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THE GEOLOGY-BASED METAPHOR AND ITS INVERSE FORM

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Abstract. *This paper deals with the use of the geology-based metaphor in common and field -specific English, while including the concept of the "inverse metaphor"* [1] *which has proven highly important for specific vocabulary learning and initial understanding. The geology-based metaphor proves to have great potential for practical application in L2 vocabulary teaching, especially when it comes to explaining new field-specific terms. The paper is divided into several sections, the first one being a general introduction to the fields of metaphor and its relation to the language of science, as well as its usage in L2 vocabulary teaching. The second part deals with the typology of the geology-based metaphor and the specificities of the metaphor itself, whereas the third part focuses on a phenomenon noticed in our teaching practice at the Faculty of Mining and Geology which has been termed "inverse metaphor" in the study of the theory of metaphor. The last section explains our views on the importance of using the geology-based metaphor known from everyday English in the language classroom, alongside final conclusions, and remarks. This paper will hopefully provide more insight into the full capacity of the applicability of the geology-based metaphor.*

Key words: *metaphor, inverse metaphor, geology, L2 vocabulary*

1. INTRODUCTION

This paper is the brainchild of years-long work and experience in teaching English at the Faculty of Mining and Geology (in further text – FMG) where, due to the specificities and lexicon of the field in question, the very methodology and its corresponding syllabus had to be adapted and made appropriate for the specific demands of the vocabulary sphere at hand. The

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[1] The phenomenon in question has been termed differently by different authors, but we have opted for the term "inverse metaphor" from the paper "On Metaphoric Inversion" (1993) by Paul D. Deane, since it best describes what we have seen in our practice.

method in which English is taught at FMG, which is the CLIL method, makes no distinction in the very approach to the language itself and it thus allows for all the nuances and intricacies of the language to seep into what is deemed a purely scientific lexical sphere. Bearing this in mind, it is no wonder that whilst teaching English for specific mining and geological vocabulary, it is all but impossible to deprive the language of its inextricable characteristics and embellishments; in this particular case, we shall be focusing on the ability of language to surpass the purely mundane and factual, and flow into a more figurative and abstract sphere of meaning, without cutting any ties with the reality behind it. We are, of course, talking about the metaphor and its overwhelming, though even indiscernible at times, language usage even though it may be within the language of science, and in this case specifically - the language of geology.

When exploring literature on metaphor, one could be led to understand that the use of metaphor and other non-literal expressions was viewed as a threat to the scientific maxim of explicitness, especially considering that the very definition of science states that it is "the study and knowledge of the physical world [...] based on experiments and proven facts", as defined in the *Macmillan English Dictionary* (2002). This resulted in academic writing conventions serving to avoid the use of figurative language. It was believed that science and its language could not be permeated by metaphor and would thus demand the use of literal expression to achieve objectivity and remain precise and unambiguous (Moc 2015, 8). Furthermore, Ortony (1993, 1) argues that "[s]cience is supposed to be characterized by precision and the absence of ambiguity, and the language of science is assumed to be correspondingly precise and unambiguous – in short, literal." However, this rather traditional view of the metaphor (Moc 2015, 8) as "primarily ornamental" (Ortony 1993, 3) was challenged by the emergence of Lakoff and Johnson's theory of metaphor and the claim that "the way we think, what we experience, and what we do every day is very much a matter of metaphor" (1980, 3). This definition not only defies the notion of the solely artistic and almost poetic application of metaphor, but it also emphasizes the natural place of the metaphor in language connecting it to the specific jargon of science without any discrimination.

Notwithstanding the many ambiguities surrounding the use and the very existence of metaphor, since it is an integral part of any language, including English, one has to ask the question of how this affects the study of the language of science altogether. With the ever-expanding scope of Cognitive Linguistics, its underlying mechanisms have become indisputably relevant in the field of language teaching methodology, especially when it comes to vocabulary teaching. An indispensable part of teaching L2 vocabulary is, of course, the metaphor. Low (2008, 212) states that the metaphor has been a tool in education since "time immemorial" and goes on to explain its role in language teaching as part of a larger scale educational change (*ibid.*). Also, as Valez (2017, 837) states, the metaphor "permeates the ways in which individuals reason and conceptualize the world" and could aid the "reasoning and conceptualization" of new terms and concepts.

This is particularly important when it comes to L2 teaching within a specific context and field, in this particular case – geology. When referring to actual scientific jargon and the implied application of metaphor in a language classroom, Cuadrado and Durán (2013, 55) claim that "specific knowledge is organized by means of metaphorical conceptualization". Thus, we can conclude from the aforementioned that including metaphors (alongside metonymy and similes) in L2 teaching within a scientific field is not only expected just by considering the very nature of language but could be mandated as an indispensable part of vocabulary expansion and overall understanding of a specific lexical corpus.

Moreover, finding effective and inspiring ways of teaching vocabulary has always presented foreign language teachers with a specific challenge – not only are they to teach

the target vocabulary in question, but they must do so bearing in mind the importance of vocabulary retention and subsequent facilitated production and recollection. All of this is, however, influenced by various individual factors that come into play with all students when faced with new vocabulary items. Schmitt (2000, 116) singles out the influence of L1, amount of exposure, motivation and culture as factors which have an impact on vocabulary acquisition. What is also interesting to note is Schmitt's (2000, 120-121) distinction between two types of vocabulary learning – explicit and incidental. He defines explicit learning as the more straightforward variant, one which focuses directly on "the information to be learned" (Schmitt 2000, 120), whereas incidental learning happens during exposure and in conversational settings where the student is indirectly instructed the meaning of the word/phrase.

Second language teachers are faced with yet another challenge – the specificities of the vocabulary in question. In the case of FMG, the English language is taught based on the method which demands full language immersion. Thus, students are immediately exposed to geology-specific terminology in L2. It is, hence, evident that incidental learning is encouraged. Precisely because of the complexities of being faced with such vocabulary early on in university education (at FMG, English is taught to first- and second-year students), we believe that incorporating the use of geology-based metaphors would facilitate the primary understanding and acquisition of certain terms and notions, therefore creating fertile grounds for further vocabulary enhancement, both in a classroom setting but also on an individual learning level. Since students are already familiar with certain geology-based metaphors from their native language, using the metaphors in supporting the learning of this kind of vocabulary does not only match the definition of incidental learning, but also allows for the development of problem finding and, as Low states (2008, 226) aids in categorization and memorization. This opinion stands in coherence with the opinion of Beréndi, Csábi and Kövecses (2008, 66) who also believe that "teachers would seem to be well advised to try to foster their students' metaphorical competence".

One of the primary focuses of this paper is to provide a typology of chosen metaphors based on the types of mappings on which they were created. These metaphors contain terms from the fields of geology, mineralogy, earth science and other related fields based on a selected corpus. When deciding on what to include in the corpus for the research, we came to the conclusion that it would be best if we consulted general language dictionaries, as well as specialized ones, focusing on the fields in question. However, since our research is not of metaphor *en general* but a specific typology and use of geology-based metaphors in L2 teaching and learning, we thought it was necessary to include a study book on idioms and metaphors in general English which contain terms from geology and earth science, since that, alongside dictionaries, would be the primary study source for a student. The dictionaries and the study book we opted for were:

- *Oxford Advanced Learner's Dictionary* (1993), OU
- *Macmillan English Dictionary for Advanced Learners* (2002), Macmillan Education, which also has a separate section dedicated specifically to the study of metaphor.
- *Dictionary of Earth Sciences* (2008), Michael Allaby, OU
- *Dictionary of Geology and Mineralogy* (2003), McGraw Hill.
- *Idioms Organizer (*2002*)* by John Wright, Thomson/Heinle, with a very intuitive approach to metaphor learning, dividing the book into sections based on specific metaphor mapping, topics and key words.

The search for specific metaphors was based on key terms when it comes to the introduction to earth sciences, specifically *earth* and *rock* as overarching terms which we

deemed could yield the biggest number of associated metaphors, but also more specific terms like *coal, chalk, landslide* as well as names of certain metals. This provided us with examples of metaphor such as, *between a rock and a hard place, rock bottom, as solid as a rock,* something *on the rocks,* a *rocky* relationship, *mother/host/parent rock, salt of the earth, earth-shattering* and many others which show the tightly knit relationship between the seemingly unrelated language of the scientific discourse and that of metaphor. Cuadrado and Durán (2013, 55) state that "well-structured conceptual metaphor (is) very frequently found in the fields of geology, environmental science, mineralogy, geophysics, and other related fields."

2. MAPPING OF GEOLOGY-BASED METAPHOR

Though the use of metaphor in discourse, either written or spoken, is mostly intuitive, with most people not even realizing a metaphor had been used, it is essential to define what a metaphor actually is. Lakoff and Johnson (1980: 5) define metaphor as a concept whose essence is "understanding and experiencing one kind of thing in terms of another". This kind of metaphor has been named *conceptual metaphor* (Moc 2015, 9). A further subdivision of metaphor, one which geology-based metaphors belong to, is that of *structural metaphor* (Kövecses 2010, 37) where "the source domain provides a relatively rich knowledge structure for the target concept" (*ibid.*). As Moc explains (2015, 10) "one domain always represents concrete concepts which are the sum of all our knowledge from the surrounding world and our life experience, through which we explain more abstract concepts which belong to the second domain". The two concepts are called *source* and *target* domain, respectively. These relations between the two domains are described in terms of *mappings* (Kövecses 2010, 37). The conceptual correspondence between the two domains, however, cannot be fully overlapping, since "we must not perceive them as equal" (Moc 2015, 12).

The type of conceptual metaphor we are covering in this paper is the metaphor containing geology-specific terms. We have decided on the term "geology-based metaphor" since the term adequately emphasizes the nuances in meaning pertaining to the field of geology. Another paper which deals closely with what we are describing and the one which we will be using as an important reference in our paper is Cuadrado and Durán's 2013 seminal paper *Rocks are human beings: Researching the Humanizing Metaphor in Earth Science Scientific texts* on metaphor in Earth science, where they limited their research only to the "humanizing" aspect of what we have called "geology-based" metaphors. The aim of this paper is to include both this and a few other mappings in an attempt to demonstrate the potential of the geology-based metaphor.

As previously said, in Cuadrado and Durán's paper the mapping in geology-based metaphor is viewed through the lens of "humanization" of certain geological phenomena. There, the phrase 'ROCKS ARE HUMAN BEINGS' allows for the personification of an inanimate geological formation 'ROCKS' which further allows for the subsequent ascribing of human features limited to the domain of 'HUMAN BEINGS' only to a rock. In their paper, Cuadrado and Durán explore the mapping of the metaphorical expression associated with the central word 'ROCK'. We shall expand on their examples adding those of 'PARENT ROCK' and mention their example of 'DAUGHTER ELEMENT'.

One of the examples of the aforementioned mapping would be the geological term 'PARENT ROCK' which refers to a type of rock from which fragments have been derived which form a later, usually sedimentary rock, as defined in *Dictionary of Geology and Mineralogy* (2003). It is also known as 'MOTHER ROCK' or source rock. Here we can see the mapping 'ROCKS ARE HUMAN BEINGS' clearly, but not only that – we can also

recognize the two domains, which may facilitate initial understanding of the phrase in question in the following way - the mapping 'ROCKS ARE HUMAN BEINGS' provides the implication: Rocks can be described in terms of being a human being, thus can procreate and become a 'PARENT' (or in the case of the synonymous expression – 'MOTHER' - which further strengthens the mapping since it implies the "child bearing,, quality of a rock.'). The source domain 'PARENT' allows us to understand the position of the rock as the *initial* one, further implying a succession and a *lineage.* Thus, even without knowing the actual meaning of the phrase "parent rock", through metaphorical mapping one can, at least partially, deduce it.

Another example of this mapping could be applied to the geological formation of *minerals.* The definition of a mineral given in *Visualizing Earth Science* (2009) is – a naturally formed, solid, inorganic substance with a characteristic crystal structure and a specific chemical composition. Nowhere does it mention any trait pertaining to human beings. However, when describing "a group of minerals that are similar to one another in terms of chemistry or atomic structure or (more commonly) both" the term 'MINERAL FAMILIES' is used. The Cuadrado and Durán (2013, 60) mapping 'MINERALS ARE HUMAN BEINGS' is evident here. And here, like in the previous example with 'PARENT ROCK' we have the attribution of human characteristics to minerals which allows for them to make *familiar* connections and be "related" in certain ways (in this case, through their chemical or atomic structure).

Moreover, leaning on the same mapping '*X* IS A HUMAN BEING', it is interesting to mention the concept of "age[2]". The metaphor 'PARENT ROCK' already implies *seniority* or *older* age compared to its "child" – the rock which resulted from a sedimentary/ metamorphic/igneous process on the parent rock. One of the ways in which, in stratigraphy, which is concerned with the study of stratigraphic correlation of stratified rocks in terms of time and space, the *age* of a *rock* is determined is through radiometric dating by measuring the number of certain isotopes in a rock. An isotope is also defined as the 'DAUGHTER ELEMENT' of a 'PARENT ELEMENT' which had undergone radioactive decay i.e. the process by which a radioactive 'parent' element loses elementary particles from its nucleus and in doing so becomes a stable 'daughter' element (*Dictionary of Earth Sciences* (2008)). The metaphors used here clearly imply the connection (a *familiar* connection) between the two elements, allowing for the terms to be understood as concepts before the actual definition is given.

3. The Inverse Metaphor

We have already established that when talking about conceptual metaphors, we have to take into consideration the mapping which is at the root of their metaphorical nature, that is to say, the relation established between the source and the target domain. However, there are instances where there can be a form of "role reversal" within the same mapping, i.e., when the source and target domain exhibit reversed orientation (Deane 1993: 111). In such situations we are faced with metaphoric inversion and such metaphors are referred to as "inverse metaphors" (Deane 1993: 112). This section deals with this type of metaphoric inversion with geology-based metaphors.

In the example of 'PARENT/DAUGHTER ELEMENT' the source and target domains are clear, and the well-known concepts of "parent" and "daughter" make it possible to understand

[2] Cuadrado and Durán also touched on "age" as a trait to confirm their 'ROCKS ARE HUMAN BEINGS' mapping in their 2013 paper.

the target domains in terms of older/younger, which can be particularly useful when initially met with these terms. However, there are instances within this particular mapping where the roles of source and target domain are reversed, as mentioned above, meaning that we can understand the first through the latter. Taking the initial mapping into consideration and the subsequent attribution of the category of *age*, let us consider the term *fossil.* According to the Macmillan English Dictionary (2002) a fossil has a twofold definition: a) an animal or plant, or part of one, that lived many thousands of years ago and is preserved in rock or as a piece of rock, and b) *informal* an insulting word for someone who is old and has old-fashioned ideas. Based on this definition, if we were to say to someone – You are such a *fossil*. – though the mapping here would remain unchanged and still be 'ROCKS ARE HUMAN BEINGS' since it is based on that metaphoricity which the term "fossil" takes its reference to age from, it is still a case where a geological term is used in the function of a source domain but from the position of a target domain within a single mapping. This means that one can understand the sentence "You are such a fossil." and its derogatory implication because they understand and accept the initial metaphoric mapping. This is, thus, an excellent example where a metaphor provides an understanding of a geological term *a priori*.

This type of "role reversal" in the source – target domain relation can prove quite beneficial when exploring other geology-based metaphors and their importance for geology-specific L2 vocabulary learning. In the previous example, it would have been easy for the students to connect the concept of a "fossil" and its connection to (very) old age before even hearing of the palaeontological definition. Therefore, the definition itself could be better understood since it is connected to previous experience and knowledge. This supports (to an extent) Mayer's theory of *instructive metaphor* where he states that metaphors can be used as aids to improve "learner understanding of scientific information" (Mayer 1993, 566) and goes on to explain that in order for students to understand quantitative, scientific descriptions "they must first construct qualitative models of the underlying explanatory mechanisms". (Mayer 1993, 568)

Furthermore, a similar example to the previous one can be found with the term "cleavage". This term was first introduced as a geological term[3] and the *Dictionary of Earth Sciences* (2008) describes it as referring to the ability of minerals to split along planes of weakness inherent in the structure of their atomic lattices. However, in most dictionaries today, the primary definition as "the space between a woman's breasts", as given in the *Macmillan Dictionary* (2002), will be found. This demonstrates a highly interesting occurrence when the language of geology makes its way into everyday English. Thus, based on the metaphorical analogous relationship between the "split" in a mineral and the "split" between a woman's breasts, the term applied to the former has been transferred to the latter and has become a part of everyday English in so much that many would understand the original, geological term through the one extracted from it, even though the later definition succeeded the original, geological one.

Numerous examples of the target domain understanding preceding the actual source domain explanation can be found. If we look at the metaphorical mapping of 'EMOTIONS ARE EARTHQUAKES' many metaphors arise from this. For instance, the sentence "That news was *earth-shattering* for me." implies that the news was so important and/or traumatic that the person felt as if the earth was shattered. Another example could be if we took the word "earthquake" itself which is often associated with chaos and disruption in people's relationships and feelings. The definition of an *earthquake* as stated in *Visualizing Earth Science* (2009) is that it is a sudden motion in Earth caused by the abrupt release of slowly accumulated energy. Based on this definition, the metaphorical association with emotions is evident.

[3] Source: https://www.etymonline.com/search?q=cleavage . Date of access: April 17, 2023.

Moreover, earthquakes usually precede or follow a volcanic eruption, thus an emotional "earthquake" may be caused by someone's "eruption", most often of anger, for example – He suddenly *erupted* in rage, making the earth shake under our feet. These examples indicate a pre-existing notion of what an "earthquake", "eruption" or "volcano" might be, with all the pre-conceived notions which may facilitate the actual understanding of the geological terms once they have come into contact with them outside the metaphorical setting.

Another example of metaphor among geological terms is the term 'bedding' which, in general, English refers to the sheets and covers that are used on a bed, or things that an animal uses to make its bed, as defined in the Macmillan English Dictionary (2002). Both of these definitions directly refer to the making of a bed, the place where one needs to be in a horizontal position. In geology, however, as described in *Visualizing Earth Science* (2009) "bedding" refers to the layered (sheet-like) arrangement of strata in a body of sediment or sedimentary rock. The key term 'BEDDING' here is used to imply a metaphorical resemblance between the different layers of sedimentary strata and the bed sheets one puts on a bed.

The same could be said for the metaphor 'A ROUGH DIAMOND' containing the geological term 'DIAMOND', or any simile[4] which uses the term to define something strong and durable, for example, 'STRONG LIKE A DIAMOND' or 'HARD LIKE A DIAMOND'. Based on the definition from the *Dictionary of Earth Sciences,* a diamond is the crystalline form of carbon that is the hardest naturally occurring material. On our course at FMG, diamonds are mentioned very early on in the course as examples of level 10 of Moh's scale. The Moh's scale is a scale for the qualitative measurement of the physical property of "hardness" in mineralogy. It is used as an aid in the identification of minerals based on their hardness which is a measure of a mineral's relative resistance to abrasion and scratching and it is used for describing the hardness of minerals, as opposed to the softest mineral which would be level 1. The students immediately grasp the method of hardness determination in Moh's scale and the connection between the label "hardest" and the term "diamond" since they are already familiar with this concept through popular metaphors and similes. Hence, by first providing them with the target domain term (diamond, in this case) we are explaining the source (hard) leaning on their previous, metaphor-based knowledge.

Going back to the metaphor 'A ROUGH DIAMOND' (the other variant is 'DIAMOND IN THE ROUGH') another example can be observed. Through popular culture and general knowledge, diamonds are used in widespread contexts to describe not only something very hard, strong and virtually unbreakable, but they are also used to describe something deemed invaluable and beautiful. Thus, the aforementioned metaphor is used when talking about something or someone with a lot of potential and talent, yet those traits remain hidden, or in a way unpolished, or something that is in poor condition but is likely to become valuable with appropriate care[5]. The geological definition of the phrase 'ROUGH DIAMOND' (or *diamond rough*) is a diamond found in its original, uncut state, not having been processed yet. The metaphorical and literal meaning of the phrase all but mirror each other, thus the more widely spread metaphor enables the understanding of the actual geological phrase which is its source.

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[4] The definition of a *simile* from the *Macmillan English Dictionary* describes it as a phrase that describes something by comparing it to something else using the word "like" or "as". They are often considered together with metaphors since similes can also make figurative comparisons, alongside literal ones. Relying on Gentner and Bowdle's (2008) research, Gibbs (2008, 7) points out that both metaphor and similes are understood based on similarity and analogy – yet the two terms are not identical.

[5] Definition taken from https://www.britannica.com/dictionary/diamond-in-the-rough . Date of access: December 19, 2022.

These examples may be used to illustrate the potency of metaphor to settle within a scientific environment even though it contradicts the very essence of scientific language – it being literal and fact-based – and thus prove a powerful tool of scientific discourse notwithstanding the lack of factual evidence or the fact that the metaphors themselves spring from an *actual* scientific, in this case geological, vocabulary and lexicon. As Rickards (2015, 3) points out: "The idea that science sits in contradistinction to metaphor stems in part from the tricky fact that as metaphors become more popular and 'successful', they tend to disappear from view, settling into our sedimented patterns of thought as apparently literal, not metaphorical relations." We would argue that the metaphor's "disappearance from view" mentioned by Rickards can also be seen in the cases where there has been a reversal of metaphoric mapping in relation to the understanding of the actual metaphor whereby the source domain becomes the sought-after term which is to be understood by the target. In such instances, the "disappearance" may actually be traced back to the swapped positions of the domains causing the understanding of the non-metaphoric term through the lens of the metaphor itself.

4. Conclusion and Pedagogical Implications

The use of the geology-based metaphor in the second language classroom at the FMG has demonstrated many advantages in terms of enhanced vocabulary learning and retention, alongside its practical applicability in the case of incidental learning. Having already developed a certain familiarity with (initially) unknown geological terms and language constructs through the use of geology-based metaphors in real life situations and scenarios, students have a better opportunity to discern the meaning of a seemingly new geological lexeme through the lens of the metaphor containing the lexeme in question as its source or target domain. Thus, it is our opinion that language teachers should be encouraged to foster the use of the already existent and known metaphors in order to elicit the meaning of a certain term, in this concrete case a geological one, from their students. The use of metaphor in L2 teaching and learning stands as an important, yet often overlooked tool and aid.

We propose the use of teaching the geology-based metaphor pointed towards a facilitated teaching and learning of specific scientific terms in a language classroom. This entails speaking activities which emphasise students' use of the geology-based metaphor and its recognition in geology-related texts. This can be conceptualized as a combination of reading and speaking activities, in which students are to read a text with geology-based metaphors, followed by a speaking activity based on the students' explanation of the given metaphors. Prior knowledge of the metaphors is not essential, since the speaking activity itself is more focused on the students' initial understanding of the metaphor within a given context and the ensuing associations they make, rather than on their knowledge of the given vocabulary. The teacher should encourage and elicit any free associations that may arise and lead the students so that they come to the meaning of the metaphors by themselves, based on their knowledge of the general language and not specific geological terms. This would be a potent yet indirect demonstration of the importance of the geology-based metaphor in geology-related texts and how it transcends the field of geology by finding its place in "common" English.

This is only one of many ways in which the metaphor could be used in an L2 classroom, but we propose that most activities be speaking based, since the discussions on the meaning and "origin" of certain metaphorical expressions could be very engaging for students and thus prove highly useful for the memorization of the vocabulary. Furthermore, though there are many

aspects of using conceptual metaphor in language learning, the first one is most evidently vocabulary expansion. Geology-based metaphors, as a type of conceptual metaphor, share the same traits and hence allow for the possibility of seeing one thing through another and making analogous connections. Secondly, certain geology-based metaphors can carry a kind of stigmatisation for the students, like the previously mentioned term "cleavage". Even though it is a proper geological term, students will be more familiar with it through its common English use. Thus, learning about the connection between geology-based terms and metaphors and their common-English variants can help remove the social aspect connected to them (which can sometimes even have a highly negative connotation) and teach the students to notice the very strict and unemotional distinctions between the language of science and that of everyday use. Thirdly, in the process of eliciting the meaning of certain geology-based metaphors in a language learning classroom, teachers encourage students to use a variety of synonyms and synonymous expressions to reach the desired conclusions. These activities are very valuable in motivating students to use their own language apparatus and activate even the passive parts of their lexicon.

Since the use and creation of metaphors are in themselves creative acts, the activities and exercises used in the classroom when discussing metaphors should follow suit. There can be no ready-made set of exercises or activities which could cover the wide and varied range of metaphor usage in language. It depends on the creativity of the teacher, but also on the demands of the class, which activities they will deem appropriate for this particular area of study. For example, in our practice at the FMG, upon reading selected texts on geology, all of which contained the metaphors and metaphoric expressions discussed in this paper, our students were motivated, through various speaking activities, to express their own views on the meaning of the metaphors in question, before being given the correct definitions. As discussed above, we encouraged debate, opinion exchange and brainstorming in order to elicit the meaning of the metaphors in question. More often than not, the students were right at guessing the correct meaning and would remember it for subsequent classes.

All of the aforementioned heavily relies on the students' almost "innate" understanding of metaphor and its underlying mapping, even though the vast majority of students is completely unaware of the very construct of metaphorical mapping. Especially important for teaching geological terms, as our practice at the FMG has proven, is the noticing and application of such metaphors which have bridged the gap between the scientific language and the vernacular and thus entered everyday-language use enabling, in turn, the understanding of their underlying geological, scientific source domains through the use of the "inverted mapping" model. It is important to note that this model allows for the understanding of how it is possible for students who start off as laypeople in terms of geological literacy to understand seemingly unfamiliar geological terms and concepts simply by connecting them to the widespread use of the geology-based metaphor in everyday discourse.

Overall, the second language classroom, especially a CLIL-based one, which is the case at the FMG, depends and insists on the dominant use of L2 in teaching and explaining new vocabulary items, all the while demanding the active participation of the students. Such an approach may prove that the use of the geology-based metaphor not only influences but also enables better vocabulary acquisition and retention, since the environment in the classroom encourages the students to use their own knowledge of the language in order to comprehend and subsequently explain the new geological terms through the use of the geology-based metaphor. Furthermore, the geology-based metaphor proves to have a set place in the English language and its enhanced use in teaching the language of geology may prove highly valuable and beneficial.

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METAFORA ZASNOVANA NA GEOLOGIJI I NJEN OBRNUTI OBLIK

Rad se bavi metaforom zasnovanoj na geologiji u svakodnevnom i stručnom engleskom uz obradu koncepta „obrnute metafore" koji se pokazao vrlo značajnim prilikom učenja stručnog vokabulara i početnog razumevanja. Metafora zasnovana na geologiji pokazuje veliki potencijal kada je u pitanju njena praktična primena u nastavi vokabulara L2, posebno prilikom objašnjavanja novih uskostručnih pojmova. Rad je podeljen na nekoliko sekcija, od kojih je prva opšti uvod u oblasti metafore i njenog odnosa sa jezikom nauke, kao i njena upotreba u predavanju vokabulara L2. Drugi deo se bavi tipologijom metafore zasnovane na geologiji i specifičnostima same metafore, dok se treći deo fokusira na fenomen koji smo primetile kroz nastavu na Rudarsko-geološkom fakultetu, a koji se u literaturi definiše kao „obrnuta metafora". Poslednja sekcija objašnjava naše viđenje značaja upotrebe metafora zasnovanih na geologiji, a poznatih iz svakodnevnog engleskog, u jezičkoj učionici, nakon čega pružamo završne zaključke i komentare. Nadamo se da će ovaj rad pružiti uvid u punu mogućnost primenljivosti metafora zasnovanih na geologiji u praksi.

Ključne reči: *metafora, obrnuta metafora, geologija, L2 vokabular*