuses on the use of tactical maps with emphasis on typological classification, the use of symbols, and digital cartography. The authors thus analysed the tactical maps of the Italian Third Army, which were being constantly updated by plotting the changes in positions and tactical movements of both sides. These changes were examined both in terms of the use of new symbols and the analysis of the movements.

This is followed by a geographical presentation of the Italian Army's activities during the First World War. The authors Paolo Plini, Sabina Di Franco and Rosamaria Salvatori have thus collected 21,856 toponyms by analysing documents and maps. The locations were also geolocated to give an overview of the places where the Italian Army operated during the First World War. The analysis initially revealed the complexity of the events on the battlefields, but also that the sources had misidentified the places of operation, as toponyms were misidentified, especially in the case of homonyms. Consequently, the area of operation was misidentified as well. In this respect, the case of Vipava was highlighted, which can refer to both a river and a settlement.

The following paper is the first on the Second World War. It is the article by H. A. P. Smith on Italian prisoners of war in South Africa. The author outlines the circumstances in which Italian soldiers arrived to and lived in the southern African continent, and the contribution they made to the local environment and the society, and the remnants of their presence preserved to the present day.

In their article, William W. Doe III and Michael R. Czaja analyse the history, geography and significance of Camp Hale in the state of Colorado. In doing so, they focus on the analysis of the military organization and its impact on the local community. Camp Hale was thus the first military installation of the U.S. Army, designated to test and train U.S. soldiers in mountain and alpine warfare. It was here that the U.S. 10th Mountain Division was formed, which concluded its war path on Slovenian soil. The Division's presence in this former camp, which was in military use also after the war until 1965, and in the surrounding area is still visible through numerous monuments.

This is followed by a paper by Hermann Häusler, who deals with German military geography and geology on the Eastern Front of the Second World War. A good year before the German attack on the Soviet Union, German and Austrian military geologists began an analysis of the topography, population and infrastructure of the European part of the Soviet Union, which led to a series of publications, including maps showing the suitability of the terrain for military operations. During the war, military geological teams then followed the frontline units and carried out geotechnical tasks such as water supply, construction of fortifications, supply of building materials for transport infrastructure, and analysis of the suitability of the terrain for all-terrain driving of tracked and other vehicles.

The same author also authored a paper in the next chapter, this time focusing on the activities of German military geologists in the Adriatic area. Similarly to his first contribution, the author presents the work of military geologists in northern Italy and north-western Slovenia. He also focuses on the construction of fortification systems in northern Italy and presents the work of karst hunters in the Operational Zone of the Adriatic Littoral.

Part 3 covers the 21st century with five different papers (chapters).

The first paper by Alexander K. Stewart deals with the operations of the U.S. Army specialised teams in Afghanistan. These Agribusiness Development Teams (ADTs) carried out a specialised form of counter-guerrilla warfare in which they sought to improve the conditions for the development of local communities through agricultural assistance to the local population. In this way, they were also counteracting support for the Taliban. The author notes that, in the decade after the programme's launch, the project had only a 19% success rate. However, he stresses that such forms of civil-military cooperation should be present in future operations.

The next chapter, by Francis A. Galgan, analyses the activities of modern pirates through military-geographical or geological methods. Pirates, who pose a major international security threat, are present in four regions of the world: South and South-East Asia, East Africa and the Gulf of Guinea. Building on the data on pirate attacks between 1997 and 2017, the author shows the temporal and spatial patterns of pirate activities, as well as the influence of the geography of coastal areas on their activities.

This is followed by another chapter with a maritime topic. Mark Stephen Blaine discusses the geography of territorial disputes in the South China Sea. Through a presentation of international law, the strategic importance of the sea (sea lanes, natural resources) and the overlapping territorial claims of China, Taiwan, Malaysia, Vietnam and Indonesia, the author shows the increasing level of conflict in the area and calls for the utmost efforts to be made to prevent the outbreak of hostilities or war.

M. H. Bulmer's paper analyses the Turkish Armed Forces' activities in Syria from the perspective of military geology. The author focuses on the Kurdish forces' defence projects, which mainly involved the construction of gun trenches, observation towers or points, tunnels and underground facilities, as well as on the Turkish armed forces' actions against this military infrastructure. This involved both mountain and underground warfare activities. While these defensive infrastructures proved to be successful during the guerrilla warfare period, direct Turkish attacks on these installations demonstrated their vulnerability.

The last chapter deals with the current operational needs and limitations of military geosciences from the perspective of the Austrian Armed Forces. Friedrich Teichmann points out that the global operational interest of states determines the need for accurate geo-data as well as geo-support in case of rapidly evolving requirements. In this context, geoscience must respond to new forms of threats, both asymmetric and cyber, at a time when resources for geospatial services are limited, which also requires greater synergy and an innovative approach to finding solutions among multiple stakeholders. This also includes increased digitisation, including the use of satellite and other space technologies.

The number of chapters in the publication illustrates the breadth and depth of military geoscience, as well as the relevance of geoscience to past, present and future conflicts or military operations and missions. The current military operations in Ukraine demonstrate the need to take into account the geo-geological realities of the environment and that terrain remains one of the decisive factors for success on the battlefield, irrespective of the technological developments in military engineering and technology. This can also be an incentive for Slovenian researchers and the Slovenian Armed Forces to increase research activities in the field of military geosciences, especially in view of the rich military and war history in the geographically and geologically diverse territory of Slovenia.