

KARST IN PERSPECTIVE IN THE NARUTO ANIME: LANDSCAPE REPRESENTATIONS AND PEDAGOGICAL POTENTIAL

O carste em perspectiva no anime Naruto: representações paisagísticas e potencialidades didáticas

El karst en perspectiva en el anime Naruto: representaciones del paisaje y potencialidades didáticas



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ABSTRACT

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Karst has been studied by the modern scientific community for just over a century. Owing to its scenic and geoenvironmental significance, it has attracted growing interest in the conservation of the biotic and abiotic components that underpin its landscapes and support substantial biodiversity. Karst features are represented in diverse forms across literature, comics, banknotes, stamps and cinema. Nevertheless, public understanding of karst and its landforms remains limited. Against this background, this study examines whether karst landscapes are a significant component of the anime Naruto Shippuden and whether the depicted landforms have educational value in lower and upper secondary education. The karst-related features depicted in approximately 300 episodes available on Netflix were analysed and compared with analogous landforms and descriptions in the international karst literature. The results show that endokarst and exokarst features appear in specific scenes and have considerable potential as teaching resources and tools for science communication. The study contributes to the dissemination of knowledge about karst and highlights the anime's pedagogical potential, particularly for teaching physical geography, while opening avenues for further research.

Keywords: caves; karst; geography education; Naruto Shippuden.

RESUMO

O carste é tema de debate e investigação da comunidade científica moderna há pouco mais de um século. Por sua importância paisagística e geoambiental, recebe atenção de quem busca conservar seus aspectos bióticos e abióticos, responsáveis pela beleza cênica e pela manutenção de uma parcela significativa dos seres vivos. Na literatura, em histórias em quadrinhos, em cédulas monetárias e selos, e no mundo cinematográfico, elementos desse sistema são retratados de forma diversificada. Ainda assim, há muitas pessoas que não conhecem o carste nem suas feições. Nesse contexto, o trabalho visa demonstrar se a paisagem cárstica é um elemento importante no anime *Naruto Shippuden* e se as morfologias expostas têm utilidade no ensino fundamental II e no ensino médio. Após análise de cerca de 300 episódios na plataforma de streaming Netflix e comparação com imagens e descrições semelhantes, conforme a literatura cárstica internacional, constatou-se que fenômenos endocársticos e exocársticos fazem parte de cenas específicas, as quais também confirmam o bom nível do material educacional e como fonte de comunicação. O trabalho contribuirá para a disseminação do carste e para o reforço do potencial didático do desenho analisado, especialmente em temas relacionados à Geografia Física, suscitando pesquisas futuras.

Palavras-chave: Cavernas; Carste; Ensino de Geografia; *Naruto Shippuden*.

RESUMEN

El karst ha sido objeto de debate e investigación por parte de la comunidad científica moderna desde hace poco más de un siglo. Debido a su importancia paisajística y geoambiental, recibe atención de quienes buscan conservar sus componentes bióticos y abióticos, responsables de su belleza escénica y del mantenimiento de una porción significativa de la vida. En la literatura, los cómics, los billetes, los sellos y el mundo cinematográfico, los elementos de este sistema se representan de diversas formas. Aun así, hay muchas personas que no conocen el karst ni sus características, aunque aparezca o se exhiba en diferentes medios de difusión. Por ello, este trabajo tiene como objetivo demostrar si el paisaje kárstico es un elemento importante en el anime *Naruto Shippuden* y si las morfologías expuestas resultan útiles en la educación primaria y secundaria. Después de analizar alrededor de 300 episodios en la plataforma de streaming Netflix y compararlos con imágenes y descripciones similares, según la literatura kárstica internacional, se encontró que los fenómenos endokársticos y exokársticos forman parte de escenas específicas, lo que también confirma su buen nivel como material educativo y como fuente de comunicación. El trabajo contribuirá a la difusión del karst, y a reforzar el potencial didáctico del dibujo analizado, especialmente en temas relacionados con la Geografía Física, dando lugar a futuras investigaciones.

Palabras clave: Cuevas; Karst; Enseñanza de Geografía; *Naruto Shippuden*.

1. INTRODUCTION

The Brazilian Portuguese term *carste* derives from the forms *kras*, *carso* and *karst*, originally associated with the Kras Plateau between Slovenia and Italy. From the nineteenth century onwards, the term became established in the geomorphological literature to designate landscapes developed predominantly in soluble rocks and characterised by features such as dolines, swallow holes, karren, caves and poljes (Gams, 1993; Kranjc, 2011; Travassos, 2019; Mattes, 2024).



Since Cvijić's pioneering work, karst has been defined by a set of diagnostic landforms, including dolines, uvalas, swallow holes, resurgences, karren, caves and poljes. Its contemporary interpretation, however, extends beyond morphology to encompass hydrogeological, biological, climatological, palaeontological and speleological dimensions, with particular emphasis on water circulation between the exokarst, epikarst and endokarst (Cvijić, 1895, 2017; Ford; Williams, 2007; Goldscheider, 2012; Travassos, 2019; Maia *et al.*, 2024).

Advances in technology have enabled the scientific community to investigate karst extensively and to recognise its environmental fragility. At the same time, the public has shown growing appreciation for these environments, drawn by their distinctive landforms and clear waters, although knowledge of the complexity of karst systems remains limited (Ford; Williams, 2007). In response to this gap, geographers, karstologists, geomorphologists and speleologists have sought to communicate both the potential and the risks associated with karst, as well as its vulnerability to human activities (Simón *et al.*, 2009; Pueyo Anchuela *et al.*, 2012; Sauro, 2012; Goldscheider *et al.*, 2020).

Because public understanding of karst remains limited, even in regions where karst terrain predominates, strategies have been developed to make scientific knowledge more accessible. These initiatives range from university outreach activities in local communities to the creation of replicas and analogue models of caves, dolines, karren and speleothems for use at conferences, symposia and school workshops (Mandu; Morais, 2013; Lima; Morais, 2020).

Karst landscapes also appear in cultural, artistic and media products, including stamps, banknotes, telephone cards, literature, cinema and other forms of entertainment, particularly when associated with the imagery of caves and the underground world (Labegalini, 2007; Travassos, 2007; Pôssas; Travassos, 2011; Tolkien, 2019; Silva; Travassos; Gonçalves, 2023).

Given the relevance of these different forms of communication with the public, an analysis of the Naruto anime is pertinent because it enables reflection on the presence and representation of karst landscapes and their features, which are the focus of this study. Although the anime has already been examined in geographically oriented research (Coelho, 2014), it still offers opportunities for analysis in karst geomorphology.

Considering the foregoing, this study examines whether and how karst is represented in Naruto Shippuden, the second part of the Naruto series. It also seeks to determine whether the visual settings depicted in the episodes can serve as a pedagogical tool for

disseminating knowledge about karst landscapes among lower and upper secondary students. Two questions therefore guide the research: (1) what is the relationship between the landscapes represented in Naruto Shippuden and karst geomorphology? and (2) how can analysis of these settings contribute to the dissemination of knowledge about karst among students in lower and upper secondary education?

Based on these questions, the study hypothesises that karst is a significant geomorphological component of Naruto Shippuden, particularly from a classical geomorphological perspective, and is represented by typical karst landforms that form a variety of scenic settings. In this sense, the anime may be understood as a medium capable of disseminating knowledge about karst landscapes.

2. MATERIALS AND METHODS

The study began with a literature review to determine whether the Naruto anime had already been investigated in Geography, Environmental Sciences or related fields, to avoid duplicating previous research on the topic. Search terms were defined and applied to academic journal platforms and scientific databases. These were: “Naruto”; “Naruto Shippuden”; “Naruto e Geografia” [Naruto and Geography]; “Carste em Naruto” [Karst in Naruto]; “Naruto and Karst”; “Geomorphology in Naruto Shippuden”; and “Naruto and Geography”. The search covered articles, dissertations and theses across six platforms: (1) the Brazilian Digital Library of Theses and Dissertations (BDTD), (2) SciELO, (3) Google Scholar, (4) the CAPES Periodicals Portal, accessed via the CAFE system, (5) Web of Science and (6) ResearchGate.

After the initial survey and subsequent refinement of the results, 29 works containing the term Naruto were identified, including theses, dissertations, undergraduate dissertations and scientific articles. Although some address artistic, cultural, educational, narrative, geographical or climatological themes, none deals specifically with karst, karst geomorphology or the associated underground and surface features.

Among studies related to geography, Coelho (2014) stands out for using the Naruto manga to discuss concepts such as geographical space, place, landscape and territory. Maquiné (2024), Silva (2019) and Stagnaro (2019) also examine the work from different perspectives, but none directly addresses karst landscapes or karst geomorphology.

In his analysis of heroism in the Naruto narrative, Silva (2019) uses the word “caverna” [cave] nine times, but only in reference to a Platonic conception rather than to karst.



Similarly, although unrelated to karst, Stagnaro (2019) uses the Spanish word “cueva” [cave] nineteen times, chiefly when discussing Naruto’s dialogues with Nagato.

Having established that the anime—adapted as an audiovisual medium from the manga created by Masashi Kishimoto—has potential for use in geography education but still lacks studies specifically addressing karst, the research proceeded to its next stage. This stage involved analysing episodes of Naruto Shippuden, the second part of the series. Its plot centres on Naruto Uzumaki, the protagonist and eponymous character, who attempts to persuade his best friend, Sasuke Uchiha, to return to the Hidden Leaf Village. The series proved suitable for the research aims because it depicts a wide variety of geomorphological landscapes.

Using the Netflix streaming platform, 300 episodes of Naruto Shippuden were screened between June and December 2025. These totalled approximately 6,900 minutes, or about 115 hours, based on an average episode duration of 23 minutes. In each episode, the settings were examined for possible karst-related elements, particularly features and landforms characteristic of karst landscapes.

Following the preliminary identification of features, the episode number was recorded for subsequent detailed analysis. The selected episodes were then reviewed to enable a more precise classification of the observed landforms. The following information was recorded for each occurrence: type of karst feature (endokarst or exokarst); season; episode number; episode title; and time stamp of the scene.

The identified features were subsequently compared with information from the international karst literature, particularly books and scientific articles devoted to the subject. This procedure was intended to determine whether karst landforms constitute a relevant element of the anime’s visual settings.

From a pedagogical perspective, the features identified in the anime were related to the geomorphological, geographical and geoenvironmental themes and skills outlined in the Brazilian National Common Core Curriculum (BNCC) (Brasil, 2018). The analysis covered Years 8 and 9 of lower secondary education, selected in view of the series’ 12+ age classification, as well as all three years of upper secondary education within the Brazilian basic education system.

In addition, a table was prepared to demonstrate how the karst landforms portrayed in the anime, alongside analogous real-world landforms, can be used at the educational levels analysed. The corresponding alphanumeric BNCC skill codes were identified and discussed,



thereby highlighting opportunities for the pedagogical application of the geomorphological and geoenvironmental content under investigation.

3. RESULTS AND DISCUSSION

The analysis revealed a notable presence of endokarst and exokarst landforms, which have the potential to support both the understanding of karst and the teaching and learning process. Of the 300 episodes examined, karst features appear in 23. Within the sample, these landscape representations first appear in Season 5, Episode 94, and last appear in Season 13, Episode 295 (Table 01).

Caves and cave-related landforms appear in 11 episodes, while exokarst features form part of the scenic environment in 12 episodes. In general, there is no consistent pattern in either the repetition or duration of the scenes. Some feature types nevertheless remain on screen for longer periods or recur in three or four episodes. Others appear abruptly and do not become prominent elements; instead, they are repeatedly used to transition to events or actions of greater narrative significance.

Table 01 – Episodes and scenes featuring karst landforms in Naruto Shippuden.

Karst features	Season	Episode no.	Episode title	Timestamp
Endokarst	5	94	A Night of Rain	1'13"
	6	116	Guardian of the Iron Wall	2'01"
	6	118	Formation	3'34"
	6	125	Disappearance	9'16" / 9'19"
	6	139	The Mystery of Tobi	16'37"
	8	172	The Meeting	3'00"
	8	173	The Origin of Pain	12'32"
	8	174	The Tale of Naruto Uzumaki	1'01"
	9	195	Team 10's Teamwork	5'33" / 14'07"
	11	226	Battleship Island	10'20" / 11'37"
	12	256	Assemble! Allied Shinobi Forces!	10'50"
Exokarst	8	156	Surpassing the Master	2'24"
	10	204	The Power of the Five Kage	0'09" / 0'32"
	10	217	The Infiltrator	6'08"
	11	222	The Five Kage's Decision	13'11"
	12	254	The Top-Secret S-Rank Mission	17'10"
	12	256	Assemble! Allied Shinobi Forces!	10'52"
	12	261	For My Friend	0'12"
	13	290	Power – Episode 1	12'34"
	13	291	Power – Episode 2	1'40"
	13	293	Power – Episode 4	20'42"
	13	294	Power – Episode 5	3'09"
	13	295	Power – Final Episode	8'21"

Source: Prepared by the authors based on the episodes available on the Netflix platform.

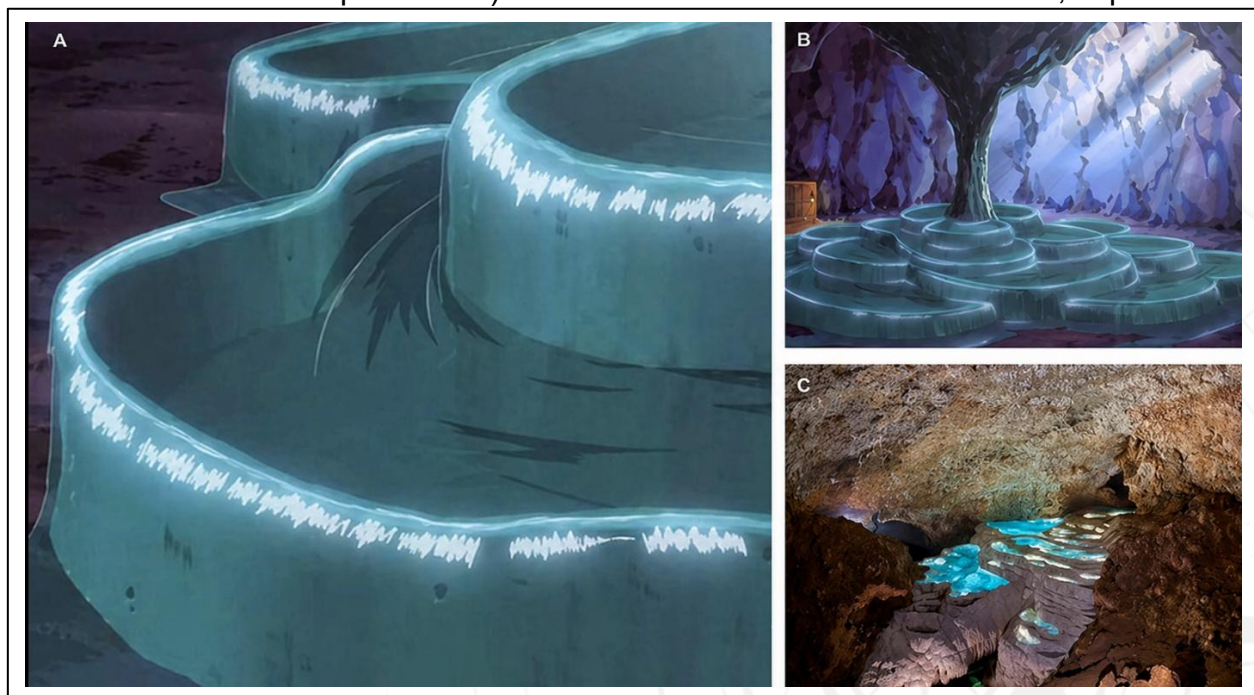
In Episode 94, typical speleothems found in carbonate caves can be observed, including travertine dams and columns (Figures 01A and 01B). The cave serves as a shelter for Yūkimaru during a conversation with Kabuto and Guren, all of whom are subordinates of the Legendary Sannin Orochimaru. Features analogous to travertine dams can be found in Ginsui-do Cave, Japan (Figure 01C).

The joining of stalactites and stalagmites forms columns, whereas travertine dams are carbonate barriers produced by the deposition of calcium carbonate from flowing water, commonly forming stepped arrangements (Gilli, 2015; Travassos; Timo; Rodrigues, 2025).

In Episode 116, Sasuke Uchiha and Suigetsu Hōzuki are shown entering the “Southern Hideout” through a large cave entrance. This offshore prison houses Karin, a member of the Uzumaki clan and one of the characters selected by Sasuke to join his team, Taka, whose objective was to find and confront his brother, Itachi Uchiha (Figure 02A). Linear stalactites, apparently developed along fractures in the rock, can also be seen at this location.

Episodes 118, 125, 174 and 195 also depict distinct cave entrances from different viewing angles: both from the external perspective of an observer looking at the cavity from the surface (Figure 2B) and from the internal perspective of someone within the underground space (Figure 2C). Except for the cave where Naruto interacts with Nagato, the others contain speleothems, particularly stalactites, stalagmites, and columns.

Figure 01 – Endokarst features. A) Detail of the rimstone dams depicted at the base of the column shown in panel B. C) Real rimstone dams in Ginsui-do Cave, Japan.



Source: A–B) Episode 94 of Naruto Shippuden. C) Wakita *et al.* (2025).

Columns are formed by the joining of stalactites and stalagmites, whereas travertine dams are carbonate barriers produced by the deposition of calcium carbonate from flowing water, commonly forming stepped arrangements (Gilli, 2015; Travassos; Timo; Rodrigues, 2025).

Cave entrances are geomorphologically, visually and symbolically significant features that function as transition zones between the surface and the subsurface. In Brazil, the entrance to Terra Ronca I Cave, associated with the Rio da Lapa sinking stream, is an example of a monumental entrance to an underground system (Perret, 1996).

Another set of endokarst features represented in *Naruto Shippuden* comprises underground lakes and rivers, which appear in Episodes 195 and 226 (Figure 03). Stalactites, stalagmites and columns are again depicted, some of them particularly massive (Figure 03A). In addition to the lake, the scenes show speleothems resembling cave volcanoes (Figure 03B). In speleology, this term denotes conical speleothems generally associated with pools or rimstone dams containing carbonate-rich water on cave floors, with a concave or crater-like summit that visually resembles a small volcano. Figure 03 also shows a passage that appears to lead to other underground chambers (Figure 03C).

Figure 02 – Cave entrances. A) Sasuke and Suigetsu entering the “Southern Hideout”. B) Jūgo, a member of Team Taka, entering a cave in Episode 118. C) Kakashi’s and Asuma’s teams seen from inside a cave used as the Baji gang’s hideout.

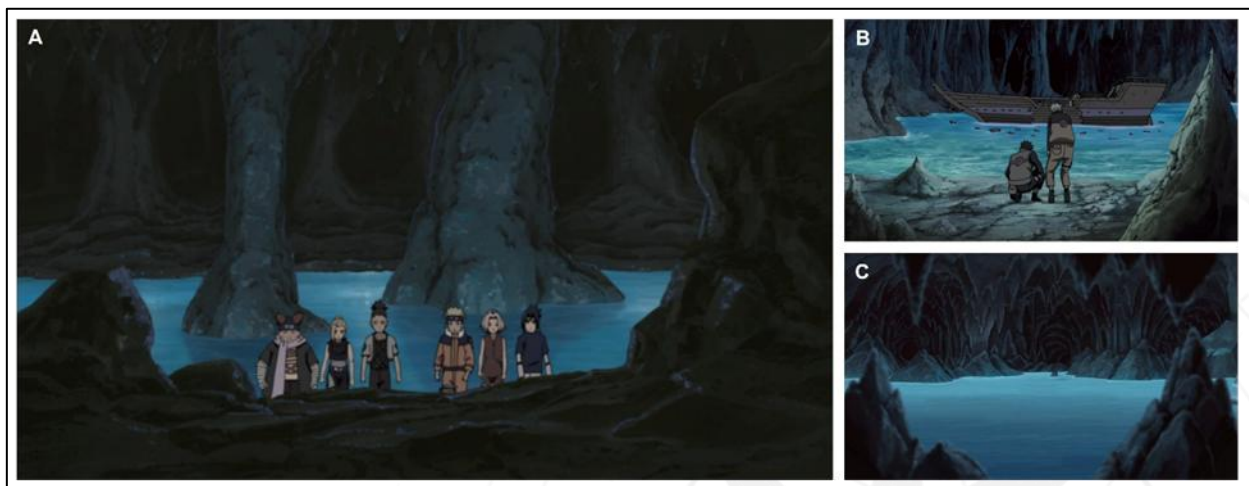


Source: Episodes 116, 118 and 195 of *Naruto Shippuden*.

The sequence of images presented in Figure 03 relates directly to karst hydrology, which examines the connections among the exokarst, epikarst and endokarst and the resulting hydrogeomorphological characteristics of individual cave systems (Williams, 2008; Goldscheider, 2012; Bakalowicz, 2013; Jones, 2013; Maia *et al.*, 2024). The presence of underground lakes and rivers in the anime provides an opportunity to discuss karst hydrology, particularly the connections between the exokarst, epikarst and endokarst. In the real world, systems such as Gruta do Lago Azul in Brazil, Pazin Cave in Croatia and Xe Bang Fai Cave in Laos demonstrate the hydrogeomorphological diversity of these environments (Boggiani *et al.*, 2009; Travassos; Silva; Borges, 2018; Bolger, 2019; Jiang *et al.*, 2020).

In addition to recurrent dissolutional and depositional features, Naruto Shippuden also contains evidence of turbulent water flow. Flow markings known as *scallops* (Figure 04) appear in a cave in Episode 125, when Itachi Uchiha and Kisame Hoshigaki, both members of the Akatsuki, seek shelter during a storm. These features resemble forms produced by water circulating through underground conduits and may indicate past or present water flow through the cave.

Figure 03 – Caves with underground lakes. A) From left to right, Chōji, Ino, Shikamaru, Naruto, Sakura and Sasuke during a mission at the Baji gang’s hideout. B) Captain Yamato, crouching, and Naruto, standing, during a mission on Battleship Island. C) Underground lake and speleothems, with possible passages in the background leading to other chambers in the Battleship Island cave.



Source: Episodes 195 and 226 of Naruto Shippuden.

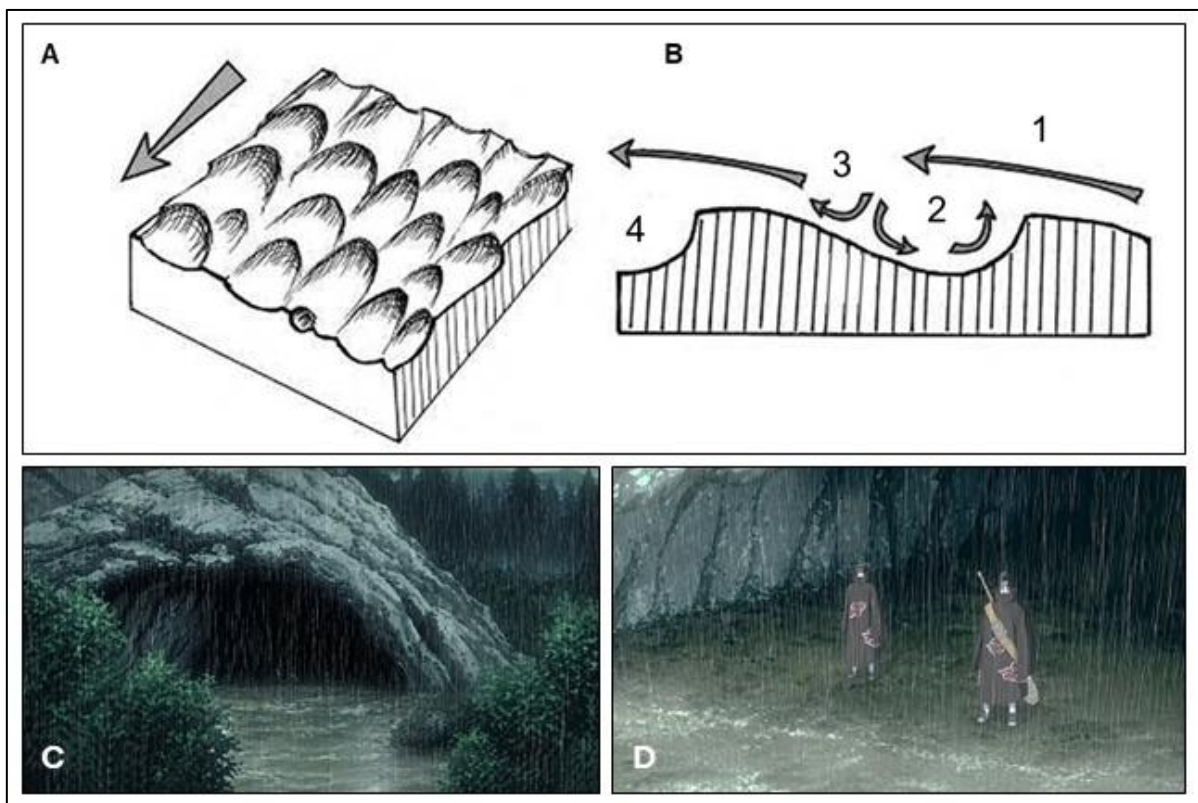
Regarding surface karst, the visual settings contain both positive and negative landforms. In Episode 156 of Season 8, pinnacles can be seen while Naruto trains in “Sage

Mode” on Mount Myōboku, home of the summoning toads (Figure 05A). These features may be compared with karrenfields or pinnacle karst (Figure 05B).

Episodes 204, 217, 222, 254, and 256 repeatedly show features that strongly resemble tower and cone karst (Figure 06). These geomorphological landscapes occur chiefly around the “Hidden Cloud Village”, which is located in the “Land of Lightning” and is home to the Raikage’s official residence (Figure 06A).

Overall, the graphic representations of these features vary in their distribution across the episodes: in some scenes the peaks are more densely concentrated, whereas in others they are more widely spaced. This pattern bears some resemblance to *fenglin* and *fengcong*, tropical karst landscapes found in Guangxi, China (Figure 06C). *Fenglin* and *fengcong* correspond, respectively, to forms of tower and cone karst, each with its own morphological and genetic configuration (Waltham, 2009; Travassos; Timo; Rodrigues, 2025). The landscapes depicted in Naruto Shippuden can therefore be compared morphologically with these real-world karst settings, although their function in the anime is primarily scenic.

Figure 04 – Representative drawings of *scallops*. A) A scalloped surface with a spoon-shaped pattern. B) Formation sequence: (1) flow direction and water level; (2) formation of an eddy or turbulent vortex; (3) return of the flow to its original direction; and (4) the concavity produced by turbulence and corrosion. C) Cave entrance used as a refuge. D) Features resembling *scallops*.

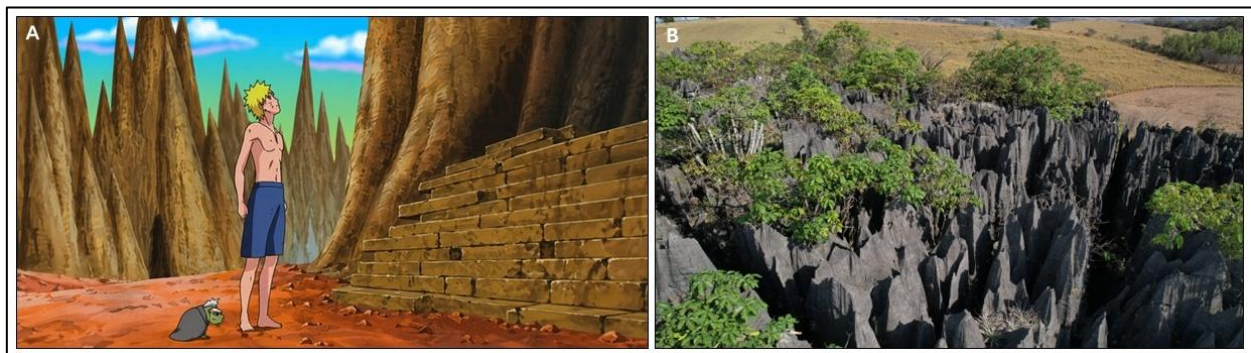


Source: A–B) Lundberg (2019, p. 592). C–D) Episode 125 of Naruto Shippuden.

Whereas *fenglin* consists of more isolated towers rising above plains, *fengcong* comprises groups of clustered hills or peaks separated by karst depressions (Sweeting, 1995; Ford; Williams, 2007; Waltham, 2009; Veress, 2020; Travassos; Timo; Rodrigues, 2025).

Among the negative karst landforms, a closed depression appears successively in Episodes 290, 291, 293, 294 and 295. This feature is known as “The Hole” and is said to be located near the Land of Fire (Figure 07A). In the narrative, “The Hole” is regarded as a sacred place, chiefly because of the medicinal properties of its waters, which are protected by the inhabitants of Tonika Village, built at the centre of the depression (O Buraco, 2025). *Naruto* and his companions undertake a mission to the village to protect its residents from Kabuto, who seeks to expand his biological knowledge by studying the springs’ healing properties.

Figure 05 – Karst pinnacles. A) Naruto and Fukasaku on Mount Myōboku. B) A karrenfield in Pains, Minas Gerais, showing the pointed morphology of the exposed rocks.



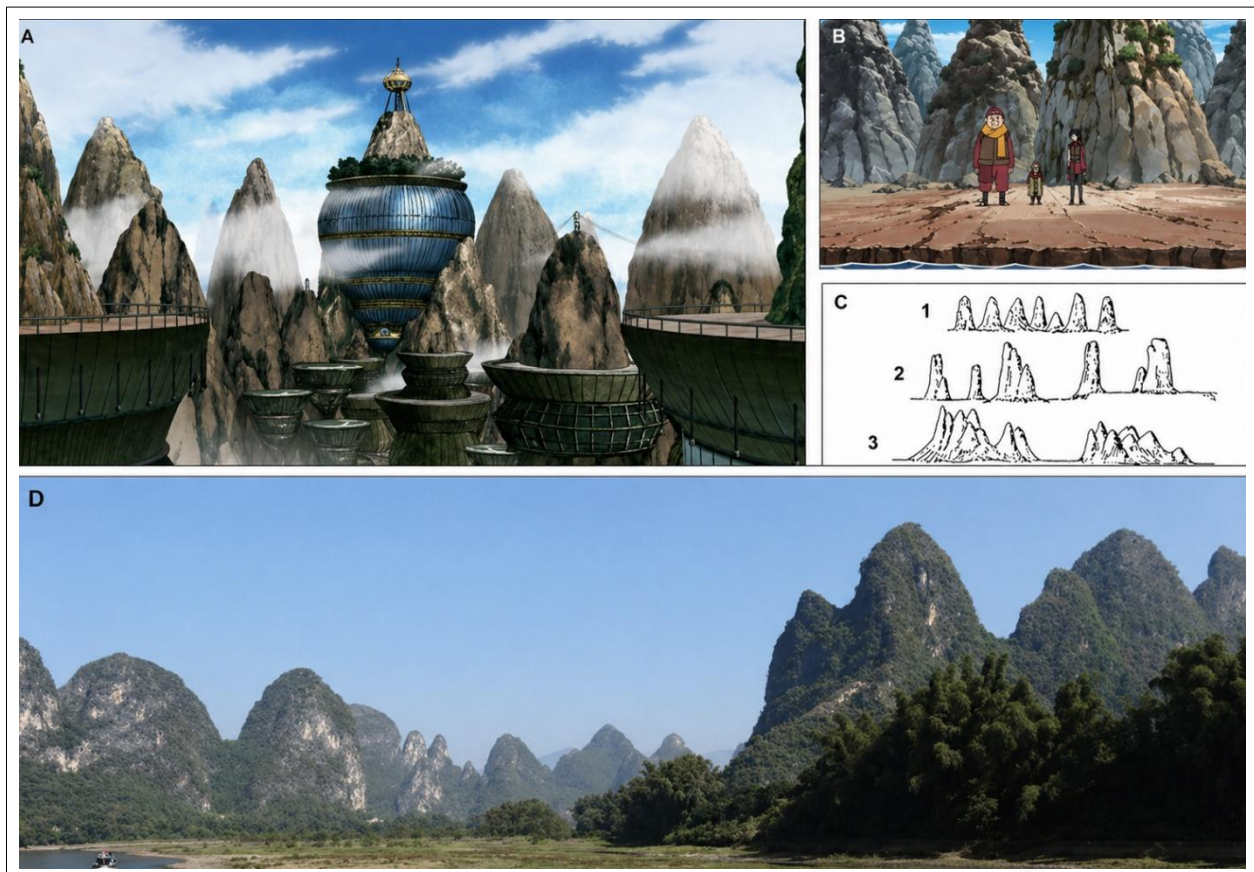
Source: A) Image from Episode 156. B) Photograph by L.E.P. Travassos (2025).

The features shown in Figure 07A resemble dolines, defined as circular or elliptical karst depressions whose horizontal dimensions may range from a few tens to several hundred metres. Since the earliest studies in karst geomorphology, dolines have been regarded as essential features for classifying this type of landscape. They were initially associated chiefly with the surface dissolution of carbonates, the process responsible for forming solution dolines. As research advanced and new genetic models were identified, the concept broadened and gave rise to several classifications (Kohler, 1998; Ford; Williams, 2007).

Dolines may be classified according to morphological and genetic criteria. Morphological types include basin-, funnel- and bucket-shaped forms, whereas genetic types include dissolution, collapse, subsidence, suffosion and processes involving

sedimentary cover (Soriano; Simón, 1993; Waltham, 2008; Sauro, 2012; Kranjc, 2013; Ferreira; Uagoda, 2019; Travassos, 2019).

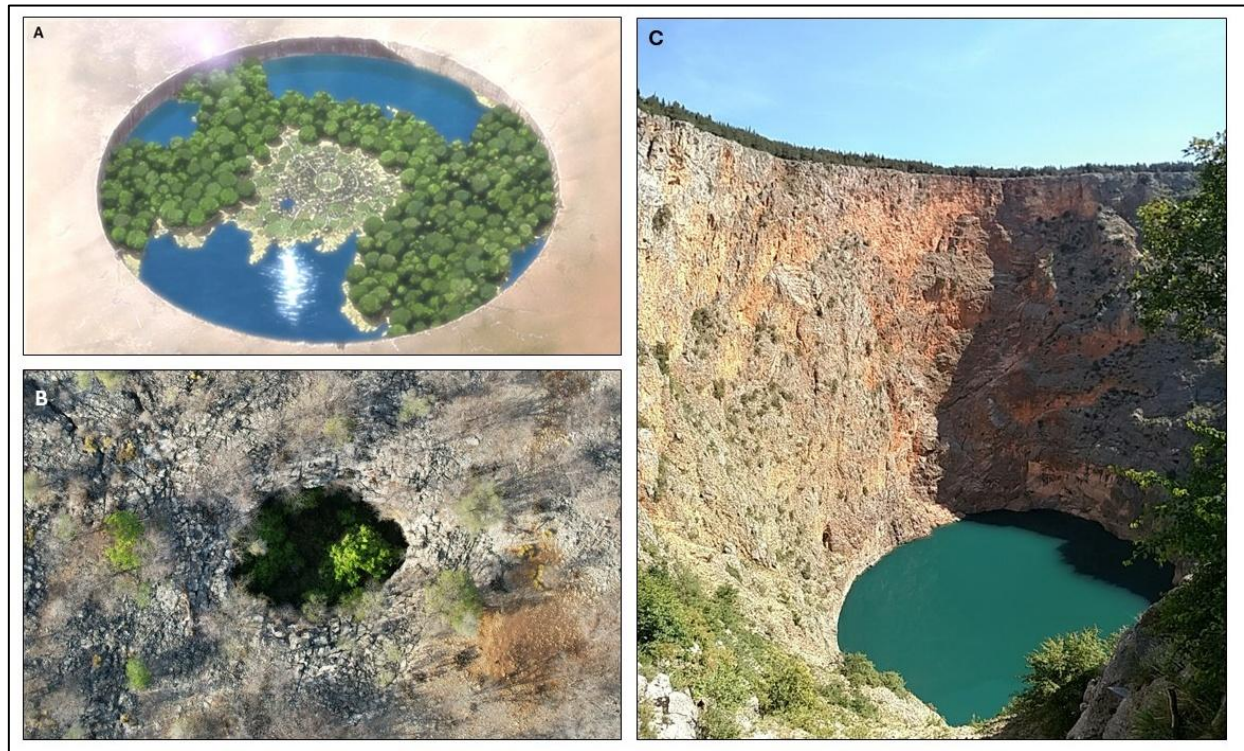
Figure 06 – Karst towers and cones. A) The Raikage’s official residence among rocky peaks. B) From left to right, Akatsuchi, Ōnoki (the Third Tsuchikage) and Kurotsuchi in an area surrounded by rocky outcrops. C) Representations of *fenglin* and *fengcong* resembling the features shown in the anime. D) Panoramic view of a karst landscape similar to those depicted in the anime.



Source: A–B) Images from Episodes 217 and 254, respectively. C) Adapted from Sweeting (1995, p. 44). D) Photograph by L.E.P. Travassos (2014).

From a hydrological perspective, dolines may function as swallow holes or as zones connecting surface and underground karst. When filled with water, they may have environmental and symbolic significance and may also serve as water sources, as occurs in various tropical karst landscapes (Gaona-Vizcayno; Anda; Villasuso-Pino, 1980; Piló, 2000; Ford; Williams, 2007).

Figure 07 – Dolines. A) “The Hole”, containing intensely blue water, vegetation and Tonika Village at its centre. B) Vegetated collapse doline in the state of Rio Grande do Norte, Brazil. C) Collapse doline in Croatia.



Source: A) Image from Episode 290. B–C) L.E.P. Travassos (2016).

The data and reflections presented above indicate that karst plays a relevant role in the construction of the Naruto Shippuden narrative. At times, the plot reflects historical and contemporary human uses of caves, particularly as hiding places and shelters (Travassos, 2010). At other times, landform elements assume a central role in the development of the episodes. It is also evident that karst is used primarily as a visual and narrative device rather than as an explicit scientific theme intended to advance geomorphology or karstology. It is not possible to determine which landscapes directly inspired Masashi Kishimoto. Nevertheless, given the cultural bricolage present in the work and the existence of karst areas in Japan and elsewhere in Asia, indirect visual similarities with real landscapes are plausible, without implying any scientific intention on the part of the author (Coelho, 2014; Wakita *et al.*, 2025).

Karst landscapes are therefore substantially represented in Naruto Shippuden, with diverse endokarst and exokarst landforms appearing in approximately 7.3% of the episodes analysed. This finding highlights the pedagogical potential of anime in communicating this

type of landscape to students in basic education, helping broaden their knowledge and encouraging them to protect natural resources from the impacts of human activities.

3.1. PEDAGOGICAL POTENTIAL OF KARST IN NARUTO IN RELATION TO THE BNCC

Given the age classification of Naruto Shippuden, karst can be explored as a pedagogical resource under the BNCC from Year 8 of lower secondary education onwards and throughout upper secondary education. The main possibilities lie in Geography and Science at the lower-secondary level, and in the areas of Applied Humanities and Social Sciences and Natural Sciences and their Technologies, at the upper-secondary level (Table 02).

In Year 8 Geography, the topic falls within the Thematic Units “The world of work” and “Nature, environments and quality of life”. Their respective Objects of Knowledge are “Transformations of space in urban-industrial society in Latin America” and “Environmental diversity and changes in Latin American landscapes”. In this context, three skills may be addressed: (1) EF08GE15, (2) EF08GE22 and (3) EF08GE23.

In Year 8, skills EF08GE15, EF08GE22 and EF08GE23 enable students to relate karst to water resources, natural resources and Latin American environmental diversity. Brazilian and other Latin American karst landscapes can therefore be used to discuss groundwater, landscape transformation, environmental vulnerability and the use of natural resources (Brasil, 2018; Goldscheider *et al.*, 2020; Souza *et al.*, 2023).

In Year 9, skills EF09GE07, EF09GE16 and EF09GE17 support a comparative approach to karst landscapes in Europe, Asia and Oceania, enabling discussion of morphoclimatic domains, physical-natural components and forms of human occupation on different continents (Gams, 1994; Gillieson, 2005; Ford; Williams, 2007; Mattes, 2024).

Skill EF09GE07 aims to analyse the physical-natural components of Eurasia and the historical-geographical determinants of its division into Europe and Asia. Skills EF09GE16 and EF09GE17 respectively seek to identify and compare different morphoclimatic domains and to explain physical-natural characteristics, together with patterns of occupation and land use in Europe, Asia and Oceania. Europe includes the Classical Karst region; Asia contains extensive karst systems; and Oceania contains the notable Nullarbor Plain.



Table 02 – BNCC skills suitable for using karst landscapes as a pedagogical resource.

Level	Lower Secondary	Area	Humanities			Natural Sciences
		Curricular component	Geography			Science
			Skills			
		Year 8	EF08GE15	EF08GE22	EF08GE23	EF08CI16
		Year 9	EF09GE07	EF09GE16	EF09GE17	EF09CI12
	Upper Secondary	Area	Applied Humanities and Social Sciences			Natural Sciences and their Technologies
		Curricular component	Geography			Physics / Chemistry / Biology
			Skills			
		Year 1 Year 2 Year 3	EM13CHS106 EM13CHS206 EM13CHS302			EM13CNT105 EM13CNT206

Source: Prepared by the authors.

All these examples are relevant to the teaching and learning process (Gams, 1994; Gillieson, 2005; Ford; Williams, 2007; Mattes, 2024).

Skill EF09CI12 enables discussion of the importance of conservation units—legally designated protected areas in Brazil—for the preservation of biodiversity and national heritage, using Brazilian karst areas such as PETAR, Terra Ronca, Fuma Feia, the Peruaçu Caves and Lagoa Santa as examples (Brasil, 2018; Karmann, 2008; Travassos, 2019; Lima, 2024).

For upper secondary Geography, karst-related content aligns with Specific Competences 1, 2 and 3 in the field of Applied Humanities and Social Sciences. The relevant skills are EM13CHS106, EM13CHS206 and EM13CHS302. Skill EM13CHS206 seeks to develop understanding and application of the principles of location, distribution, order, extent and connection, which are related to geographical reasoning, in analyses of human occupation and the production of space at different times.

At upper-secondary level, skills EM13CHS106, EM13CHS206 and EM13CHS302 support discussion of geographical reasoning, connections between natural and social phenomena, the use of natural resources and socio-environmental impacts in karst areas (Brasil, 2018; Milanovic, 2002; Ford; Williams, 2007).

Skills EM13CHS106 and EM13CHS302 are thematically related because both seek to analyse socio-environmental impacts associated with the exploitation of natural resources, particularly by individuals, government institutions and companies. Karst environments are



used in various ways, particularly as sources of water for human consumption and other needs, which may result in degradation and pollution.

In *Naruto Shippuden*, “The Hole” contains waters regarded as sacred; similarly, *Luzia de Lagoa Santa* illustrates the symbolic relationship between human communities, water and the karst landscape (Milanovic, 2002; Ford; Williams, 2007; Lima, 2024).

Analysis of these socio-environmental impacts also connects with subjects in Natural Sciences and their Technologies, particularly through skills EM13CNT105 and EM13CNT206. The former addresses the cycling of chemical elements through soil, water, the atmosphere and living organisms, as well as how natural dynamics and human practices interfere with these cycles. The latter emphasises conservation and preservation, reinforcing the need for environmental policies aimed at protecting natural systems (Brasil, 2018).

4. FINAL CONSIDERATIONS

The research demonstrates that *Naruto Shippuden* can be analysed both as a widely circulated cultural product and as a valid object for geographical, geomorphological and pedagogical reflection. The literature review showed that, although the work has already been examined in different academic fields, it had not previously been examined specifically from the perspective of karst geomorphology and its associated surface and underground landscapes.

Endokarst features display the greatest morphological diversity, particularly caves, large cave entrances, speleothems and underground environments containing water. In many episodes, the endokarst is represented as a place of shelter, concealment, passage or habitation, echoing the symbolic and historical uses of caves in the real world. Stalactites, stalagmites and columns are the most frequently depicted speleothems, indicating that the classical representation of carbonate caves remains strongly associated with popular conceptions of underground environments. The presence of underground lakes and rivers also underscores the hydrogeological dimension of karst. However, it is presented in a simplified manner and remains subordinate to the plot.

From a geomorphological perspective, features associated with both the endokarst and exokarst were identified, including caves, cave entrances, speleothems, underground lakes, possible flow markings, pinnacles, towers, cones and closed depressions. Although fictional and idealised, these forms show morphological similarities to elements described in the international karst literature, allowing them to be used as an initial resource for raising awareness and framing questions in the classroom.

Interpretative caution is required when considering Masashi Kishimoto's possible inspirations, because there is insufficient documentary evidence to establish direct relationships between specific anime settings and real karst landscapes.

The anime's pedagogical potential lies in its capacity to connect scientific knowledge with students' cultural repertoires, particularly in the final years of lower secondary education and throughout upper secondary education. The scenes analysed can be linked to BNCC skills concerning water resources, environmental diversity, conservation, protected areas, socio-environmental impacts and the vulnerability of natural systems. However, because the work is fictional, its pedagogical use requires careful teacher mediation to distinguish artistic representations from the morphology and dynamics of real karst landscapes.

The study concludes that karst has a significant presence in the landscapes of Naruto Shippuden, appearing in approximately 7.3% of the episodes sampled. Although it is not a predominant theme of the series, its recurrence justifies the scientific and pedagogical analysis undertaken here. By connecting a popular medium with geomorphological knowledge, the study broadens the range of strategies available for science communication. It encourages the appreciation, conservation and protection of karst landscapes and geosystems.

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