

JOSEF-MICHAEL SCHRAMM – FOUNDER OF THE WORKING GROUP “WEHRGEOLOGIE” OF THE AUSTRIAN GEOLOGICAL SOCIETY. A CONTRIBUTION TO THE HISTORY OF THE WORKING GROUP.

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GEOLOGY AND JOSEF-MICHAEL SCHRAMM

Born in 1949 in Salzburg, Josef-Michael Schramm (JMS) first studied geography at the University of Salzburg and continued studies in geology/palaeontology as well as mineralogy/petrology at Innsbruck University, where he received his “Doctor philosophiae” degree in Geology in 1974. From 1974 until 1975 he worked as a research assistant at the Institute of Geology and Palaeontology at Salzburg University, returning there in 1976 after post-graduate studies at Bern University, Switzerland. Since 1982, JMS has been a Professor of Geology at Salzburg, finally heading its Geology Division until he retired in 2012 (Table 1).

JMS started his academic career with research projects on diagenesis and low temperature metamorphism of the Austro-alpine units based on measurements of illite crystallinity, the results of which are not discussed here. This paper, on JMS as a military geologist, refers predominantly to achievements relevant to his applied geological projects and his military geological career. As a consultant for engineering geology as well as a sworn and court-certified expert, he accumulated considerable experience on the foundation of power plants, highway construction, tunnelling, and on landslides, studies which were published in numerous articles (e.g. Nössing et al., 1979

11.4.1949	Born in Salzburg, Austria
1955-1959	Primary school, Salzburg
1959-1967	Realgymnasium, Salzburg
1967-1968	Military service (one year volunteer – reserve officer training, artillery)
1968-1974	Studies in geography, geology and palaeontology, mineralogy and petrology at universities in Salzburg and Innsbruck
1972-1974	Student Research Assistant (geology) at the Institute of Geology and Palaeontology (University of Salzburg)
9.11.1974	Doctoral thesis at Innsbruck University: „Geologische Untersuchungen im Raume Saalfelden-Filzensattel-Dienten (Grauwackenzone/ Nördliche Kalkalpen, Salzburg)“.
1974-1975	Scientific Assistant, Institute of Geology and Palaeontology (University of Salzburg)
Since 1975	External collaborator of the Geological Survey of Austria
1975-1976	Research assistant (post-doc grant) at the Institute of Mineralogy and Petrology (University of Bern, Switzerland)
1976	Thesis in military geosciences and assignment as military geology officer
1977-2005	Military geographic officer, Milgeo/Korpskommando II (Corps Command II, Salzburg) and Federal Ministry of Defence (MoD, Vienna)
1976-1981	Assistant Professor in geology at the Institute of Geology and Paleontology (University of Salzburg)
1981	Habilitation thesis at Salzburg University: „Die Metamorphose feinklastischer altpaläozoischer und permioskythischer Sedimentgesteine des Oberostalpins nördlich der Zentralalpen (Österreich)“. Professorship (“Venia docendi”) for geology at University of Salzburg
1981	Gold Medal Award of the Indian Geotechnical Society for his contribution: „The New Austrian Tunnelling Method, a special conception and its application in poor rock“
1981-2008	Generally sworn and court certified expert for geology and mineralogy
1982-1986	Head of Working Group “Wehrgeologie” of Austrian Geological Society
Since 1982	Associate Professor of Geology at the Institute of Earth Sciences (University of Salzburg)
1.10.1997	Extraordinary Professor of Geology at the Institute of Geology and Palaeontology (University of Salzburg).
1999	Corresponding member of the Geological Survey of Austria
2003	Extraordinary Professor, Department of Geography and Geology, Division of Regional and Applied Geology (since 2008 Geology Division), University of Salzburg
Since 2005	Member of expert staff (militia), Institute for Military Geography (Institut für Militärisches Geowesen – IMG, MoD, Vienna)
2007	Decoration of Honour in Gold for services to the Republic of Austria
1.10.2008	Head of Division Geology, University of Salzburg
2009	Decoration for Art and Science of the Austrian Albert Schweitzer Society
1.12.2012	Retired from University of Salzburg
2013	Grand Decoration of Merit of the Federal State of Salzburg

TABLE 1: Education, academic career and major steps of military career of Josef-Michael Schramm (URL1; additional details courtesy of JMS).

a, b; Schramm, 1980). In the early 1980s he contributed to the application of the New Austrian Tunneling Method (NATM) for poor rock (Golser et al., 1980), a concept for which in 1981 he was awarded the Gold Medal of the Indian Geotechnical Society.

During 1990–1993, Josef-Michael Schramm was principal investigator for an interdisciplinary project concerning investigations on the giant landslide area at Langtang in central Nepal (Weidinger and Schramm, 1995, a, b; Weidinger et al., 1995 a, b; Schramm and Weidinger, 1996; Hejl et al., 1997; Weidinger et al., 1996; Weidinger et al., 1997; Schramm et al., 1998). From 1993–1996 JMS was principal investigator of another project of the Austrian Science Foundation Fund (Fonds zur Förderung der Wissenschaftlichen Forschung – FWF) on the geology of selected mass movements in the Nepal Himalayas, and in Sikkim/India (Uhlir and Schramm, 1997, 1999). Gusenbauer and Schramm (2000) introduced a GIS-based hazard mapping index of potential mass movements, and Uhlir and Schramm (2003) analysed the kinematics of a rock fall near Salzburg. More recently, JMS began compiling a book on engineering geology of the Federal State of Salzburg.

To sum up, his research focus comprised:

- Low grade and very low grade metamorphism in the Eastern Alps
- Regional geology (Greywacke zone, base of the Northern Calcareous Alps)
- Engineering geology (hydroelectric stations, roads and highways, landslides)
- Forensic geology (mass movements, properties of weak and hard rocks, and
- Military geology (trafficability, diggability, excavations, underground openings and blasting sites), and
- History on Earth Sciences, in particular the history of geology.

In total, Josef-Michael Schramm published about 200 papers, about 50 of which deal with military geology, and he wrote about 600 reports, expert assessments and studies, which have not been published. At his department at Salzburg University JMS supervised about 90 theses of bachelor-, diploma-, master, and doctoral students. Academic teaching since 1975 comprised:

- Seminars: Geology for diploma candidates, geology for doctoral candidates
- Lectures: General geology, principles of technical geology, examples of engineering geology, mining geology, sedimentology, diagenesis and low grade metamorphism, analysis of geologic field data, bibliography in geology.
- Practical courses: Clastic sedimentology, technical geology, geologic mapping in the field, geotechnical mapping in the field, geotechnical mapping of underground space, subsurface mining geologic mapping, analysis of geologic field data, and literature research in geology.
- Excursions and field trips: General geology, regional geology, technical geology.

JMS has been and is a member of several professional associations, notably the Austrian Geological Society, the Aus-

trian Society of Geomechanics, the German Geotechnical Association, the International Society for Rock Mechanics, the International Association of Engineering Geology, and the Study Group on Very Low Metamorphic Rocks SG-A (Subcommission on the Systematics of Metamorphic Rocks, International Union of Geological Sciences). He has been active contributing, and still contributes, to working groups of the Austrian Geological Society, namely the Working Group Engineering Geology, the Working Group History of Earth Sciences, and the Working Group „Wehrgeologie“.

Several important decorations were awarded to Josef-Michael Schramm, notably in 1975 the Promotion Award of the Federal State of Salzburg for his doctoral thesis; in 1981 the Gold Medal Award of the Indian Geotechnical Society for his contribution: „The New Austrian Tunneling Method, a special conception and its application in poor rock“; in 2007 the Decoration of Honour in Gold for services to the Republic of Austria; in 2009 the Decoration for Art and Science of the Austrian Albert Schweitzer Society; and in 2013 the Grand Decoration of Merit of the Federal State of Salzburg (URL2).

MILITARY GEOLOGY AND JOSEF-MICHAEL SCHRAMM

After leaving Secondary School in Salzburg in 1967, JMS joined the Austrian army as a one-year volunteer (EF = „Einsjährig-Freiwilliger“), in Baden south of Vienna. The military training for reserve officers (at that time the militia system did not exist) lasted for about four years. The artillery training program required theoretical and practical knowledge of the 105 mm towed gun, 155 mm towed field howitzer, and 155 mm towed field gun. In 1968 JMS joined the first battery of a 130 mm multiple rocket launcher unit (32 tubes) at Siezenheim training base, near Salzburg. JMS was promoted progressively to the rank of acting sergeant, sergeant, and officer cadet. In 1971 he was promoted to the rank of second lieutenant, and became first an artillery forward observation officer, later battery commander of the multiple rocket launchers at Artillery Regiment 3 in Salzburg.

When employed at Salzburg University, Josef-Michael Schramm fortunately contacted Gerhard Fasching, at that time the commissioned officer heading the Military Geography Service at Corps Command II („Korpskommando II“) in Salzburg, thus starting his second military career, as a military geologist (Table 1). In 1976 JMS passed the commissioned examination for the higher military technical service, and then became an officer of the military geography service at Corps Command II in Salzburg and later a member of the expert staff (militia) of the Institute for Military Geography, Ministry of Defence, Vienna. Due to his major interests in applied geology, and increasing experience as a consulting Austrian engineer for geology, JMS steadily developed his knowledge in applied geology, and military geology became his second profession, paralleling his university career.

In the early 1970s Gerhard Fasching, at that time head of the Military Geography Service at Corps Command II in Salzburg, contacted geologists serving in the army, and he was

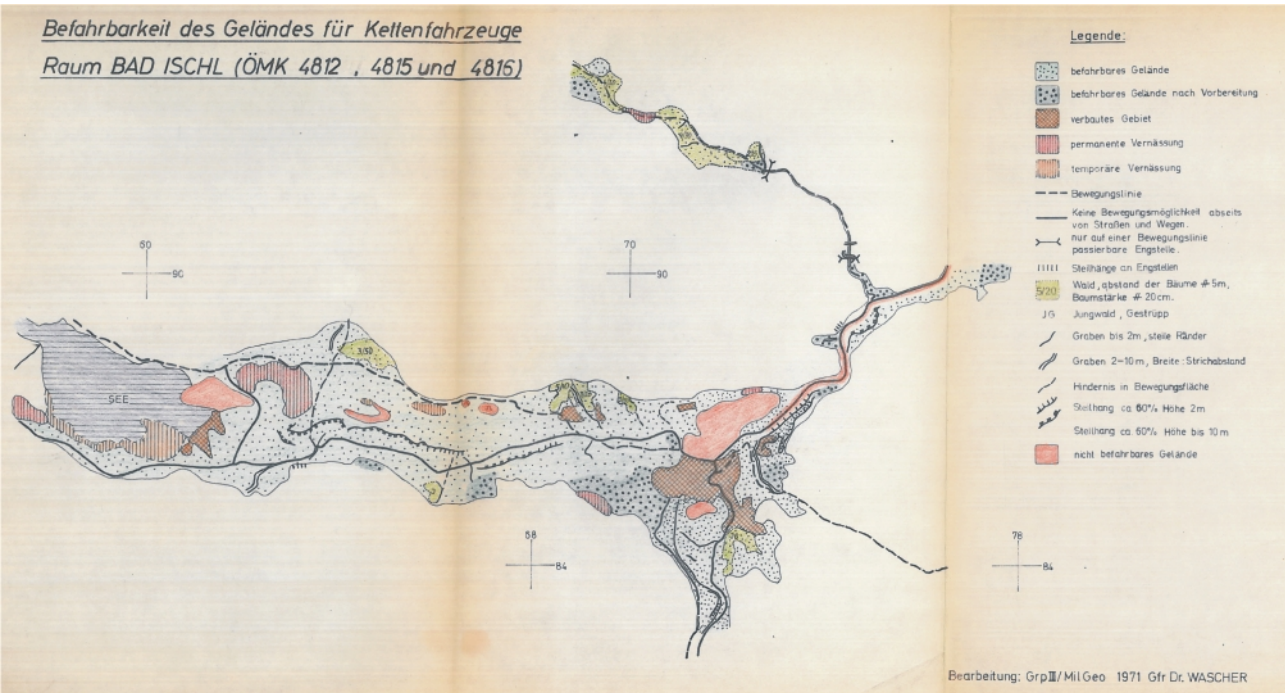


FIGURE 1: Example of a trafficability map for tracked vehicles („Befahrbarkeitskarte des Geländes für Kettenfahrzeuge Raum Bad Ischl“), original at scale 1:50.000, provided by the geologist Werner Wascher, in 1971 serving in the Austrian Army as a lance-corporal (Schramm, 1976; courtesy of Josef-Michael Schramm).

contacted also by private soldiers, who were interested in military geology. During this “hot” period of the Cold War, all military commands in Austria were interested in trafficability maps showing “go/no go” conditions of the terrain suitable for tank attacks and their defence. A very early example of a tank trafficability map at 1:50.000 was prepared by the geologist Werner Wascher, at that time employed at the Geological Institute of the Technical University of Vienna, when serving the Military Geography Service of former Group Command III (Gruppenkommando III) in 1971 (Schramm, 1976).

This example of a trafficability map (Fig. 1) is a very early variant of a cross-country movement map (CCM-map) based on a combined interpretation of geological maps, pedological maps, stereo photographs, and a sound knowledge of the region. The legend therefore comprises permanent go- and no go-conditions of flat terrain, vegetation hindering off-road trafficability, and a classification of slope angles and valley/creek morphology relevant for passing and crossing with wheeled and tracked vehicles. Later on, Austrian CCM-maps of tank terrain (partly identical with agricultural land) were developed

based on very detailed Austrian soil maps (Schramm, 1978 a, b; Häusler, 1980).

When passing specialist courses in military geology in the late 1970s, JMS wrote about a fundamental concept defining the needs and tasks of a military geology service in the Austrian Armed Forces (“Notwendigkeit und Aufgaben eines Militärgeologischen Dienstes im Österreichischen Bundesheer”). This paper was not published as such but used as a scientific technical paper for improving the function of the higher military technical service, the basis of his military geology career. In 1978 Josef-Michael Schramm became the founder of modern Austrian military geology by publishing a paper on geology and national defence (“Geologie

Führungsfunktionen und deren Definitionen (nach TF, Nr. 33)		Führungsebenen		Landesverteidigungsrelevante Disziplinen der angewandten Geologie	
Strategie	Strategie ist die Vorbereitung und Anwendung aller militärischen Mittel durch die Staatsführung zur Erreichung des politischen Zieles im Falle der Bedrohung und im Krieg	ULV		Wehrgeologie	Bodenkunde, Boden- und Felsmechanik, Hydrogeologie, Bau- und Ingenieurgeologie, Montangeologie
		AK	BMLV		
Operation	Operation ist die Bewegung großer Verbände zum Zwecke der Schlacht und in der Führung der Schlacht	Reg	DivKps	Militärgeologie	
		Baon	MilKdo		
Taktik	Taktik ist der Gebrauch der militärischen Mittel zum Zwecke des Gefechts		Kp	Geländewahl (Befahrbarkeit; Bearbeitbarkeit) Logistische Maßnahmen	
			Zg		

FIGURE 2: Application of applied geology for civil and military officials for strategic, operational and tactical use in the 1970s (modified after Schramm, 1978 d). Abbreviations: ULV = Umfassende Landesverteidigung (Comprehensive National Defence); BMfLV = Bundesministerium für Landesverteidigung (Federal Ministry of Defence); AK = Armeekommando (army high command); Div/Kps = Division/Korps (division command/corps command); MilKdo = Militärkommando (provincial military command); Reg = Regiment (regiment); Baon = Bataillon (battalion), Brig = Brigade (brigade); Kp = Kompanie (company); Zg = Zug (platoon); TF = Truppenführung (service manual for commanding forces; courtesy of Redaktion Österreichische Militärische Zeitschrift).

und Landesverteidigung”; Schramm, 1978 c) in the Austrian military journal “Truppendienst”, one of the first publications on military geology in German-speaking countries after the end of World War II.

In his second paper published in the same year, on “Wehr- und Militärgeologie” (Schramm, 1978 d) in another prominent Austrian military journal, JMS introduced the term „Wehrgeologie” for Comprehensive National Defence of Austria (“Umfassende Landesverteidigung”), a specification, which still is valid until today.

For admission to the higher military technical service, Josef-Michael Schramm in 1976 wrote a military scientific paper on the needs and use of a military geology service for the Austrian army, and in 1976 he became military geographic officer serving both the Corps Command II in Salzburg, and the Operation Department of the Federal Ministry of Defence in Vienna. In the following years he prepared special geologic studies for military exercises and higher commands (Schramm, 1977, 1978 a, b).

Figure 2 clearly differentiates between tasks of military geology and those of “Wehrgeologie” in Austria in the 1970s, and highlights the use of geo-information at different scales for decision makers at strategic, operational and tactical level. This diagram shows that “Wehrgeologie” serves strategic planning of military and non-military means by the highest levels of governance in order to reach political goals, at that time primarily in case of serious military conflicts. “Wehrgeologie” therefore supported national decisions in terms of geological terrain and underground information, and therefore provided small-scale geo-information for use by the highest civil and military commands, such as the Federal Ministry of Defence (“Bundesministerium für Landesverteidigung”, BMLV) including the army high command (“Armeekommando”, AK), and Comprehensive National Defence (“Umfassende Landesverteidigung”, ULV) respectively.

Military doctrine during the Cold War period defined an operation as employment of strong battle forces, namely divisions, corps and brigades. Military geology therefore supported both operational decisions at regional and provincial level, and tactical decisions at local level, and provided geo-information at a larger scale, in particular on hydrogeology, engineering geology, mining geology, rock mechanics, soil mechanics and pedology for (in the 1970s solely) defence purposes. Hence military geology information was primarily provided by the provincial military commands (“Militärkommandos der Bundesländer”, the military authority equivalent to the civil administration of the nine Austrian provin-

cial governments), and the divisions predominantly serving the corps commands, brigades, and battalions, and for special tactical purposes down to company and platoon level. The scale of geologic information for military commands at different levels is a very fundamental one: the lower the military command, the larger the scale of thematic cartographic information, and the higher the military command, the smaller the scale of information relevant to national defence. This means e.g. that for tactical use of a platoon, company or battalion high-resolution geologic information for trafficability, diggability or water supply e.g. at a scale of 1:20.000 up to 1:50.000 is useful. For planning of military operations by brigades (or the former divisional commands) and by the Military Commands at state level, geoinformation at smaller scale such as 1:100.000 up to 1:200.000 is useful. For planning purposes at tactical and operational level, military geologists of the Austrian Armed Forces in general provided appropriate geoinformation to the staff of brigades and corps commands (S3: operation; S4: logistics).

A few years after this publication (Schramm, 1978 d), Josef-Michael Schramm was joined as a military geologist by Hermann Häusler, who in 1980 was admitted to the higher military technical service (Häusler, 1980; 1992), and who also promoted military geology in the Austrian Armed Forces (Häusler, 1981 a, b).

It was the head of the Military Geographic Service of Corps Command II, Gerhard Fasching, who, together with a few experienced militia officers, founded the working group “Military Geology” as a special expert group affiliated to the military geography organisation of the Austrian Armed Forces (Fasching, 2005, p. 35). Since that time the military geology group has held a privileged position in the Austrian Army. In a footnote of this paper, Fasching (2005, p. 38) referred to a few members of this military geology group by name: Josef-Michael Schramm (University of Salzburg), Fritz Ebner (Mining University, Leoben), Hermann Häusler (University of Vienna),



FIGURE 3: In 2007 Josef-Michael Schramm introduced the staff of the Institute for Military Geography (IMG: MjdhmtD Mag. Dr. Tamino Eder, Dipl.-Ing. Robert Ditz, ObstdhmtD Mag. Gerald Gnaser, Dr. Georg Bissinger; from left to right) to the geologic block-diagram of the Nepal Himalayas at ERKUDOK Institute, the “Institut für Erd- und Kulturgeschichtliche Dokumentation” in Gmunden/Upper Austria (photograph courtesy of Mag. Werner Heriszt, IMG).

Hubert Flachberger (Forest Engineering Service in Torrent and Avalanche Control-Section Upper Austria, Bad Ischl/Linz; Flachberger, 2006), Ingomar Fritz (Geological-Mineralogical Survey of Carinthia, Graz), and Wilfried Schimon (Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna; Schimon, 2001).

On the occasion of the very first seminar for military geologists, held in Salzburg on 3 June, 1983 ("1. MilGeol.-Seminar"), organised by Gerhard Fasching, at that time heading the Military Geographic Service of Corps Command II, Josef-Michael Schramm, at that time a Captain of the higher military technical service, came up with the idea to found a working group on "Wehrgeologie" under the umbrella of the Austrian Geological Society as a counterpart of the MilGeo-working group "military geology" of the Military Geographic Service. During the second seminar for military geologists, held in Salzburg on 2 March 1984, this group was founded and Josef-Michael Schramm became the first president of Working Group "Wehrgeologie", affiliated to the Austrian Geological Society (Schramm, 1987, 1989). A major task for this Working Group was to provide information, material and maps supporting the sustainable use of the environment ("Geogenes Naturraumpotential", e.g. Ebner, 1981; Ebner et al., 1984, Gräf et al., 1984) for geotechnical, ecological, socioeconomic and military-related tasks and decisions. The priorities of military geological support for national military defence at that time were assessments of a) trafficability for tanks and wheeled vehicles, b) diggability (use of heavy construction machines), c) acquisition of construction material for trenching and obstacles in operation, and d) emergency supply of water of drinking water quality.

From 1987 until 2006 Colonel (later Brigadier General) Dr. Gerhard Fasching headed this military working group, organising seven other seminars on military geology (3rd-9th "MilGeol. Seminar"). From June 2006 until November 2008 Johannes Reisinger became the third president of the Working Group "Wehrgeologie". He held a unique position as an Austrian military geologist, because of his affiliation to the Development and Advanced Training Division of the NBC Defence School (NBC = Nuclear, Biologic, Chemical) of the Austrian Armed Forces, located in Korneuburg (ABC-Abweherschule "Lise Meitner"). As a geologist with a sound educational background in geophysics, he brought skills as a damage analyst and actively supported the international operations of the Austrian Forces Disaster Relief Unit (AFDRU; Reisinger, 2006, 2011).

In 2006 Josef-Michael Schramm published an extensive account of 'terrain and the underground', generally regarded as the major operational field of military geology (Schramm, 2006 a). This benchmark paper provides short comments on about 1000 (one thousand!) of the most important papers published on military geology worldwide. And it is incredible that this contribution, published by the Institute for Military Geography, covers only small percentage of the selected bibliography and index of Military Geology and related subjects, in total of 8000 publications, which have been documented by JMS during the last five decades.

A coeval paper on tasks and challenges of military geology (Schramm, 2006 b) provides a short introduction to historical and modern examples and future challenges for military geologists, focusing on geologic terrain analysis for trafficability, diggability, field constructions, fortification and tunnelling as well as resource acquisition and logistics.

Amongst others, JMS in 2007 contributed to an Austrian-wide campaign promoting military geology from the Institute of Military Geography (Mang, 2010). In September 2007 Josef-Michael Schramm organised a 5-day special course for the staff of the Institute for Military Geography (IMG, MoD, Vienna), held at the University of Salzburg. This course was preceded by an academic training course at the Institute of Geography at Klagenfurt University in 2004, and at the IMG in Vienna in 2005. The 2007 training course at Salzburg University introduced the organisation, staff, facilities and research projects of the Department of Geography and Geology, and hot spots in geoinformatics and in applied geology. JMS organised and guided an applied geologic excursion covering engineering geology of high alpine roads, tunnels and hydropower schemes, as well as geotechnical aspects of mass movements for road construction works, etc. This excursion offered many places for JMS to explain historic and actual aspects of military geologic terrain evaluation, in particular natural obstacles, rock falls and landslides relevant to the passability of narrow alpine valleys. Another excursion led to a special institute in Gmunden (Upper Austria), which was installed for documentation of Earth history and of cultural history (ERKUDOK, Weidinger, 2004; Fig. 3). There JMS explained a geologic block model of gigantic land slides in the Nepal Himalayas, the mechanism and geology of which he had studied within a research project with PhD students from Salzburg University (Tsergo Ri landslide, Langthang Himal, Nepal; Weidinger et al., 1996).

Since 2008 JMS was the co-author of several military regional fact sheets on geology, geohazards and military geology respectively of the Middle East and Northern and Central Africa in general, and on Algeria (Wechselberger et al., 2010), Chad, Libya, Nigeria, Somalia and several other countries in particular, all published by the Institute for Military Geography. In addition, JMS wrote many expert accounts on mining, caverns and blasting sites in Austria, which are classified and so not in the public domain.

In 2009 JMS supported the organisation team of the 8th International Conference on Military Geosciences, held in Vienna, June 15-19, 2009. He compiled an account of the regional physiogeography and geology of Austria for a flight excursion of about 25 foreign conference participants, many of them geologists from Canada, Croatia, France, Germany, Great Britain, South Africa and the United States of America. The flight excursion took place on June 17, and the participants flew in one Sikorsky S-70 "Black Hawk" helicopter and three Pilatus PC-6/B2H2 "Turbo Porter" aeroplanes a 1000-km distance from the military airbase at Langenlebarn, crossing the Northern Calcareous Alps, Greywacke Zone, and Central Alps towards the Southern Alps, where they visited the World War I museum

at Kötschach-Mauthen (Schramm, 2011 c).

During this flight JMS not only demonstrated geology along the route but also all aspects related to economic geology, engineering geology, petroleum geology, and security geology. Before returning to the air base, the flight passed the former Austro-Italian front line and JMS demonstrated the World War I military geology aspects of positions and operations along this route, which he also published as conference contribution (Schramm, 2011 a). The profound knowledge of Austrian military geology, which JMS presented during this 2009 international conference (Schramm, 2011 b) was based on a series of military geological maps of Austria at 1:2.000.000 showing on trafficability, diggability, drinking water supply, mineral construction materials, and mineral raw materials and other features published previously (Schramm, 2007 a). The 2009 conference participants who joined the flight excursion to the southern border of Austria thus had these thematic small-scale maps of Austria at their disposal.

As a member of the Working Group on History of Earth Sciences (“Geschichte der Erdwissenschaften”) of the Austrian Geological Society, JMS joined several conferences and presented his archive studies on military geology and historic geoscientific maps. These conference contributions were published in a special journal of the Austrian Geological Survey (“Berichte der Geologischen Bundesanstalt”; Schramm 2011 d, 2012).

Those, who personally know Josef-Michael, called “Pepi” by his friends (Pepi = short for Josef), have realised that besides his profound knowledge of geology and physiogeography, of applied geology, and of military geology, he is also a very humorous person. He deliberately contributed a humorous element on the occasion of the 10th anniversary of the formation of the Institute for Military Geography, in 2007 (Schramm, 2007 b, 2007 c).

At present Dr. Josef-Michael Schramm holds the rank of a Colo-

nel of the higher military technical service, and is a member of the expert staff of the Institute for Military Geography (Institut für Militärisches Geowesen), Federal Ministry of Defence and Sports in Vienna.

Josef-Michael Schramm is a renowned proponent of Austrian



FIGURE 4: A: Dr. Gerhard L. Fasching, Brigadier General (retired), 1980-1993 Head of Military Geography Service of the Austrian Armed Forces – Dipl.-Ing. Hubert Flachberger, Brigadier General (militia, retired), Head of Forest Engineering Service in Torrent and Avalanche Control-Section Upper Austria, Bad Ischl/Linz) – Dr. Josef-Michael Schramm, Lieutenant Colonel of the higher military technical service – General Roland Ertl, Chief of Defence Staff of the Austrian Armed Forces (from left to right, photograph taken in 2006). B: Josef-Michael Schramm – (background: Mickaël Aubout, Paris) – Colonel Dr. Eugene Palka, Professor and Head, Department of Geography and Environmental Engineering, U.S. Military Academy, West Point, New York (from left to right, photograph taken in 2009 on the occasion of the 8th International Conference on Military Geosciences, held in Vienna, June 15-19, 2009). C: General Mag. Edmund Entacher, Chief of Defence Staff of the Austrian Armed Forces together with Josef-Michael Schramm (photograph taken in 2010; all photographs courtesy of Austrian Armed Forces Press Department).

military geology due to the following qualifications and activities:

- Geoscientific university education (geography and geology)
- Core competence in geology (PhD)
- Scientific geologic work on geohazards etc., and publications in renowned national and international journals
- Applied scientific expertise in engineering geology, tunneling geology, soil mechanics, hydrogeology etc.
- University lectures, field exercises and university courses in geology and applied geology
- Geology refresher courses for teachers as well as military geology continuation courses for military staff of different commands
- Military career as a troop officer (realising the military geology needs of troop commanders of different command levels)
- Military career as a military geographic and military geologic officer (following training and qualification for higher military technical service)
- Contacts with various offices of the Federal Ministry of Defence, Military Commands of the Austrian States, and other departments of the Austrian Armed Forces, such as the Military Intelligence Service, and supporting them with military geologic expertise of Austria and abroad
- Regular contacts with the Austrian Institute for Military Geography, and with staffs of Corps Commands (S3 operations/S4 logistics, and the assistant chief of general staff G3/G4 respectively)
- Regular contacts with Austrian experts for military geology (e.g. at conferences at the National Defence Academy in Vienna), and knowledge exchange (of non-classified studies etc.) with military geologists of foreign armed forces
- Archive studies and publications on historic examples of military geology
- Preparation of national and international conferences on military geosciences
- Presentation of military geology studies at national and international conferences

Because of these qualifications, which by far exceed those of other members of the Milgeo-expert staff Josef-Michael Schramm is doyen of Austrian military geology. Figure 4 highlights recent meetings of the military geologist JMS in gala uniform with the former Chief of Defence Staff of the Austrian Armed Forces, General Roland Ertl in 2006, with Colonel Eugene Palka, Professor and Head, Department of Geography and Environmental Engineering, U.S. Military Academy, West Point in 2009, and with General Edmund Entacher, Chief of Defence Staff of the Austrian Armed Forces in 2010.

The military career and thus the military geology career of JMS was deeply influenced by his conviction of serving Austria in the sense John F. Kennedy expressed very simply when he was sworn in as the 35th President of the United States of America on January 20, 1961. When speaking of the need for all Americans to be active citizens, he famously said: "Ask not what your country can do for you; ask what you can do for your country (URL3)." Retrospectively seen, Josef-Michael can be termed a "Child of the Cold War", a period often dated 1945-

1991, sustained by the political and military tensions between powers of the Western Bloc, dominated by the United States with NATO and other allies versus powers in the Eastern Bloc, dominated by the Soviet Union with the Warsaw Pact and other allies. Probably this view also explains his intention to engage in military geology during peacetime in order not to experience it in armed conflict.

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Thanks are due to Edward P.F. Rose, Department of Earth Sciences, Royal Holloway, University of London, for significant help to improve the initial draft of this tribute.