



REVIEW OF THE TALE “*BACI BACI CAN BACI*” ACCORDING TO VLADIMIR PROPP'S “*FAIRY TALE ANALYSIS*” METHOD

Abdullah Aydemirⁱ,

Hasan Otlu,

Ahmet İçalın,

Erdem Akilli

Teacher,

Ministry of National Education,

Turkey

Abstract:

There were many narrative types in the oral tradition period when there was no written culture. One of these is the fairy tales that form the language, cultural and value judgments of the society. Fairy tales, which have an important function in the education of children today, have survived until today by being told by a narrator. As a result of research conducted both in the world and in Turkey, many fairy tales have been unearthed so far. Fairy tales, told in different ways from region to region and from region to region, vary in this respect. The imaginary elements in fairy tales, in which we can see the characteristics of the society in which they were created, are important in that they reflect the beliefs and common views that have an impact on societies. Fairy tales continue to exist today through broadcast media such as cinema and television, and they have an important place in the mental development of young children, especially. As a result of the studies carried out so far, different classifications have been made on fairy tales and tales have been divided into categories. Many researchers, especially in Europe, have conducted studies on folk narratives. Many approaches and opinions have been put forward, especially on the structure and typology of fairy tales. One of these studies belongs to Vladimir Propp, who examined the structure of fairy tales. With his work, he tried to analyze the structure of fairy tales within the framework of morphology and by formulating the structural scheme of tales, he determined that there are 31 functions in fairy tales. In this study, after mentioning Vladimir Propp's morphological method, the tale named “*Bacı Bacı Can Bacı*”, one of the Turkish tales, will be examined according to Vladimir Propp's tale analysis method, and the functions of the tale will be determined, and its basic structure will be revealed.

Keywords: function, fairy tale, Propp, structuralism

ⁱ Correspondence: email : can.aydemirs42@gmail.com, hasanotlu91@gmail.com, ahmeticalan@gmail.com, akilli.erdem@gmail.com

1. Introduction

The narratives created by people living in the past, both by being influenced by natural events and by using their imagination, form the structure of the oral tradition by being told from word of mouth before the written era. Fairy tales, which are a product of oral tradition, are also included in this structure. Fairy tales reflect the beliefs and perception of the world of the society in which they are created and are affected by the language and cultural characteristics of that society. The tales of people spread over a wide geography also show diversity and diversity. As a result of studies carried out primarily in the world and abroad, many fairy tales have been identified. Various expressions have been used, and definitions have been made of the tale, which contains many elements. According to Şükrü Elin, who studies Turkish fairy tales, a fairy tale is the story of events or adventures of unknown beings taking place in an unknown time and place (Elin 2004: 368). According to Saim Sakaođlu, another researcher who has worked on fairy tales, the fairy tale is a type of oral narrative that takes place in a fairy tale country and whose heroes, some of which are animals and supernatural beings, are imaginary but can make the listeners believe (Sakaođlu 2002: 4). In the form of this etc. Fairy tales, which have been defined differently by different researchers, appear as an important genre in terms of the elements it contains. Supernatural beliefs and traces are also included in the tales, which contain many psychological and sociological motifs (Sarıkaya 2004: 6).

A lot of research has been done on fairy tales in Europe, and new methods have been developed. Studies on this subject are also carried out by researchers who approach folkloric products from a structural perspective. One of these studies is the "structural analysis" method. The aim of this method is to understand the cultural and mental development of humanity by comparing folklore products by reducing folkloric products to universal models and formulas (obanođlu 2019: 202). In this regard, researchers such as Levi Strauss and Vladimir Propp put forward different opinions.

Structural analysis studies on Turkish fairy tales have also been carried out in Turkey. The first application of the structural analysis method to Turkish tales was made by Umay Günay. In her doctoral thesis titled Elazığ Tales, Umay Günay examined the tales she compiled from Elazığ according to Propp's method and revealed the structure of the tales. (Günay 2011: 15). In addition, many researchers have published articles on Vladimir Propp's structural analysis method.

Vladimir Propp, one of the structural folklore theorists who examined and systematized Russian fairy tales in terms of their structure, pioneered the development and spread of structuralism (Akarslan 2015: 286). Vladimir Propp, a Russian folklorist, conducted studies on folklore. One of these works, "*The Morphology of the Fairy Tale*" (Morfogija Skazki), was not noticed due to the political conditions of the period in which it was published, and was translated into English in the following years. In this way, it has become a method accepted and applied by disciplines such as Linguistics, Literature and Anthropology. Thanks to this method, which later influenced many scientists, new studies and new methods were developed (obanođlu 2019: 209-210). This method,

introduced by Vladimir Propp against the Historical-Geographical method, tries to show how the logical structure of fairy tales is created by revealing the structures of fairy tales that have co-functions (Ekici 2013: 122). For this purpose, Propp takes as a basis the extraordinary tales collected by Afhanassiev (Propp 2017: 27). By examining and classifying Russian fairy tales in terms of their structure, Propp breaks new ground in this field (Abalı 2013: 29). Analyzing the structural features of fairy tales, Propp argues that fairy tales consist of two fixed and variable elements. There are 31 fixed elements in fairy tales and a special term called "function". The elements called variables are also divided into groups. Again, according to him, even if the characteristics and names of the characters change, what does not change, that is, what remains constant, is their functions or actions (Çobanoğlu 2019: 210-211).

The examples he identified are as follows:

- 1) The king gives an eagle to one of the heroes; The eagle takes the hero to another kingdom.
- 2) An old man gives a horse to Suchenko; The horse takes Shuchenko to another kingdom.
- 3) A magician gives Ivan a boat; The boat takes Ivan to another kingdom.
- 4) The king's wife gives Ivan a ring; Big men come out of the ring and take Ivan to another kingdom (Propp 2017: 23).

When the examples above are examined, the fixed and variable elements mentioned by Propp are clearly seen. Although the characters and their names change in the examples, the functions/actions called functions always remain constant. No matter how much the characters in the fairy tale change, they mostly perform the actions in the same way (Bars 2014: 260).

According to Propp, while the heroes in fairy tales perform the same functions, the number of functions is limited, while the number of changing heroes is unlimited. This adds rituality and diversity to the tales. While the heroes, objects, environment and values in the tale provide diversity, the functions provide ritual and uniformity in the tale (Günay 2011: 28). In addition, Propp states that not all functions will appear in fairy tales, and the fact that some functions are missing is because some parts of the tales are shortened or skipped. And he says that this situation will not change the order of emergence of the plot in the tale (Çobanoğlu 2019: 212).

In his study on fairy tales, Propp identifies the following four features of functions:

- 1) The functions that constitute the basic part of the tale are permanent and unchanging elements of the tale, no matter who and how they are performed.
- 2) The number of functions is limited in extraordinary tales.
- 3) The functions are always the same in order.
- 4) Extraordinary tales adhere to a single type in terms of their structure (Propp 2017: 24-26).

Stating that there are 31 functions and symbols in fairy tales, Propp says that fairy tales always have an initial situation, and in this section, the hero or family members are introduced. Stating that this is not a function, Propp refers to it as a morphological

element and initial state. Additionally, this situation is indicated by the symbol α (alpha). After the initial state, 31 functions follow, and these functions are divided into subclasses (Günay 2011: 29). By numbering each of these functions, Propp briefly determines the subject, definition and symbol of the functions. In this way, it aims to compare the structures of the tales schematically (Propp 1987: 43).

The 31 functions identified in fairy tales by Vladimir Propp are:

1. A family member moves away from home. (Definition: moving away, symbol β)
2. The hero encounters a ban. (Definition: ban, symbol γ)
3. The ban is broken. (Definition: breaking the ban, symbol δ)
4. The attacker tries to obtain information. (Definition: investigation, symbol ϵ)
5. The attacker gathers information about his victim. (Definition: gathering information, symbol ξ)
6. The attacker tries to deceive his victim or his wealth in order to get his hands on him. (Definition: deception, symbol η)
7. The victim is deceived and thus unwittingly helps his enemy. (Definition: participation in crime, symbol θ)
8. The attacker harms someone in the family. (Definition: evil, symbol A)
- 8.a. Someone in the family is missing something; Someone in the family wants to achieve something. (Definition: deficiency, symbol a)
9. News of evil or deficiency spreads, and the hero is appealed to with a wish or command. The hero is sent away or allowed to go. (Definition: mediation, moment of transition, symbol B)
10. The seeker hero agrees or decides to take action. (Definition: beginning of opposing action, symbol C)
11. The hero leaves his home. (Definition: going, symbol \uparrow)
12. The hero undergoes a test, interrogation, attack, etc. that enables him to obtain a magical object or aid. encounters. (Definition: first function of donor, symbol D)
13. The hero reacts to the actions of a future donor. (Definition: hero's reaction, symbol E)
14. The magic object is given to the hero. (Description: receiving the magical object, symbol F)
15. The hero is transported to the location of the object he is looking for, and is guided or shown the way. (Definition: journey between two kingdoms, journey accompanied by a guide, symbol G)
16. The hero and the attacker face each other in a shootout. (Definition: conflict, symbol H)
17. The hero acquires a special sign. (Definition: special sign, symbol I)
18. The attacker is defeated. (Definition: victory, symbol J)
19. The initial evil is removed or the deficiency is met. (Definition: troubleshooting, symbol K)
20. The hero returns. (Definition: return, symbol \downarrow)

21. The hero is watched. (Definition: monitoring, symbol Pr)
22. The hero is watched. (Definition: monitoring, symbol Pr)
23. The hero hides his identity and returns to his home or goes to another country. (Definition: coming incognito, symbol O)
24. A false hero makes false claims. (Definition: unfounded allegations, symbol L)
25. The hero is offered a difficult task. (Definition: power work, symbol M)
26. Power is brought to the workplace. (Definition: performing difficult work, symbol N)
27. The hero is recognized. (Definition: recognition, symbol Q)
28. The true identity of the fake hero, attacker, or villain is revealed. (Definition: uncovering, symbol Ex)
29. The hero gets a new look. (Definition: transfiguration, symbol T)
30. The fake hero or attacker will be punished. (Definition: punishment, symbol U)
31. The hero marries and ascends to the throne. (Definition: marriage, symbol W)
(Propp 2017: 29-64).

2. The Tale of "Bacı Bacı Can Bacı"

Once upon a time, a father, his daughter and his son lived together. Since the children's mother died, their father married someone else, and the woman he married did not like children at all. The stepmother, who tortured the children in various ways, asked her husband to throw the children out of the house. Since the father could not bear the children, the stepmother thought of getting rid of them by burning them in the oven. The boy found out about this and ran away with his sister and told their dead mother what their stepmother had done at their mother's grave. A voice from the grave told the two brothers to take a comb, a brush, and soap and run away and throw them to those who came after them. The children took what they were told and started to run away, and their stepmother heard that they were running away and sent soldiers after them. While the two brothers were running away when they saw the soldiers approaching from behind, they first threw the comb, and there were thorns everywhere, saving the children time. Again, as the soldiers approached, this time they took action. There were snakes everywhere, and they gained the opportunity. After some time passed, the brothers saw the soldiers approaching and threw away the soap, and everywhere became a huge sea, and the soldiers stopped following them. That's how the children got rid of them. The two brothers then see water in a place where they stopped to rest. The boy says he is very thirsty and wants to drink the water collected on the deer trail. The girl tells the boy not to drink the water, and if he drinks it he will become a deer. The boy does not care, drinks the water, and becomes a deer. The boy wanders in the meadows during the day and comes to his sister at night. One day, they come to a spring, and the boy goes to graze. The girl goes up to the poplar tree near the spring. While a prince was coming to water his horse, he noticed the girl when his horse got scared. Even though he begs the girl to get off the tree, he cannot convince her. The prince orders his men to cut down the tree.

The men start to cut down the tree, but when it is almost finished, they leave it so that they can cut it down again the next day. When they come to cut down the tree the next day, they see that the tree is flat. Apparently, the deer licked the tree to make it flat to protect its brother. The men cut down the tree again, and when it is almost finished, they leave, saying they will cut it down the next day. When they come in the morning, they see that the tree is still in the same state. Unable to get the girl down from the tree, the prince asks for help from an old woman he sees there. The old woman takes dough and sheet metal to where the girl is and asks the girl for help. While the girl comes down from the tree and helps her, she ties the girl to herself, and when she is done, the girl cannot go back up the tree. The prince takes the girl and the deer and marries the girl. After the wedding, for forty days and forty nights, he sits on the throne with the girl. The deer also lives with them. The girl will have a child soon and tells the Arab aunt that she will go into the water and asks her to bring her loincloth. Meanwhile, the girl's husband went to war. One day, when the girl was going to go into the water, the Arab halayik pushed her into the lake in front of the palace. He wears the girl's clothes, puts the crown on his head and becomes sultan. One day, the gentleman wonders why his white wife has turned so dark and asks. Halayik says that it has darkened because he stays in the sun every day and waits for their path, and the gentleman believes it. Time after time, the halayik gets pregnant, and the food melts away. The woman says she wants to eat a deer, and although the gentleman says that the deer is his brother, he cannot explain anything. When the butchers are about to slaughter the deer, the deer comes to the shore of the lake and calls out to its sister. It turns out that his sister was eaten by a fish. Those who were there heard the deer talking and informed the lord. The gentleman secretly hears what the deer says to the girl. The gentleman understands the truth of the matter and wants all the fish to be caught. A large fish is caught, and its belly is opened, bringing out the woman and her child. The woman tells the gentleman everything that happened to her, one by one. The bey punishes the Arab girl with forty mules, and every part of her is tied to the mule's tail and remains at the top of the mountain. They finally live happily (Sarıkaya 2004: 34-37).

One of the tales analyzed by Umay Günay, who analyzed the tales she compiled from Elazığ using Vladimir Propp's method, is the tale of Bacı Bacı Can Bacı. In the tale called Bacı Bacı Can Bacı, of which Umay Günay examined different versions, it is stated that the tale does not contain some functions. In addition, Umay Günay says that the tale consists of four actions such as "being kicked out of the house, changing shape under the influence of magical water, changing place by throwing it into the water and giving a death order". As a result of the analysis of the tale, she determines its scheme as follows:

- 1) Action: $\alpha \beta_2 A_9 B_5 \eta_1 \theta_1 \lambda \uparrow \gamma_1(\dots)\delta_1$,
- 2) Action: $A_{11} W^*$,
- 3) Action: $\beta_3 \varepsilon_1 \xi_2 \eta_1 \theta_1 A_{10} - A_{12}$,
- 4) Action: $A_{13} B_7 Ex K_4 U w_2$ (Günay 2011: 468-469).

3. The Series of Events and Their Functions in the Tale of "Bacı Bacı Can Bacı"

3.1 Sequence of Events 1 (Action)

- 1) Once upon a time. A man had a daughter and a son. (Description: initial state, symbol α)
- 2) The children's mothers are dead. (Definition: moving away, symbol β)
- 3) The father brings a stepmother to the children, and the stepmother becomes jealous of the children and tortures them. (Definition: evil, symbol A)
- 4) The children could not raise their voices against this situation and went to their mother's grave and cried. (link element - §).
- 5) To get rid of the children, the stepmother has her men light a furnace and plan to throw the children into it. (Definition: evil, symbol A)
- 6) The children learn about the situation and go to their mother's grave and cry. (link element - §).
- 7) The voice in the grave tells the children to take brush, comb and soap and run away and throw themselves after their pursuers. (Description: receiving the magical object, symbol F)
- 8) Children run away from home. (Description: going, symbol \uparrow)
- 9) The stepmother finds out that the children have escaped and sends her men after them. (Definition: evil, symbol A)
- 10) The children take turns throwing the brush, comb and soap after the men. The men give up and return. (Definition: victory, symbol J)

3.2 Series of Events 2 (Action)

- 1) The boy gets very thirsty and sees the water on the deer trail. His sister says, don't do it, brother, then you will become a deer. (Definition: forbidden, symbol γ)
- 2) The boy does not listen to his sister, drinks from the water, and becomes a deer. (Definition: breaking the ban, symbol δ)
- 3) Prince marries the girl. (Definition: marriage, symbol W)

3.3 Series of Events 3 (Action)

- 1) The girl enters the lake in front of the palace, and the Arab halayik pushes her into the lake. (Definition: evil, symbol A)
- 2) When the prince asks the Arab woman why she turned dark, she says that it happened while she was waiting for him to arrive. (Definition: unfounded allegations, symbol L)

3.4 Series of Events 4 (Action)

- 1) One day, when the Arabian halayik had a craving, she asked for the deer to be slaughtered. (Definition: evil, symbol A)
- 2) The deer comes to the lake and explains the situation to his brother. (Definition: moving away, symbol β)

- 3) When the girl fell into the lake, a fish swallowed her, and he told the deer that he could not get out because the fish was in his belly. (link element - §).
- 4) The prince listens to the deer's conversations and learns the truth. (Definition: revealing, symbol Ex)
- 5) The prince makes the fishermen catch all the fish and saves the girl from the fish's belly. (Definition: troubleshooting, symbol K)
- 6) The girl comes out of the fish's belly with her child. (Definition: transfiguration, symbol T)
- 7) The prince has the Arab girl tied to the tails of forty mules, and every part of the woman remains at the top of the mountain. (Definition: punishment, symbol U)
- 8) They all achieve their goals in the end. (Definition: marriage, symbol W)

In the tale of Bacı Bacı Can Bacı, which was analyzed according to Vladimir Propp's analysis method of the tale, four actions were identified: the children running away from home, the boy becoming a deer, the Arab woman throwing the girl into the water and taking her place, and the Arab woman giving the order to kill the deer. The tale first started with the initial situation, and it was seen that not all 31 functions were present in the tale. We can show the schema structure of the tale examined within the scope of Propp's structural analysis method as follows:

- 1) Action: $\alpha \beta A \S A \S F \uparrow J$,
- 2) Action: $\gamma \delta W$,
- 3) Action: A L,
- 4) Action: A $\beta \S Ex K T U W$.

4. Conclusion

Thanks to fairy tales that have nourished man's sense of curiosity and imagination since the past, man has been able to transfer his beliefs and interaction with nature from generation to generation through fairy tales. Fairy tales, which can influence people with the extraordinary elements they contain, are a genre that folklore studies. In this respect, much research have been done on fairy tales, and the origin, structure and formation process of fairy tales have been a matter of curiosity. As a result of studies on fairy tales, especially in Europe, approaches, methods and opinions about fairy tales have been revealed. One of these approaches is the fairy tale analysis method of Vladimir Propp. Propp, who examines the structure of extraordinary Russian fairy tales and states that there are "functions" in fairy tales, which he calls action, argues that even if the heroes, places, objects and values change, the functions will always remain constant. In Turkey, there are also studies in line with Vladimir Propp's views. Umay Günay, one of the first to apply this method in Turkey, analyzes the structure of the tales she compiled from Elazığ. One of the tales he analyzed, the tale of Bacı Bacı Can Bacı, which has different versions, is compatible with Propp's views.

In this study, the "Fairy Tale Analysis Method" of Vladimir Propp, one of the representatives of structural folklore, who tries to reduce folkloric products to universal

models and formulas, which is the subject of our analysis, has been applied to the tale of Bacı Bacı Can Bacı. As a result of the application, it was seen that the majority of the functions in the tale were in accordance with the approach stated by Propp. As Propp points out in this approach, no matter how much the subjects and heroes change, what does not change is the functions. In this respect, a fairy tale has a background function regardless of the nation it belongs to. We can say that the tale of Bacı Bacı Can Bacı, one of the Turkish tales, is also suitable according to the functions created by Propp based on Russian tales. Indeed, this study shows that Turkish fairy tales can also have functionality, even though their themes and heroes are different from Russian fairy tales. In addition, this method applied to Russian fairy tales reveals that it can also be applied to the literary products of different cultures.

Conflict of Interest Statement

The authors declare no conflicts of interest.

About the Author(s)

Abdullah Aydemir works as a Turkish teacher in Konya Karapınar district. He participated in various events. I participated in TÜBİTAK project activities as a participant. Aydemir, who also carries out managerial duties, He received a master's degree from Tesisiz. He has a published book titled "Analysis of the Turkmen Copy of Dede Korkut".

Orcid ID: <https://orcid.org/0009-0003-2129-7413>

Hasan Otlu works as a science teacher in Konya Karapınar district. He took part in various TUBİTAK project activities as a participant. Otlu, who also performed managerial duties, received a master's degree from Tesisiz. Otlu, who has a published article, is still continuing his master's degree with thesis at Necmettin Erbakan University.

Orcid ID: <https://orcid.org/0000-0003-1387-2628>

Ahmet İalan was born in Mersin-Gölınar in 1984 and completed primary and secondary education in Mersin and the first stage of higher education at Hacettepe University. After graduating from Public Administration, I ranked 648th in Turkey in P29, which is the Public Administration-based score type in the 2014 KPSS. After graduating from the Occupational Health and Safety department, I successfully passed the exam held by ÖSYM and received my Class COHS specialization. Afterwards, I studied at the 4-year Department of Social Services and received the title of Social Worker. I completed my master's degree in the Department of Educational Administration Inspection Planning and Economics. I continued to improve myself by reading the sections I mentioned. I will graduate in 2 courses from the 4-year Management Information Systems course I am currently attending. Although I have a published book called "Continuity in Education", I continue to work on my second book "Management and Education Management". I also received training on Projects and wrote various Erasmus+ projects and took part as a coordinator.

Orcid ID: <https://orcid.org/0000-0003-1387-2628>

Erdem Akıllı was born in Afyonkarahisar in 1989 and received my primary, secondary and secondary education in Konya. I completed Cumhuriyet University Computer Programming department in 2010 and Anadolu University Business Administration department in 2019. I passed the 2012 KPSS Associate Degree Exam with a 1% grade and was appointed to the Konya Karapınar District Directorate of National Education and I am still serving in this position.

Orcid ID: <https://orcid.org/0009-0008-3317-1507>

References

- Abalı, İ. (2013). "Yapısal Folklor Bağlamında Bir Masal İncelemesi Örneği", *İdil*, Cilt 2, Sayı 8, ss. 26-40.
- Akarşlan, T. (2015). "Vladimir Propp'un Biçimbilimsel Yaklaşımı Çerçevesinde El Bilmez Alelaceip Oyunu Masalı Üzerine Bir İnceleme", *Gaziosmanpaşa Üniversitesi Sosyal Bilimler Araştırmaları Dergisi*, Cilt 10, Sayı 1, ss. 283-300.
- Bars, M. E. (2014). "Vladimir Propp'un Biçimbilimsel Yaklaşımı Çerçevesinde 'Basat Depegözi Öldürdüğü Boy' Üzerine Bir İnceleme", *Turkish Studies International Periodical for the Languages, Literature and History of Turkish or Turkic*, Volume 9/3, Winter, ss. 257, 269.
- Çobanoğlu, Ö. (2019). *Halkbilimi Kuramları ve Araştırma Yöntemleri Tarihine Giriş*, Ankara: Akçağ Yayınları.
- Ekici, M. (2013). *Halkbilgisi (Folklor) Derleme ve İnceleme Yöntemleri*, Ankara: Geleneksel Yayıncılık.
- Elçin, Ş. (2004). *Halk Edebiyatına Giriş*, Ankara: Akçağ Yayınları.
- Günay, U. (2011). *Elazığ Masalları ve Propp Metodu*, Ankara: Akçağ Yayınları.
- Propp, V. (1987). *Masalların Yapısı ve İncelenmesi*, (Çev. Hüseyin Gümüő), Ankara: Kültür ve Turizm Bakanlığı Yayınları.
- Propp, V. (2017). *Masalın Biçimbilimi*, (Çev. Mehmet Rifat-Sema Rifat), İstanbul: Türkiye İş Bankası Kültür Yayınları.
- Sakaoğlu, S. (2002). *Gümüőhane ve Bayburt Masalları*, Ankara: Akçağ Yayınları.
- Sarıkaya, B. (2004). *Türk Masallarında Aile Yapısı (Bacı Bacı Can Bacı Masalı Esasında)*, Sakarya: Sakarya Üniversitesi, Yüksek Lisans Tezi.

Creative Commons licensing terms

Author(s) will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Education Studies shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflicts of interest, copyright violations and inappropriate or inaccurate use of any kind content related or integrated into the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).