RESEARCH ARTICLE

Landscape painting as a visual representation of geographic processes: a critical and educational perspective

Abstract

Contemporary geography education highlights the need for interdisciplinary and visually enriched pedagogies that engage students both cognitively and emotionally. Within this framework, landscape painting emerges as an effective educational tool, as it captures the physical, cultural, and emotional dimensions of the environment. The study offers a critical analysis of 18 paintings representing diverse climate and landscape zones, including tropical rainforests, savannas, hot and cold deserts, Mediterranean vegetation, steppes, temperate forests, tundra, and taiga. These artworks provide accessible visual platforms for discussing environmental features, seasonal changes, and human–environment interactions while offering insights into symbolic and cultural meanings. However, stylized representations may also introduce biases or misconceptions, necessitating pedagogical mediation. The study emphasizes the importance of balancing artistic aesthetics with geographical precision to optimize educational value. Ultimately, landscape paintings can serve as a valuable bridge between abstract geographical concepts and multisensory, tangible learning experiences.

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1 Introduction

Landscape painting, recognized as an independent genre since the Renaissance and further developed during Romanticism and Impressionism (Baomar & Sanad, 2021), plays a crucial role in understanding the surrounding world. As a thematic category, landscape painting not only captures the physical features of nature but also reflects human emotions, social contexts, and philosophical reflections (Berleant, 1997). At its most basic level, landscape painting can be regarded as an artistic representation of the natural world and human-made environments (Carlson, 2009; Jones, 1991). However, in a more nuanced perspective, as highlighted by scholars such as Corner (1992), the landscape in painting becomes a medium for expressing the artist's profound emotions and aesthetic experiences. Thus, landscape painting not only documents reality but also interprets it, offering the viewer a personal and subjective perspective on the world.

The interaction between the artist and the painted landscape is highly complex. As Novak (2007) observed, landscapes in painting are not mere reproductions of nature but also carriers of symbols and cultural meanings embedded by the artist. This interpretation opens the possibility for a deeper understanding of painted landscapes as reflections of social, political, and philosophical contexts. Morin (2009) emphasizes that landscapes in painting transcend physical depictions of nature, becoming a narrative space that is both real and symbolic. These findings highlight how painted landscapes can encourage a more in-depth understanding of geographical concepts.

Using painted landscapes in geography education introduces a unique aesthetic and emotional dimension to the learning process, as suggested by Bishop (1992) and Halverson (1929). Artistic works that depict the diversity of landscapes—ranging from lush tropical forests to arid deserts and icy tundras—not only illustrate geographical zones but also stimulate students' imaginations and encourage deeper reflections on the natural diversity. Painted landscapes often capture subtle details that may be overlooked in standard educational materials, such as changes in color tones related to time of day or season (Rockman, 2000).

This article focuses on the significance of using painted landscapes in schools, particularly for teaching the complexity and diversity of landscape zones. Its primary aim is to evaluate how artistic depictions of nature can support students in identifying and interpreting the physical and human characteristics of different geographical regions. It includes an analysis of 18 selected paintings representing various zones, such as tropical rainforests, savannas, deserts, Mediterranean vegetation, steppes, temperate forests, tundra and taiga. For each zone, two paintings were analyzed, enabling a detailed assessment of the representativeness and key elements of the landscapes depicted.

The article presents an innovative approach to geography education by integrating landscape painting as a teaching tool. This approach is intended to enhance both cognitive and affective learning outcomes by engaging students' observational skills, spatial reasoning, and emotional response to place. A key novel feature of this study is the application of art analysis to showcase the diversity of landscape zones and their complex aspects, such as seasonal changes, climate dynamics, and cultural and emotional contexts. While maps and diagrams are useful for abstraction and generalization, incorporating landscape painting introduces visual and aesthetic elements that can significantly enrich the educational process. It enables a more holistic engagement with geographic content—stimulating curiosity, empathy, and critical thinking.

2 Literature review

2.1 The definition of landscape painting and its aspects

Landscape in painting is a thematic category that encompasses depictions of nature as well as environments created by humans. According to Georges Didi-Huberman (1995), landscape in painting is a space that transcends the mere representation of physical elements of nature. It becomes a space in which the artist constructs a narrative about a world that

is simultaneously real and symbolic. Through manipulation of composition, color, and painting techniques, the artist can suggest certain interpretations or emotions connected to the depicted landscape (Joshi et al., 2011), prompting reflection on the relationship between humans and their environment. On the other hand, Palma (2015) defines landscape painting as a form of social practice that gave rise to photographic reproduction, with which painting later competed (Cock, 1967). From the author's perspective, landscape painting can be defined as a dynamic dialogue between the artist's perception and the reality surrounding them. A painted landscape is not merely a static image but a process of interpretation in which the artist selects, simplifies, and transforms reality to reveal the features they deem significant. It is an art form that not only documents the state of nature at a given time and place but also serves as a tool for exploring human experiences, social relations, and changes in the natural environment. In the context of education, this interpretive nature of landscape painting makes it a particularly valuable medium for developing students' understanding of spatial patterns and environmental processes (Gergel et al., 2017; Gradle, 2007).

Landscape painting can be divided into several key elements that play a vital role in its formation, one of which is landform. In the context of landscape painting, topography refers to the depiction of various landforms such as mountains, valleys, hills, plains, lakes, rivers, and seas (Wang et al., 2022). The realistic representation of these elements aims to faithfully capture the character of a given region and its unique geographical features. In 17th-century Dutch painting, known for the development of the landscape genre (Ultee, 1988), artists like Jacob van Ruisdael frequently portrayed detailed images of flat, lowland landscapes (Courtauld Institute of Art, 1938). Their works were rich in details such as windmills, expansive fields, and characteristic water elements, highlighting the specificity of the region. An example of this is Ruisdael's "Watermill," which not only registers the physical features of the landscape but also weaves in the atmosphere and moods typical of Dutch landscapes (Gibson, 2000). Landscape topography, as a key element of painting, not only serves a documentary function but also holds significant symbolic and emotional meaning, as discussed

by Hussain et al. (2020). By accurately representing landforms, the artist can create specific aesthetic experiences and enhance the interpretation of natural spaces (Ballard & Linden, 2019). Artistic works that focus on topography often become not just geographic portraits of a place but also testimonies of the cultural, historical, and emotional connection between humans and their surrounding environment (Rogers, 2012). Analyzing topography in the context of landscape painting is essential for fully understanding the role landscapes play in art and their potential educational and inspirational functions. Through the study of landforms and their artistic interpretations, one can delve into both the diversity of nature and its cultural contexts, making landscape painting an invaluable source of geographical knowledge and aesthetic expression. It also facilitates a multidimensional approach to teaching geography by connecting physical features with human perception and cultural narratives (Marcus, 2023).

Another key element of importance in this article is vegetation. Vegetation in landscape painting refers to representations of various types of plant life typical of a given region (Raappana-Luiro, 2024). Artists often focus on specific tree species, shrubs, and flowers that are characteristic of certain climatic and geographical zones. By accurately depicting these elements, painters not only document the diversity of nature but also interpret its aesthetic and symbolic significance. In the works of the Impressionists, such as Claude Monet, vegetation played an essential role in creating a specific mood and atmosphere in their paintings (Fahlman, 2006). It can thus be emphasized that vegetation, as an element of landscape painting, not only serves a decorative function but also acts as a crucial medium for conveying information about the character of a place and its ecological and geographical context. This makes it especially relevant in education, where such imagery can support learning about biomes, climate zones, and environmental change (Thomashow, 2001). Artistic works that focus on vegetation often become unique depictions of natural ecosystems, which can be used to educationally explore biodiversity and its influence on landscape formation.

Painters often engage in depicting animals that inhabit the landscapes they paint, including both wild

fauna and domesticated animals (Thornes, 2008). In the works of English Romantics such as John Constable, one can often see rural scenes with pastures and grazing animals (Daniels, 1993), symbolizing the harmonious cooperation between humans and nature and reflecting the integrity of the rural landscape. Artistic interpretations of fauna allow not only for documenting environmental relationships between humans and animals but also for exploring their aesthetic and symbolic aspects, adding depth and authenticity to the painted depictions. Light and atmosphere are also crucial elements of landscape painting, often even becoming the subject of separate scholarly articles (e.g., Seibold, 1990). Artists are fascinated by how light influences the appearance of the landscape, creating different moods and atmospheres (Menninghaus et al., 2019).

The anthropogenic landscape, defined as the environment created by human activity (Small & Sousa, 2016; Li et al., 2017; Marinova et al., 2012), plays an important role in landscape painting due to its diverse aspects and symbolic significance. Depictions of cities, villages, and infrastructure form an integral part of many paintings, which not only document the physical presence of these elements but also interpret their social, cultural, and economic significance (Arts et al., 2017). In Renaissance Italian painting, artists such as Canaletto are known for their detailed and realistic depictions of urban panoramas, which not only reflect the architectural details and urban planning of contemporary cities but also emphasize their monumentalism and dynamic growth (Constable, 1964). In geography education, these representations provide a platform for analyzing human-environment interactions, spatial planning, and socioeconomic development.

Emotional and aesthetic sensations of the artist are inherent aspects of the painted landscape, expressed through various compositional and color techniques. The creation of landscape paintings is a process in which the artist not only reproduces the surrounding reality but also interprets it through personal experiences and emotions. According to Cupchik & Gebotys (1988), the choice of composition, color palette, and painting techniques serves as tools for expressing subjective feelings and reflections on the depicted scenes. An example of this

approach is the work of Vincent van Gogh, who in paintings such as "Starry Night" combines realistic depictions of the landscape with intense, expressive use of color and form. Through this, van Gogh's paintings not only depict the physical landscape but also reflect his internal emotional and psychological states (Dahlan, 2014). In an educational context, recognizing these expressive dimensions can encourage students to engage empathetically with geographical content, deepening their understanding through emotional resonance (Madge, 2014).

2.2 Landscape painting as a tool in geographic education

Landscape painting holds immense pedagogical potential within the context of geography education, as it integrates visual, historical, cultural, and natural elements (Birksted, 2003), thus becoming a valuable tool in the teaching process. As a didactic tool, it enables students to observe, interpret, and analyze geographical features. Paintings depicting diverse landscapes can serve as illustrations for discussing the characteristics of various geographical zones (Cosgrove, 1985), fostering spatial thinking and enhancing students' understanding of landforms, vegetation, climate and the human impact on the environment.. For example, the analysis of 17th-century Dutch landscapes by Jacob van Ruisdael, mentioned earlier in the article, offers a great starting point for discussing the characteristics of lowland landscapes and the role of drainage systems in shaping agricultural landscapes in the Netherlands. Paintings depicting cultivated fields, pastures, vineyards, and orchards can provide insight into how different agricultural techniques and geographical conditions influence landscape formation. Moreover, through the analysis of paintings, students can understand how mountain topography affects climate, vegetation, and living conditions in these regions, as well as how these landscapes may symbolize human spiritual and existential experiences (Bunkše, 2007; De Blij, 2008). It is also worth noting that mountains play a crucial role in climate regulation by acting as barriers to air masses, influencing precipitation and temperatures in their surroundings (Viviroli et al., 2011). Analyzing painted depictions of mountain slopes allows students to observe the transitions from deciduous

forests at lower elevations to coniferous zones and alpine tundra higher up.

Landscape paintings are excellent tools for illustrating the biological diversity in boreal forests and taiga ecosystems (Mustonen, 2015). The accurate depiction of various tree species, shrubs, and forest understory allows for detailed discussions on forest structure and their ecological functions, such as climate regulation, water retention, and oxygen production. Discussions can also address challenges in forest management, including sustainable resource management, deforestation, and biodiversity protection (Amoroso, 2012). Finally, landscape paintings can serve as illustrations to discuss human impact on the landscape. All these examples demonstrate how landscape painting can be used in geography education to understand and analyze various geographical, ecological, and cultural aspects while fostering critical thinking and interpretation skills among students. Studies by Osama Mohammed Fikra (2020) confirm that the use of paintings in education significantly impacts the learning process, offering not only visual representations but also the opportunity for deeper understanding of ecological, historical, and cultural contexts. Furthermore, research by Siam et al. (2020) has shown that landscape paintings can support the development of analytical skills in students. Similar conclusions are drawn from studies by Cheung & Jhavieri (2016), which highlight the role of visual educational materials in developing critical thinking and analysis skills. Research by Lai (2021) points out how paintings can stimulate reflection and classroom discussions, leading to a deeper understanding of complex geographical and ecological issues.

In conclusion, landscape painting serves as an invaluable teaching tool in geography education, enabling the integration of visual, natural, and cultural elements. By examining visual representations of landscapes, students deepen their understanding of geographic space, environmental processes, and human-nature interactions. Its application in geography education not only supports the development of critical thinking and analytical skills but also stimulates interest in the complex relationships between humans and the environment. The interdisciplinary nature of this approach makes it especially effective for engaging students in meaningful learning and encouraging holistic thinking about the world.

3 Conceptual background

This study draws upon a curated selection of 18 paintings to represent eight distinct types of geographical landscapes (Tab.1). For each landscape zone, two representative artworks were selected to enable comparative analysis. Paintings were drawn from diverse historical periods and artistic traditions, including Romanticism, Impressionism, and Modernism. This facilitated an exploration of how different artistic conventions influence the portrayal of similar landscape types. Particular attention was paid to visual clarity, the presence of key geographical features (e.g., vegetation, relief, water bodies), and each painting's potential as a didactic resource in classroom use. All selected works were sourced from open-access digital collections, such as Google Arts & Culture, Wikimedia Commons, and institutional repositories of major museums (e.g., The Metropolitan Museum of Art, Prado, Rijksmuseum). Public domain status was a key criterion to ensure unrestricted educational use.

Paintings were systematically categorized according to the geographical landscape zones they represent: tropical rainforest, savanna, desert, Mediterranean vegetation, steppe, temperate forest, tundra, and taiga. Classification was based on the identification of defining physical features—such as flora, climate indicators, or human adaptations—relevant to each zone. A comparative pairwise analysis was conducted to explore how different artists depict similar landscape types.

To structure the interpretation, a thematic coding scheme was developed by the author, informed by visual content analysis (Rose, 2016) and principles of art-based research methodology (Leavy, 2015). Each painting was examined according to four analytical dimensions in two aspects:

Physical aspects:

- Physical Aspects: Natural components – vegetation types, landforms, water bodies, and other physical-geographic features.

Table 1. Paintings depicting selected landscapes taken for analysis.

Name of the landscape zone	Author	Title of the painting	Year of origin	Source
Tropical rainforests	Henri Rousseau	Tropical Forest with Monkeys	1910	1
	Frederic Edwin Church	Rain Forest, Jamaica	1865	2
Savannas	Wilhelm Kuhnert	Massai-Löwe	1927	3
	John Karst	Giraffe	1880	4
Hot deserts	Robin Day	Libyan Desert	1943	5
	Otto Pilny	A dance in the desert	1989	6
Mediterranean zone	John Singer Sargent	Cypress Trees at San Vigilio	1913	7
	Albert Bierstadt	View of Subiaco	1859	8
Steppes	Jan Stanisławski	Steppe	1900	9
	Józef Brandt	The steppe farm	1976	10
Temperate forests	Stanisław Witkiewicz	Pond in the Forest	1895	11
	Maria Klass-Kazanowska	Wild pigs in the forest	2012	12
Taiga	Ivan Shishkin	A Morning in a Pine Forest	1889	13
	Constance Baltuck	Grayling Stream	2013	14
Tundra	MK MacNaughton	Lunch Break With Copter Peak	2013	15
	Valentin Serov	Travelling by Deer	1896	16
Ice deserts	François-Auguste Biard	Fighting with a Polar Bear at Spitsbergen	1839	17
	William Gordon Burn Murdoch	Dundee Antarctic Whaling Expedition	1893	18

- Atmospheric and Temporal Qualities – indications of weather, time of day, or season.

Social and cultural aspects:

- Human Presence – evidence of settlements, agriculture, roads, or other anthropogenic elements.
- Emotional and Symbolic Layers – affective or narrative dimensions that may shape student interpretation.

To support and synthesize these analyses, the author prepared a comparative matrix summarizing key features of each painting. This table includes landscape zone classification, artist, title, level of geographical fidelity, symbolic content and pedagogical usability. It provides a structured overview for educators seeking to select appropriate works for geography instruction. Such a matrix not only organizes the visual material but also serves as a heuristic tool, enabling comparisons across diverse geographic and artistic contexts. In a similar manner, the comparative overview prepared in this study assists educators in making well-informed and pedagogically justified decisions when selecting landscape paintings for use in geography education.

4 Results

The analysis of geographical representations in selected paintings provides a multifaceted perspective on Earth's diverse landscapes, ranging from lush tropical rainforests to icy deserts. Each artistic depiction reflects the unique geographical characteristics and biodiversity of specific regions while illustrating the influence of climate on the lifestyles of both humans and wildlife.

4.1 Tropical rainforests

4.1.1 Physical aspects

The paintings "Tropical Forest with Monkeys" by Henri Rousseau and "Rain Forest, Jamaica" by Frederic Edwin Church (Fig. 1) represent two distinct artistic approaches to depicting tropical rainforests. While both artworks address the theme of exotic tropical landscapes, they differ significantly in technique, style, and interpretation of the natural environment. Henri Rousseau, renowned for his naïve art style, creates an idealized and fantastical vision of a tropical rainforest in "Tropical Forest with Monkeys." His work is characterized by flat, simplified forms, with fauna and flora depicted in a stylized rather than realistic manner. In contrast, Frederic Edwin Church, a prominent figure in American landscape painting and a proponent of realism, offers a detailed and precise portrayal of tropical scenery in "Rain Forest, Jamaica." Church's work emphasizes meticulous observation and a faithful representation of nature,
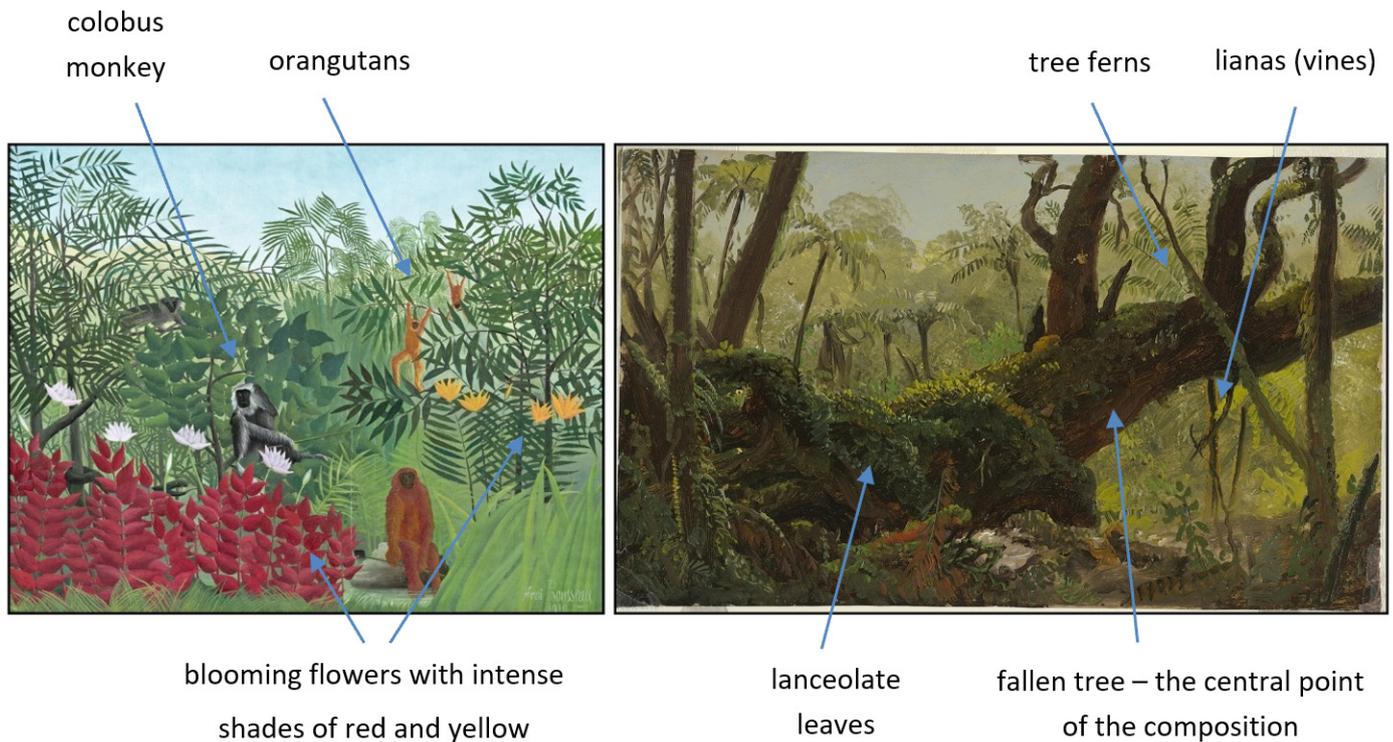
Figure 1. Paintings Depicting Tropical Rainforest Landscapes. Source: own study based on Wikimedia Commons CC BY.

setting it apart from Rousseau's more imaginative and abstract interpretation.

In Church's "Rain Forest, Jamaica," the vegetation is depicted with remarkable realism, reflecting the actual conditions of tropical rainforests. The artwork highlights massive trees that dominate this ecosystem. Tropical rainforests are known for their diverse species of towering trees, often exceeding 30 meters in height, forming a dense canopy that filters sunlight and creates a humid, shadowy understory. Church captures this complexity by portraying monumental trees as structural pillars of the rainforest. A distinctive feature of tropical rainforests is the presence of epiphytes—plants that grow on other plants rather than rooting in the soil. In Church's painting, epiphytes can be seen clinging to tree branches, accurately reflecting the rainforest's ecology. These plants, including orchids, bromeliads, and ferns, thrive in the high humidity characteristic of these forests. The painting also features dense vines, such as lianas, which are integral to rainforest ecosystems. These vines interconnect plants, providing pathways for small animals such as monkeys, birds, and insects. Church's precise depiction of these elements demonstrates his deep understanding of rainforest ecology and his careful observation of nature.

In contrast, Henri Rousseau's "Tropical Forest with Monkeys" features lush and abundant vegetation but does not represent specific species of trees, epiphytes, or vines. Instead, Rousseau presents a generalized vision of the tropics, with plants depicted in a stylized and exaggerated manner to create a surreal landscape. While the richness of vegetation in Rousseau's painting is undeniable, it lacks the realistic details found in Church's work. The trees and plants are oversized, with improbable shapes, emphasizing an artistic rather than scientific interpretation of the tropics.

4.1.2 Social and cultural aspects

A central element in Rousseau's painting is the presence of monkeys, which bring life and movement to the composition. These animals symbolize the wildness and exoticism of the tropical rainforest, serving as a focal point for interpreting the artwork. However, like the vegetation, Rousseau's depiction of fauna is highly stylized, focusing on evoking an impression of exoticism rather than accurately portraying the region's wildlife. In contrast, Church's "Rain Forest, Jamaica" does not prominently feature fauna, instead embedding the presence of wildlife subtly within the landscape. The painting conveys the tranquility and

harmony of the tropical forest, with the presence of animals implied rather than explicitly depicted. Church appears more interested in showcasing the interplay between vegetation and the natural environment than directly portraying animal life.

In summary, while both paintings depict tropical rainforests, the cultural and geographical contexts influencing the artists are vastly different. Rousseau, who never visited the tropics, relied on imagination and second-hand accounts of exotic places, giving his painting a fantastical and unreal quality. His "Tropical Forest with Monkeys" represents a personal interpretation of the tropics rather than a direct representation. In contrast, Church's experiences in Jamaica provide the foundation for "Rain Forest, Jamaica," which is based on firsthand observations. Rousseau's work can be seen as reflecting a Western fascination with the exotic and the "wild," a view that was often infused with colonial undertones, where the tropical rainforest symbolized mystery and untamed nature. Church's work serves as an authentic portrayal of the rainforest in the Caribbean, adding documentary value to its artistic merit. The painting captures the beauty and complexity of tropical nature while subtly advocating for its respect and conservation.

4.2 Savannas

4.2.1 Physical aspects

The painting "Giraffes" by Karst (Fig. 2) portrays a scene typical of the African savanna. This biome spans vast areas of East and Southern Africa, from Kenya through Tanzania and further south to South Africa. The savanna is characterized by expansive open spaces, grassy plains with scattered trees, primarily acacias, which are hallmark features of this landscape. In Karst's painting, the landscape is clearly depicted, with sparse, low trees and wide-open spaces that form the natural habitat for giraffes. These animals, as tall herbivorous mammals, are particularly well-adapted to this type of ecosystem, utilizing their height to feed on leaves from tall trees. Furthermore, the savanna operates on a cycle determined by alternating wet and dry seasons, which influences the lifecycle of both its flora and fauna. In
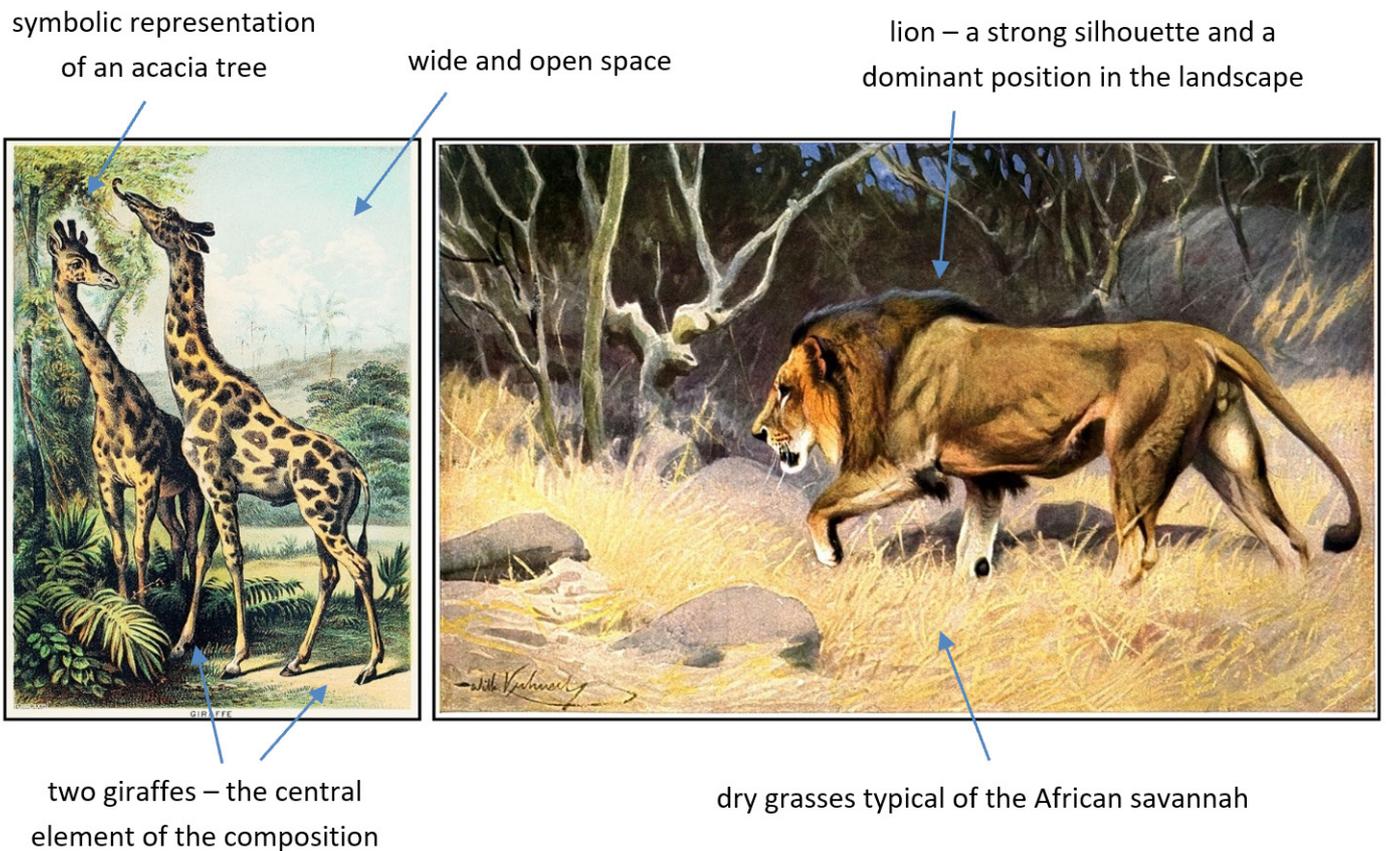
symbolic representation of an acacia tree

wide and open space

lion – a strong silhouette and a dominant position in the landscape

two giraffes – the central element of the composition

dry grasses typical of the African savannah

Figure 2. Paintings Depicting the Savanna Landscape. Source: own study based on Wikimedia Commons CC BY.

the painting, giraffes are shown in their natural environment, surrounded by vegetation characteristic of the savanna.

In contrast, the painting "Massai-Löwe" focuses on lions, another iconic species of the African savanna, but in a different ecological and geographical context. Lions, as apex predators, share the savanna ecosystem with giraffes but occupy a distinctly different ecological niche. As top predators, lions regulate herbivore populations, such as giraffes, zebras, and antelopes, maintaining the balance of the ecosystem. The painting "Massai-Löwe" portrays a lion, symbolizing the African plains but also referencing the Maasai culture—a prominent ethnic group inhabiting Kenya and northern Tanzania. For the Maasai, the lion is a symbol of strength and bravery, a theme reflected in the painting.

4.2.2 Social and cultural aspects

Geographically, both paintings depict different aspects of the same ecosystem—the African savanna—but from varying perspectives. Karst emphasizes herbivores within their grassy habitat, while "Massai-Löwe" highlights the predator's role and its cultural significance. African savannas are defined by seasonal climatic shifts, which directly impact water and food availability, influencing the lives of both giraffes and lions. The savanna's vegetation, consisting of grasses and scattered trees, supports herbivores that migrate in search of food and predators that hunt within these open spaces. The connection between these animals and their environment also reflects the social and economic challenges faced by local communities who depend on this ecosystem for resources, such as water, grazing areas for livestock, and wildlife tourism.

From a geographical perspective, both paintings center on the African savanna yet differ in their portrayal of this ecosystem. Karst's work takes a more naturalistic approach, illustrating the giraffes' natural environment within the savanna's vast openness, whereas "Massai-Löwe" emphasizes the symbolic dimension of the lion, addressing its ecological role and cultural significance within the Maasai heritage. In the case of the Maasai, lions also represent a source of conflict with human activity, such as livestock farming, highlighting the tension between

wildlife conservation and the socio-economic needs of local populations.

4.3 Hot deserts

4.3.1 Physical aspects

The Libyan Desert, a part of the Sahara, is one of the driest and most inhospitable places on Earth. The painting on the right in Fig. 3 portrays a typical desert landscape characterized by barren, arid terrain virtually devoid of vegetation. Dominating the scene are sand dunes and rocky hills, features commonly associated with the Saharan environment. These landforms are shaped by exogenic processes, particularly wind activity, which sculpts the sand dunes and other geological formations. The Libyan Desert's climate is marked by extremely scarce and irregular rainfall, a feature reflected in the painting's absence of water or plant life, effectively capturing the harshness of this environment. One can also observe a curved form resembling a path or a dry riverbed, known as a wadi. This feature suggests that, in the past or under rare circumstances, temporary water flows may have occurred. Wadis are geomorphological hallmarks of North African deserts and play a vital role during the infrequent rainy periods, contributing to the formation of new land structures.

The barren and sandy surface also characterizes the second painting analyzed in this article, which depicts a hot desert landscape. The setting sun bathes the terrain in warm hues, indicative of the desert's daily cycle, where scorching daytime heat transitions to cool nights. In the distance, low hills can be discerned, potentially symbolizing mountain ranges such as the Atlas Mountains in North Africa or other rocky formations commonly found in desert regions. The vast, vegetation-free expanse underscores the severe conditions prevailing in such environments, where rainfall is minimal, and water scarcity is a persistent challenge.

4.3.2 Social and cultural aspects

The figures depicted in the painting on the left likely belong to a nomadic community, suggested by their attire and the objects present, such as rugs, musical instruments, and tents visible in the background. The scene captures a moment of rest and celebra-
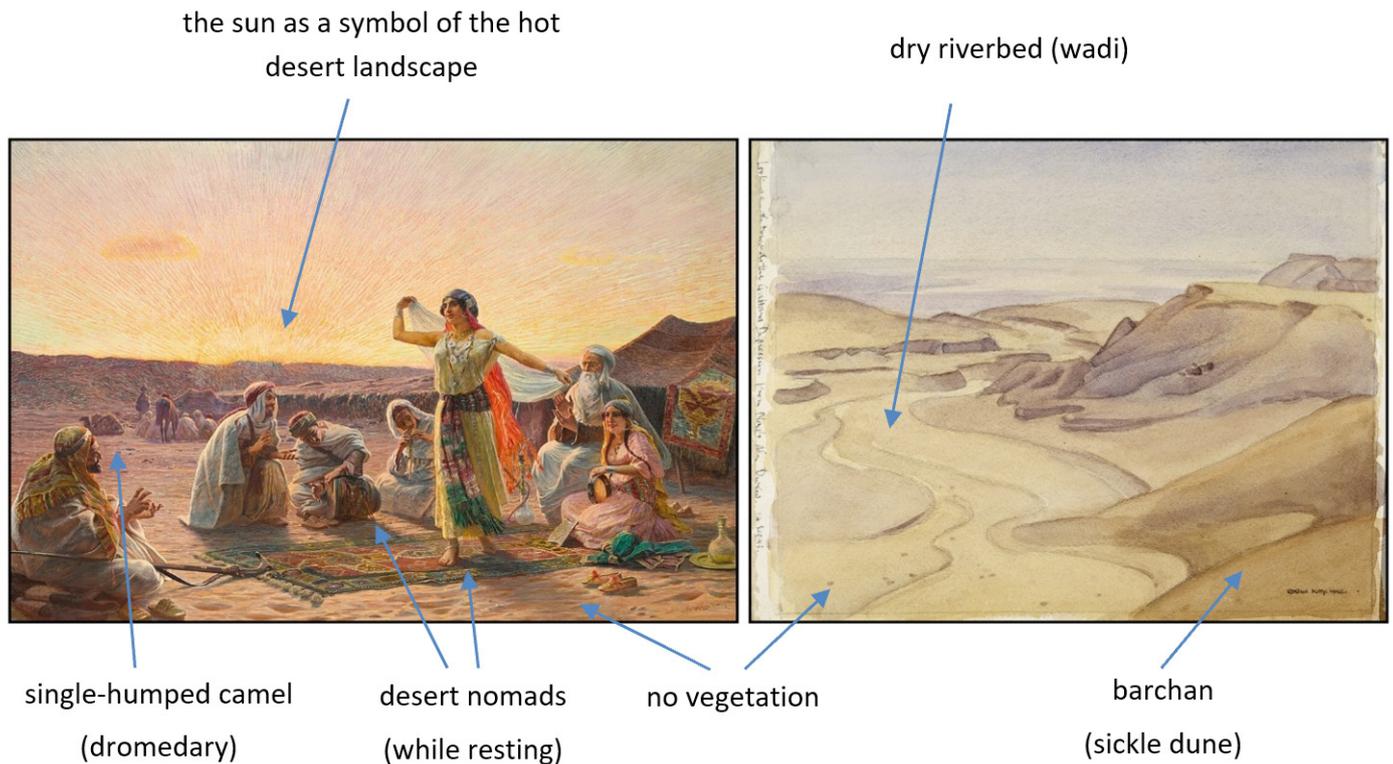
the sun as a symbol of the hot
desert landscape

dry riverbed (wadi)

single-humped camel
(dromedary)

desert nomads
(while resting)

no vegetation

barchan
(sickle dune)

Figure 3. Paintings Depicting the Hot Desert Landscape. Source: own study based on Wikimedia Commons CC BY.

tion, possibly indicating that an oasis or a temporary camp serves as a refuge before nightfall, when desert temperatures drop significantly. The dance scene, framed by the desert landscape, symbolizes not only the rituals and traditions of nomadic life but also the resilience and adaptation required to survive in such harsh geographical conditions. The presence of the nomads also reflects the socio-economic challenges of desert life, where access to water and the ability to navigate vast, barren landscapes are crucial to survival.

In summary, both paintings depict different aspects of the desert landscape, addressing the theme of life in the desert through distinct stylistic and geographical lenses. The first painting, portraying the Libyan Desert, emphasizes the starkness and monumental vastness of the desert space. In contrast, the second painting, A Dance in the Desert, focuses on human activity, with its warm and vibrant colors suggesting the richness of nomadic culture that endures despite the challenges posed by the arid climate. The contrasting representations of the desert's physical and cultural landscapes illustrate the complex relationship between geography and the human capacity to adapt to extreme environments.

4.4 Mediterranean zone

4.4.1 Physical aspects

Both artworks presented in Fig. 4 depict landscapes from the Mediterranean region, yet they do so in distinct ways, focusing on different natural and cultural elements characteristic of this area. The first painting (on the left), which centers on the cypress trees of San Vigilio, emphasizes the simplicity and elegance of the Mediterranean landscape. The cypress trees stand against a tranquil water backdrop and pastel sky dominating the composition, highlighting the vertical forms of vegetation typical of this region. The minimalist nature of the painting, along with its limited color palette, creates an impression of harmony and stillness, characteristic of coastal landscapes.

In contrast, Bierstadt's painting (on the right), depicting the view of Subiaco, directs the artist's attention to a more complex landscape dominated by hills, mountains, and valleys. The richness of terrain details and the variety of elements—from forests to the mountain town, and agricultural elements in the valley—suggest greater dynamism and complexity in the landscape. This work implies movement and

daily life, with people interacting with the surrounding nature, which is less apparent in the minimalist painting of San Vigilio. Notably, Bierstadt's painting shows a greater diversity of vegetation, including both coniferous and deciduous trees. The lush greenery in the valleys and higher mountain areas suggests more varied climatic conditions, likely influenced by the Apennine Mountains.

4.4.2 Social and cultural aspects

While in the first painting, vegetation serves a decorative function, in Bierstadt's work, it is an integral part of the local community's life. Bierstadt's painting clearly depicts the interaction between humans and the landscape. Ox-drawn carts, women working by the stream, and the visible road leading to the town all highlight the role of the landscape as a space for use, not just aesthetic enjoyment. The artist emphasizes the symbiosis between humans and nature, showing how the inhabitants adapt to the challenging geographical conditions and make use of the resources available in the valleys and hills. In contrast, the painting from San Vigilio lacks direct traces of human activity. The landscape appears

almost primordial, which gives it a more universal, timeless character. The focus on nature, rather than on humans, creates a tranquil and contemplative atmosphere, in contrast to the dynamic, life-filled scene from Subiaco.

It is also important to note the differences in lighting and atmosphere between the two paintings. In the one with the cypress trees, the light is soft, likely from a setting sun casting long shadows, which enhances the melancholic mood and peaceful aura. The artist focuses on the subtle shifts in the colors of the sky and water, conveying the harmony typical of Mediterranean landscapes. Meanwhile, in Bierstadt's painting, the light is more dramatic, intensively modeling the elements of the landscape. Though the sky is serene, the light emphasizes movement and human activity, creating the impression that life unfolds in rhythm with nature, in symbiosis with the environment. The light accentuates architectural details in the background and illuminates the midground, adding depth to the painting. Both paintings showcase the beauty and complexity of the region but do so in different ways, highlighting varied aspects of the same geographical environment.
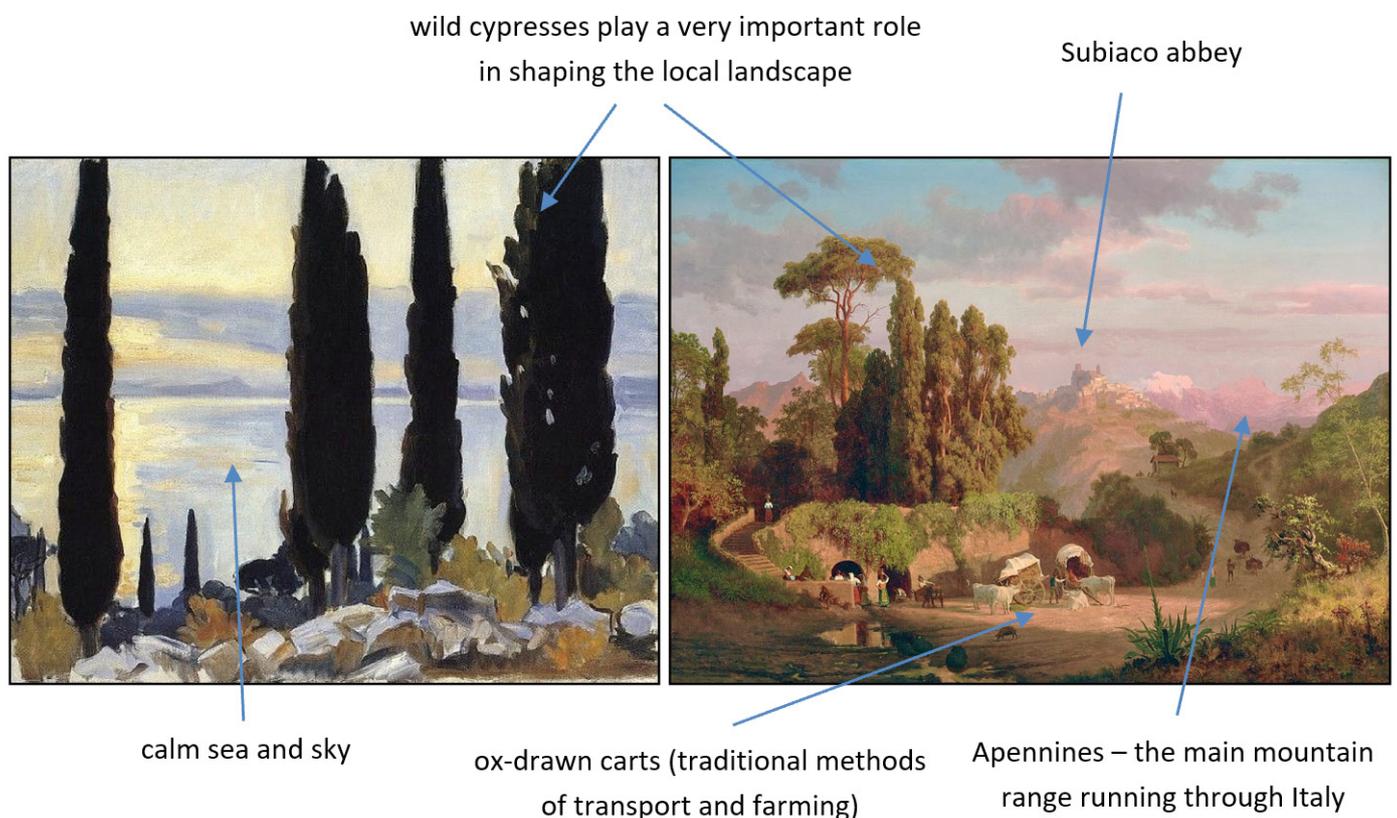

Figure 4. Paintings Depicting the Mediterranean Landscape. Source: own study based on Wikimedia Commons CC BY.
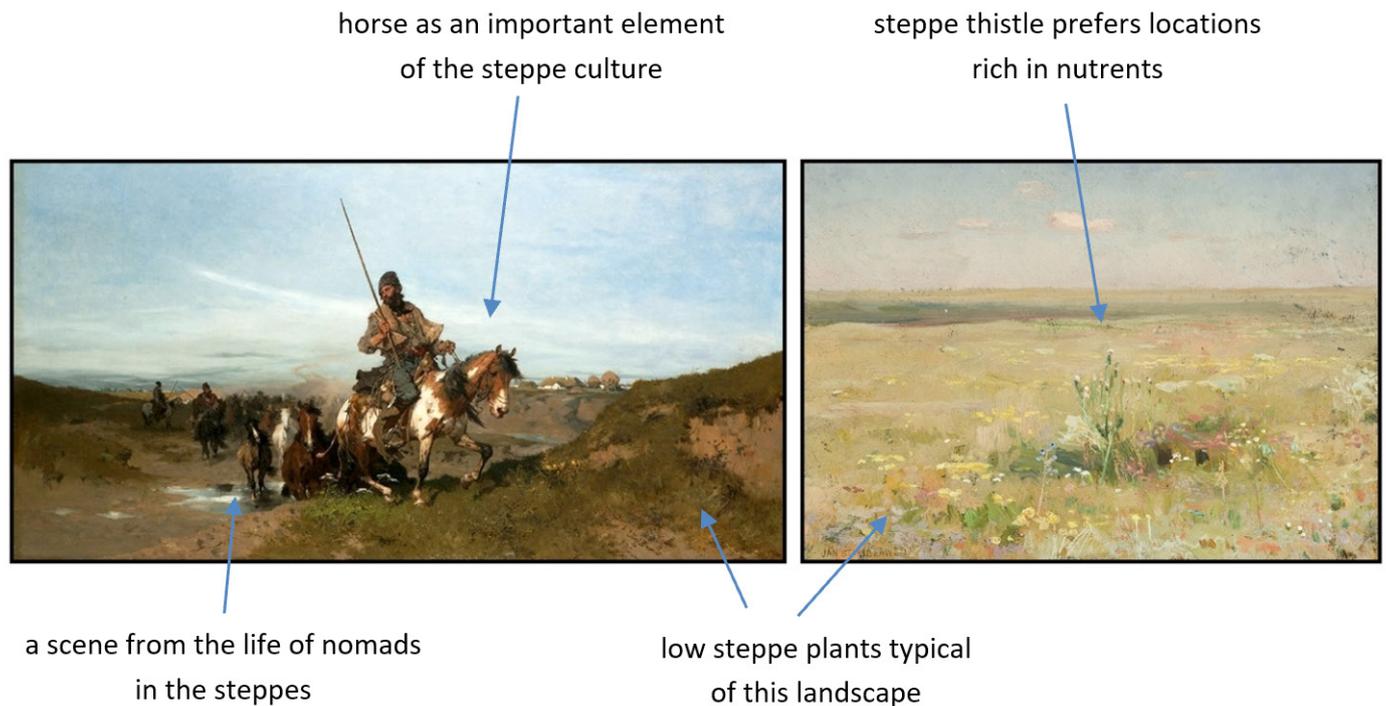
horse as an important element
of the steppe culture

steppe thistle prefers locations
rich in nutrents

a scene from the life of nomads
in the steppes

low steppe plants typical
of this landscape

Figure 5. Paintings Depicting the Landscape of the Steppe. Source: own study based on Wikimedia Commons CC BY.

4.5 Steppes

4.5.1 Physical aspects

The following paintings analyzed in this article depict the steppe landscape. The first painting (on the right) gently portrays steppe vegetation, which is low and well adapted to the semi-arid climate. Small, scattered clumps of flowers and grasses are visible, indicating the adaptation of vegetation to harsh conditions such as hot summers and cold winters. The colors, dominated by various shades of green, yellow, and beige, reflect the dryness of the terrain and the seasonal nature of the vegetation—steppes are known for blooming in spring but quickly drying out during the summer. The absence of distinct landscape elements, such as trees or hills, emphasizes the monotony of the steppe, but also its unique, natural beauty. The artist clearly focused on capturing the subtle differences in the shades of earth and vegetation, which at first glance may seem uniform, but upon closer examination, reveal a wealth of details.

4.5.2 Social and cultural aspects

The second painting analyzed depicts a scene from the life of nomads on the steppe, a subject typical of the works of Józef Brandt. Brandt, an artist strongly associated with Polish historical painting, may have been inspired by the history of the Cossacks and their relationships with Poland and Lithuania. The Cossacks, known for their nomadic lifestyle, were masters of horsemanship and are often portrayed in scenes such as this one—dominated by vast, open spaces and horses. The painting shows expansive areas with low, grassy vegetation and gently rolling terrain, typical of the steppe. Small rises and hills may suggest the proximity of rivers or other natural obstacles. This connection to the landscape highlights the nomadic culture's reliance on the steppe for grazing, travel, and survival. In the background, one can discern buildings, likely simple, low huts typical of pastoral settlements or small agricultural communities. The central figure of the painting is a horseman, emphasizing the important role of horses in steppe culture. On both the steppes of Eastern Europe and Asia, horses were essential for transportation, work, and symbolized social status. The man in the painting, armed with a lance, may represent a warrior or a herder, which was a common phenomenon on the steppe, where daily life revolved around livestock grazing. Horses were not only practical but also a social symbol, often reflecting the wealth and status of the individual or community.
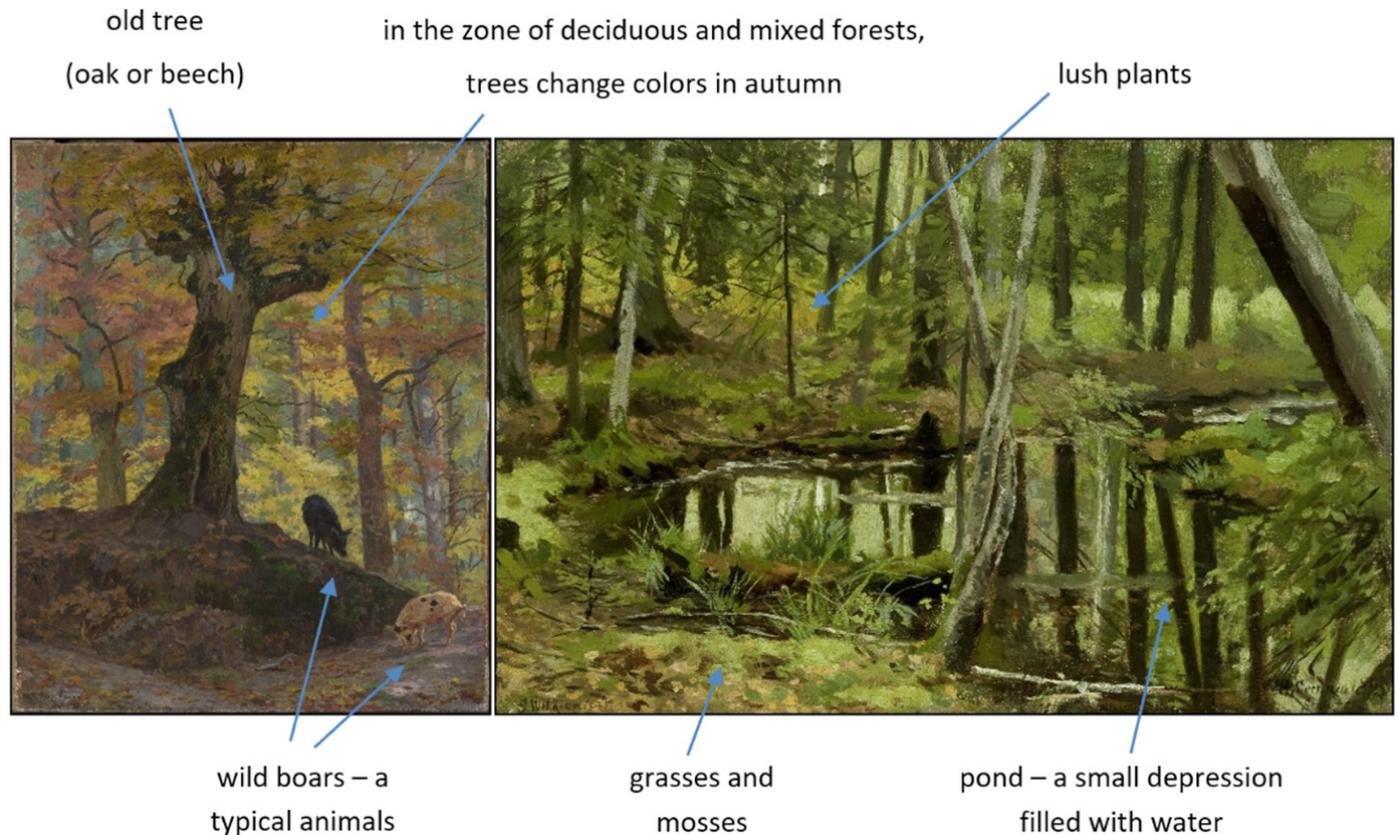
Figure 6. Paintings Depicting the Landscape of Deciduous and Mixed Forests in the Temperate Zone. Source: own study based on Wikimedia Commons CC BY

4.6 Temperate forests

4.6.1 Physical aspects

In the next painting (shown on the left in Fig. 6), the central element is a monumental, old tree, likely an oak or beech, distinguished by its thick trunk and wide canopy. These trees are typical of the deciduous forests of Central Europe. In the background, other trees with wide canopies and tall, slender trunks are visible. The forest appears to be relatively dense, suggesting a natural, unregulated ecosystem where trees have the opportunity to grow freely. Deciduous and mixed forests in the temperate zone thrive in a climate with distinct seasons. In summer, they are lush and green, while in autumn, the trees begin to shed their leaves, as depicted in the painting. Such vegetation is characteristic of the temperate climate, with warm summers and cold winters. The painting captures the dynamic nature of temperate forests, where seasonal cycles visibly transform the landscape.

In the foreground, two wild boars are visible – one with dark fur, the other lighter. Wild boars are among the most commonly found wild animals in deciduous and mixed forests of the temperate zone. These animals are well adapted to life in the forest, where they find food in the form of roots, fungi, tree fruits, and small animals. Their presence indicates a healthy, biodiverse forest environment, capable of sustaining large mammals.

The second analyzed painting (on the right) focuses more on the vegetation itself, with a noticeable absence of animals, which were present in the foreground of the previous image. The painting by Stanisław Witkiewicz depicts a fragment of the forest with a small water feature – a pond. Such scenes are typical of forests in the temperate climate zone, which can be found in various parts of Europe, including Poland, where natural water bodies in forests often play an important ecological role. Ponds serve as habitats for many species of plants and animals, including amphibians, aquatic insects, and small mammals. The vegetation around the pond

appears lush, indicating the appropriate soil moisture. Various herbaceous plants are visible, thriving in the moist areas, such as grasses, mosses, and ferns. The moist conditions in the forest allow the growth of this type of vegetation, which is typical of mixed forests in the temperate zone. This focus on a small ecological niche underlines the complexity and internal diversity of temperate forest ecosystems.

4.6.2 Social and cultural aspects

Although human activity is not directly depicted in either of the paintings, the choice of subjects reflects a cultural appreciation for forests as natural spaces vital to the European identity. Forests such as these historically provided communities with wood for building and heating, wild game for food, and herbs for medicinal purposes. The wild boar, often hunted throughout history, also symbolized both a food source and a challenge in traditional hunting culture.

Additionally, ponds and small water bodies in forests were crucial for traditional rural economies, supporting livestock, providing drinking water, and maintaining local biodiversity. Thus, even though the paintings emphasize the "untouched" natural world, they indirectly reference the forests' deep connection to human life and survival.

4.7 Taiga

4.7.1 Physical aspects

Another landscape zone analyzed in this article is the taiga, represented by the paintings of Ivan Shishkin (left) and Constance Baltuck (right) in Fig. 7. In the first painting, Shishkin depicts a forest dominated by pines and other conifers. The trees are tall and straight, which is typical for the taiga, where climatic conditions—cold winters and short summers—favor the growth of coniferous trees that are adapted to harsh, frosty environments. The thick tree trunks and undergrowth of moss, shrubs, and dead trees indicate the natural habitat of these regions. The dense structure of the forest, combined with the variety of undergrowth, highlights the biodiversity adapted to extreme climatic conditions.

The central focus of the painting is the bears, one of the characteristic species inhabiting the taiga. The painting shows young bears playing on a fallen trunk, suggesting a rich forest ecosystem. Many other species, such as wolves, moose, lynxes, and owls, also inhabit the taiga, all adapted to the harsh, forested climate. The presence of these predators and large mammals indicates a functioning food chain and a relatively undisturbed natural environment.

a forest dominated by pine and other conifers   slender conifers

bears – a typical species
living in taiga

Figure 7. Paintings Depicting the Taiga Landscape. Source: own study based on Wikimedia Commons CC BY.

The scene appears to take place in the morning, as indicated by the soft light filtering through the dense tree canopies. Mist and humidity are common in boreal forests, especially in the morning when air temperatures are lower. The presence of fallen trees, moss, and ferns suggests that the forest is in a wild, untouched state, which is typical for the taiga, one of the least urbanized ecosystems in the world. Such undisturbed taiga areas are crucial for global ecological balance, acting as major carbon sinks.

In contrast, Constance Baltuck's painting depicts the mountainous taiga in Alaska. The painting shows slender coniferous trees, likely spruces or pines, which dominate in this harsh climate. The trees are tall and slender, typical of the taiga and tundra vegetation, where plants must survive long, frigid winters and short, cool summers. The adaptation of trees, such as their narrow crowns, minimizes snow accumulation and prevents branch breakage under heavy snowfall.

The river flowing through the center of the painting suggests that water plays a key role in shaping the landscape. The meandering river indicates relatively flat terrain or a plain, suggesting that slow erosion occurs in this region, with the soils being marshy or wet in some places. The areas surrounding the river are green, indicating the presence of lush vegetation during the summer months. These river valleys in the taiga often form critical ecological corridors, supporting greater biodiversity compared to the surrounding dense forests.

4.7.2 Social and cultural aspects

Although direct human presence is absent in both paintings, the taiga has historically been both a natural barrier and a resource base for local populations. In regions like Russia and Alaska, taiga forests provided timber, fur, and food. The depiction of bears, an important animal in many indigenous cultures, highlights the taiga's role not only as an ecosystem but also as a cultural landscape, rich in symbolism and myth.

Additionally, rivers visible in paintings such as Baltuck's have been crucial for human settlement and movement, often serving as natural routes for indigenous peoples and early explorers. Today, taiga areas remain vital both economically (e.g., timber and mining) and ecologically (e.g., climate regulation), but they also face increasing pressure from resource extraction and climate change.

4.8 Tundra

4.8.1 Physical aspects

The penultimate landscape zone analyzed is the tundra. The painting displayed on the left in Fig. 8 illustrates a tundra landscape with prominently marked hills and valleys, suggesting a location in high lati-
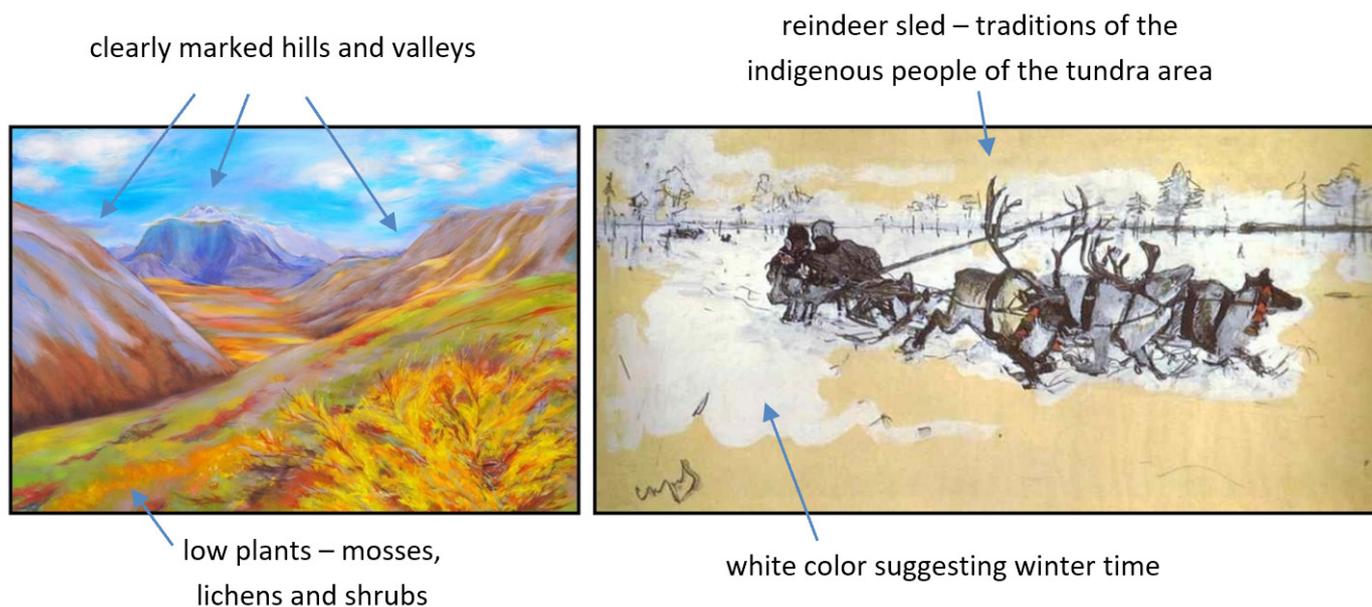
clearly marked hills and valleys

reindeer sled – traditions of the indigenous people of the tundra area

low plants – mosses, lichens and shrubs

white color suggesting winter time

Figure 8. Paintings Depicting the Tundra Landscape. Source: own study based on Wikimedia Commons CC BY.

tudes, such as Alaska, northern Canada, Scandinavia, or Siberia. The mountainous elevations are characteristic of harsh, cold regions shaped by geological processes such as glacial erosion. The presence of U-shaped valleys and steep slopes indicates the powerful influence of ancient glaciers that once covered these regions. The valley between the mountains may have once been the bed of a glacial river, indicating either past or ongoing glacial activity.

The colors and vegetation depicted in the painting suggest late summer or early autumn, as the tundra begins to change hues and the vegetation transitions from green to golden and orange shades. The presence of color-shifting vegetation highlights seasonal transitions, a defining feature of this climate type, where the growing season is brief, and seasonal changes occur rapidly. This rapid phenological shift is crucial for the survival of tundra organisms, which must complete their life cycles in just a few weeks.

As previously noted, a defining element of the tundra is its expansive, flat landscape dominated by low vegetation: mosses, lichens, shrubs, and occasional dwarf trees. The absence of tall trees is due to the permafrost layer, which prevents deep root development and significantly limits vegetation types. These regions experience short, cool summers and very long, harsh winters, which significantly influencing the way of life for the indigenous peoples inhabiting these areas.

4.8.2 Social and cultural aspects

The depiction of a reindeer sled highlights the traditions of the native inhabitants of these regions, particularly in northern Russia and Scandinavia. Tribes such as the Sámi, Nenets, and Chukchi rely on reindeer for transportation, as well as for food and clothing. Reindeer are highly adapted to the harsh conditions, thriving in low temperatures and navigating the challenging terrain, making them an indispensable part of life in these areas. The depiction of the sled emphasizes the traditional, nomadic way of life, perfectly adapted to the challenges of the tundra, such as seasonal migrations in search of better pastures.

Furthermore, the economic significance of reindeer extends beyond subsistence; reindeer herding is today a cultural and economic symbol for many indigenous groups, playing a role in eco-tourism and sustainable agriculture initiatives. The environmental sensitivity of the tundra landscape also means that traditional ways of life are closely tied to ecological balance; disruptions such as climate change or resource extraction (e.g., oil, gas) threaten not only the environment but also the cultural continuity of tundra societies.

4.9 Ice deserts

4.9.1 Physical aspects

The final set of analyzed paintings depicts the ice desert landscape (Fig. 9). The first painting on the left portrays Antarctica—the largest ice desert in the world. The region is characterized by one of the most extreme climates on Earth, with long, harsh winters featuring temperatures dropping to -60°C and summers remaining extremely cold. The painting illustrates a cold and barren landscape, emphasizing the harsh conditions where the sea is covered with ice. The uniform whiteness of the landscape, combined with minimal vegetation, reflects the extreme environmental constraints that dominate polar ecosystems. Penguins are visible on the painting, confirming its Antarctic setting. Penguins, highly adapted to the severe climatic conditions, are common inhabitants of the icy shores of this continent.

At the center of the painting, three sailing ships suggest the presence of humans in this inhospitable region. These ships could represent an exploratory mission or, as indicated by the painting's title, a whaling expedition. Such voyages to Antarctica began in the 19th century, as explorers and whalers ventured into these remote areas. Surrounding the ships are massive ice formations, likely ice shelves, which are common along the Antarctic coast. These structures sometimes break away from the main ice mass, forming drifting icebergs. This process, known as calving, significantly shapes the Antarctic coastal environment and affects global ocean circulation patterns.

The second painting (on the right) also depicts a typical ice desert landscape. Based on its title, it portrays Spitsbergen, part of the Svalbard archipelago—one of the northernmost inhabited regions on Earth. The bay depicted is partially covered with ice, suggesting
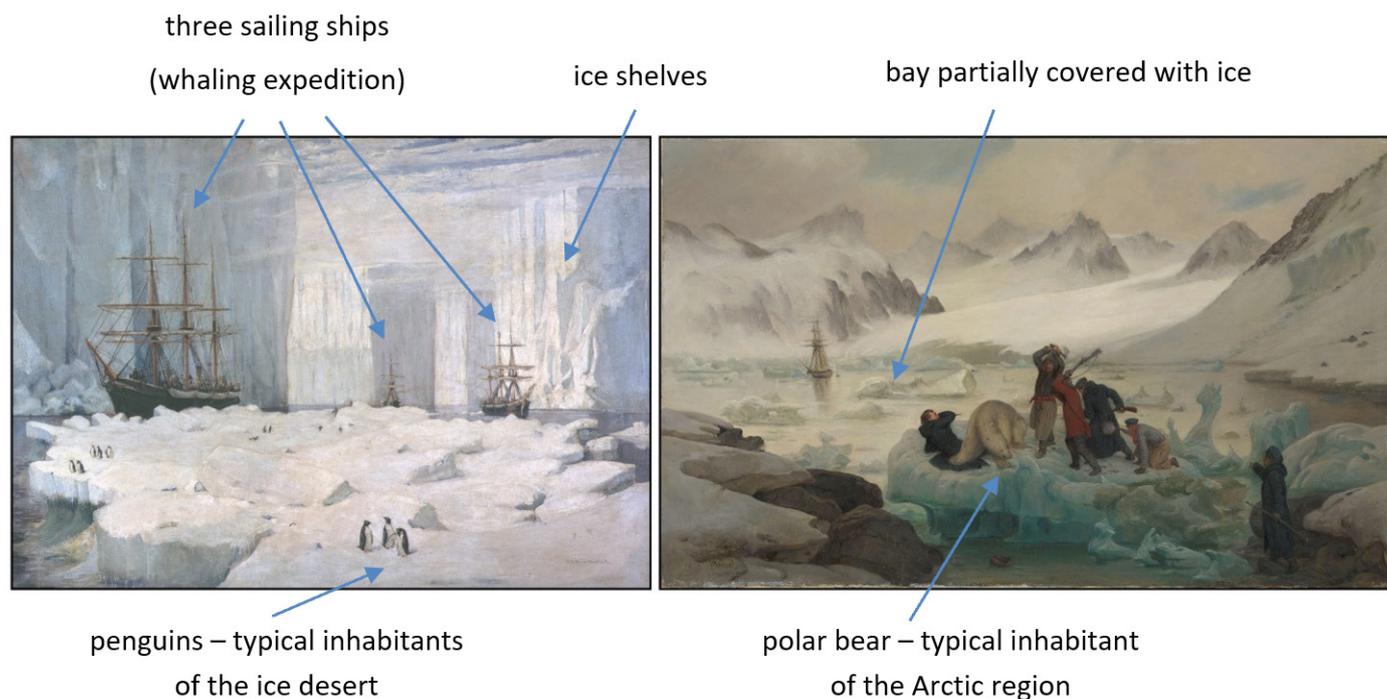
three sailing ships
(whaling expedition)   ice shelves   bay partially covered with ice

penguins – typical inhabitants
of the ice desert   polar bear – typical inhabitant
of the Arctic region

Figure 9. Paintings Depicting the Ice Desert Landscape. Source: own study based on Wikimedia Commons CC BY.

the transitional climate of this area. The scene could represent late spring or early summer, when glaciers and snow still dominate, but the water in the bay is partially ice-free. The seasonal thawing depicted here is critical for Arctic ecosystems, influencing species migration patterns and local climate regulation.

4.9.2 Social and cultural aspects

Svalbard, like other Arctic regions, has historically been a meeting point for European explorers, fur trappers, and whalers. Whalers traveled to these waters in search of abundant whale populations, using the blubber for oil production, while trappers hunted fur-bearing animals such as Arctic foxes, reindeer, and polar bears—the latter prominently depicted in the center of the painting. The depiction of the polar bear emphasizes its symbolic role as a top predator and indicator species for the health of Arctic ecosystems.

Historically, the exploitation of Arctic and Antarctic fauna contributed to major economic activities such as whaling, sealing, and fur trading, which in turn spurred geopolitical interest in polar regions. Today, these areas remain subjects of international treaties and scientific research, reflecting changing human attitudes toward conservation and sustainable use of polar resources.

4.10 Summary of results

In conclusion, the analysis of painted landscapes, such as tropical rainforests, tundra or ice deserts, provides invaluable material for geographic studies. These paintings, through detailed depictions of climatic elements, vegetation, and geomorphological structures, enable comprehensive interpretations of the natural conditions in various climatic zones. As such, these works serve as an excellent educational tool in geography, facilitating the visualization of complex theoretical concepts such as landscape zones or geomorphological processes. Beyond reflecting the physical aspects of landscapes, these paintings offer insights into human interactions with nature. They invite consideration of how different communities adapt to are shaped by the surrounding landscape.

5 Discussion

The results of the analysis of landscape painting in geography education align with previous studies on the role of art in fostering spatial understanding. Castree et al. (2016) emphasize that art can play a critical role in developing an understanding of spatial environmental processes. The use of spatial visu-

alizations, such as landscapes depicted in paintings, can enhance geographic education by engaging students' senses and facilitating the comprehension of complex natural and social phenomena. Daniels (1993) notes that landscape imagery can serve as an educational tool that reinforces regional and national identity, particularly in the context of education focused on spatial formation. Comparing these findings with those of Cosgrove (1998), it becomes evident that the use of painting in geography education not only enhances spatial awareness but also allows students to better understand the symbolic significance of landscapes rooted in social history. Similarly, as Griffin and Fabrikant (2012) point out, the relationship between maps and art can foster a more nuanced perspective on geography, combining cartographic and artistic approaches. These studies demonstrate that integrating diverse visual methods can lead to a deeper understanding of spatial relationships and processes. Furthermore, research by Lowrie et al. (2019) indicates that spatial visualization training significantly contributes to the development of skills in science and geography.

A synthesis of the analyzed paintings (summarized in Table 2) reveals both commonalities and significant differences that align with previous research, while also highlighting specific challenges in using paintings for educational purposes.

A synthesis of the analyzed paintings (summarized in Table 1) reveals both commonalities and significant differences that align with previous research, while also highlighting specific challenges in using paintings for educational purposes. A common feature across most paintings is a relatively high fidelity to geographical reality in works classified as 'realistic' (e.g., Church's "Rain Forest," Day's "Libyan Desert," and Serov's "Deer Sled"). These paintings demonstrate strong potential for pedagogical use, supporting Lowrie et al.'s (2019) conclusions about the benefits of visual realism in spatial education.

However, differences emerge when comparing paintings with a more imaginative or romanticized style (e.g., Rousseau's "Monkeys" or Pilny's "Dance in Desert"), where symbolic content is emphasized over geographical accuracy. This observation is consistent with Hodgson (2000) and Helmund (1987), who argue that stylized representations, while engaging, can lead to misinterpretations in topics requiring precision.

The analysis of paintings in Table 1 supports this view: the pedagogical value was rated lower in artworks where geographical fidelity was compromised in favor of symbolic or emotional expression. Particularly in the case of Rousseau's naïve style, the low geographical fidelity limits its direct use for il-

Table 2. Overview of analyzed landscape paintings.

Name of the landscape zone	Author	Title of the painting	Fidelity to Geography	Symbolic Content	Pedagogical Use
Tropical rainforests	Henri Rousseau	Tropical Forest with Monkeys	Low	High	Medium
	Frederic Edwin Church	Rain Forest, Jamaica	High	Low	High
Savannas	Wilhelm Kuhnert	Massai-Löwe	High	Medium	High
	John Karst	Giraffe	Medium	Low	Medium
Hot deserts	Robin Day	Libyan Desert	High	Medium	High
	Otto Pilny	A dance in the desert	Medium	High	Medium
Mediterranean zone	John Singer Sargent	Cypress Trees at San Vigilio	Medium	Low	Medium
	Albert Bierstadt	View of Subiaco	Medium	Medium	Medium
Steppes	Jan Stanisławski	Steppe	Medium	Medium	Medium
	Józef Brandt	The steppe farm	Medium	High	Medium
Temperate forests	Stanisław Witkiewicz	Pond in the Forest	Medium	Medium	Medium
	Maria Klass-Kazanowska	Wild pigs in the forest	High	Low	High
Taiga	Ivan Shishkin	A Morning in a Pine Forest	High	Medium	High
	Constance Baltuck	Grayling Stream	Medium	Low	Medium
Tundra	MK MacNaughton	Lunch Break With Copter Peak	Medium	Low	Medium
	Valentin Serov	Travelling by Deer	High	Medium	High
Ice deserts	François-Auguste Biard	Fighting with a Polar Bear at Spitsbergen	Medium	High	High
	William Gordon Burn Murdoch	Dundee Antarctic Whaling Expedition	High	Medium	High

lustrating biome characteristics but offers opportunities for discussions on cultural perceptions of exotic landscapes. Thus, the key challenge remains finding a balance between the aesthetic and symbolic qualities of paintings and their educational utility, depending on the intended learning outcomes (e.g., conceptual understanding vs. factual knowledge).

Historical significance also plays a vital role in the depiction of landscapes, especially in the context of colonialism and exploration. Many of the analyzed paintings, particularly those portraying exotic landscapes, served as documentation for European explorers who brought back visual representations of previously unknown regions. An article by Clinton De Menezes (2004) examines the evolving postcolonial and colonial attitudes toward landscapes in South Africa, analyzing how these representations influenced perceptions of the region in both historical and contemporary contexts. Additionally, it is noted that visual representations were instrumental in shaping perceptions of distant lands, influencing colonial policies and societal attitudes toward colonized peoples (Butlin, 2009).

Similarly, Table 1 reveals that paintings of tropical rainforests and deserts often carry implicit or explicit colonial perspectives, emphasizing the 'exotic' and 'otherness' of non-European landscapes. This reinforces the need for critical analysis of historical context when incorporating such artworks into educational settings, as recommended by De Menezes (2004) and Butlin (2009). In conclusion, the comparative synthesis of the analyzed paintings confirms that landscape art can significantly enrich geography education when used thoughtfully and critically, with attention to both its spatial fidelity and its historical-symbolic layers. Table 1 provides a clear framework for selecting paintings based on their educational potential, supporting future practical applications in geography curricula.

6 Conclusions

The primary aim of this article was to examine the potential of utilizing landscape painting as a tool to support geography education, particularly in understanding landscape zones. It was hypothesized that representations of various landscape zones in paintings could effectively enhance the educational process. The analysis of landscape representations in paintings, such as tropical rainforests, tundra, and polar deserts, demonstrated that visual art could play an educational role in teaching geography. Paintings like Fighting with a Polar Bear by François-Auguste Biard or Dundee Antarctic Whaling Expedition effectively capture the harshness of the climate and the challenges faced by Arctic explorers. Similarly, depictions of tundra, as seen in works by Ilya Repin, illustrate a landscape vastly different from tropical rainforests, potentially aiding students in comprehending the contrasts between these zones. These findings confirm that paintings can serve as an effective tool in geography education, providing students not only with an aesthetic experience but also valuable insights into the climate, fauna, and flora of different world regions.

The limitations of this study primarily stem from the nature of the research material—painting, as an artistic medium, often incorporates elements of stylization that may distort the representation of geographical reality. Stylization in art, driven by the individual visions of artists, can lead to subjective depictions of landscapes or places, affecting the interpretations of their geographical significance. Furthermore, the analysis was based on a selection of paintings, which limits the generalizability of the findings. The choice of specific works may not encompass the full range of styles, techniques, or themes present across different periods and artistic traditions.

Another limitation of this study is the deliberate exclusion of artworks from the Romantic period, which played a significant role in shaping social patterns of interpretation and valuation of landscapes. The selection of paintings was guided by the aim to include works that provide clear and accurate representations of physical-geographical and ecological elements, thereby enhancing their didactic utility in geography education. Future research should consider engaging more extensively with Romantic landscape art, particularly in relation to its symbolic and affective dimensions.

Additionally, it is important to note that there is a risk of misinterpretation of the geographical elements depicted in the paintings. As art often presents sub-

jective interpretations of landscapes, students may encounter discrepancies between visual representations and actual geographical realities. For example, exaggerated color schemes or idealized depictions may lead to misunderstandings regarding the true characteristics of a region. To address this issue, it is crucial for educators to provide contextual explanations alongside the artworks, helping students differentiate between artistic representations and geographical facts, thereby fostering a more accurate understanding of landscapes.

Building upon the findings and limitations outlined above, this study contributes to the growing body of research on interdisciplinary approaches to geography education by highlighting the educational potential of visual arts. One of the key strengths of this work lies in its methodological framework, which combines visual content analysis with pedagogical criteria to systematically assess the educational value of landscape paintings. This approach offers educators a practical model for selecting and interpreting artworks in the classroom, bridging the gap between aesthetic appreciation and geographical literacy. Moreover, the comparative overview of different landscape zones through art encourages students to engage with geographical content in a more holistic, emotionally resonant way—supporting the development of spatial thinking, visual literacy, and intercultural understanding. Despite its limitations, the study opens new pathways for the integration of art into geography curricula and calls for further research into how students perceive and process geographical information when it is embedded in artistic representations.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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