GC Insights: The *Anthro-Pokécene* - Environmental impacts echoed in the Pokémon world

Lewis J. Alcott[1,2] and Taylor Maavara[3]

[1]School of Earth Sciences, University of Bristol, Wills Memorial Building, Queen's Road, Bristol, BS8 1RJ, United Kingdom
[2]Ecohydrology Research Group, Department of Earth and Environmental Sciences, University of Waterloo, Waterloo, Ontario, N2L 3G1, Canada
[3]School of Geography, University of Leeds, Leeds, LS2 9NH, United Kingdom

Correspondence: Lewis J. Alcott (lewis.alcott@bristol.ac.uk)

16   **Abstract**. Public perception of anthropogenic environmental impacts including climate change is primarily driven

17   by exposure to different forms of media. Here, we show how Pokémon, the largest multimedia franchise

18   worldwide, mirrors public discourse in the video games' narratives with regard to human impacts on

19   environmental change. Pokémon demonstrates a trajectory towards greater acknowledgement of climate change

20   and anthropogenic impacts in each released game, and presents a hopeful vision for how society can adapt.

Introduction

The public perception and societal importance of anthropogenic impacts on the environment, including climate change, has evolved over recent decades. This perception is shaped and reflected by political discourse and news media, as well as creative and narrative media, including movies, television, literature, and video games illustrating climate and environmental change (Bulfin, 2017; McCormack et al., 2021). Video games take over 3 billion players to virtual worlds where they can assimilate information as they see and interact with virtual environments (Bankhurst, 2020), and have been recognized for their potential to teach and expose players to learning concepts for decades (Adams, 1998; De Freitas, 2018; Squire et al., 2008).
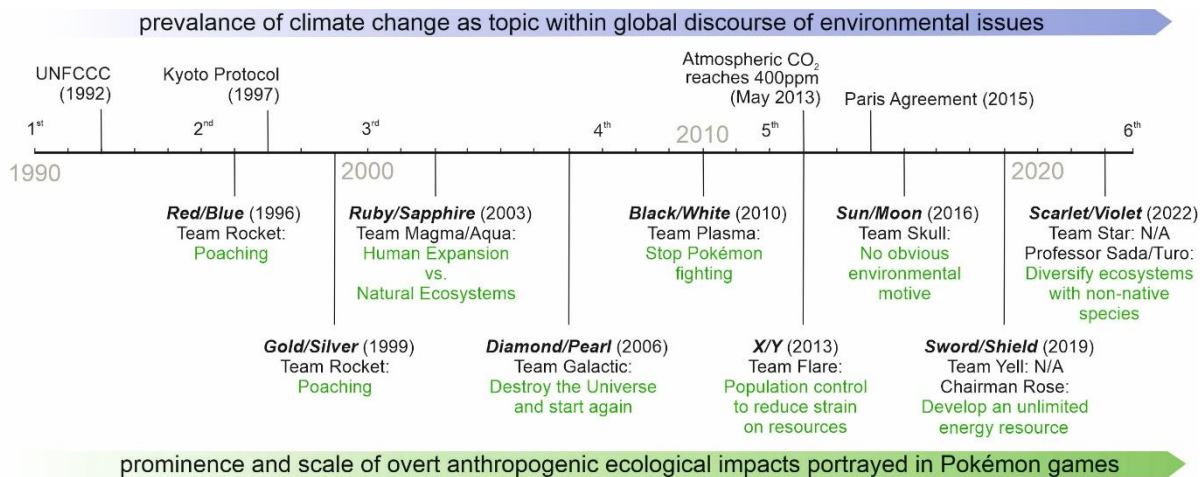
Research into Earth and environmental science's representation in video games is still a growing field (Clements et al., 2022; Hut et al., 2019; McGowan & Alcott, 2022; McGowan & Scarlett, 2021), with many video games inspired by real world settings, events or locations, making them ideal for teaching environmental features, processes and interactions. Pokémon is the largest media franchise worldwide with a total revenue near $100 billion USD (Bulchoz, 2021), with 122 total games across 9 generations, merchandise, trading cards, numerous theatrical film releases and a TV series spanning decades (ThePokémonCompany, 2022). Through gameplay, players can explore interactions between anthropogenic and natural settings, showcasing and exposing human impacts on local and global ecosystems, to audiences of all ages. As is well documented, climate change is a global challenge, and with Pokémon media available across 192 countries (ThePokémonCompany, 2022), it is uniquely poised to be a valuable resource as a climate change knowledge distributor. Therefore, we ask the questions: how have the Pokémon video game's representations of environmental change evolved over the past three decades, and how have they mirrored public discourse and priorities?

Methods

We played the main series Pokémon games released from 1996 to 2023 and thematically analysed driving narratives, imagery, and mentions of anthropogenic impacts in the games, including in game Pokédexes (Bulbapedia, 2024), to evaluate evolving environmental themes. To further define the motives identified from the game, quotes were collated from each generation of games by interrogating game scripts, with themes and representative quotes summarized at https://figshare.com/articles/dataset/Quotes_xlsx/26583709.

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prevalance of climate change as topic within global discourse of environmental issues

UNFCCC (1992) Kyoto Protocol (1997) Atmospheric CO₂ reaches 400ppm (May 2013) Paris Agreement (2015)

1st 2nd 3rd 4th 2010 5th 6th

1990 2000 2010 2020

Red/Blue (1996) Team Rocket: Poaching

Ruby/Sapphire (2003) Team Magma/Aqua: Human Expansion vs. Natural Ecosystems

Black/White (2010) Team Plasma: Stop Pokémon fighting

Sun/Moon (2016) Team Skull: No obvious environmental motive

Scarlet/Violet (2022) Team Star: N/A Professor Sada/Turo: Diversify ecosystems with non-native species

Gold/Silver (1999) Team Rocket: Poaching

Diamond/Pearl (2006) Team Galactic: Destroy the Universe and start again

X/Y (2013) Team Flare: Population control to reduce strain on resources

Sword/Shield (2019) Team Yell: N/A Chairman Rose: Develop an unlimited energy resource

prominence and scale of overt anthropogenic ecological impacts portrayed in Pokémon games

Figure 1: Original release timeline of main-series Pokémon games and the evolution of global discourse surrounding climate change, benchmarked using climate action or impact milestones since 1990. The qualitatively coded themes of the antagonists' motives are highlighted in green. Numbered IPCC reports are noted above the timeline, 1st through 6th.

The Anthro-Pokécene through time

The modern geologic era is often referred to as the Anthropocene due to widespread human impacts across geologies and ecosystems, caused by human impacts including climate change (Waters, 2016). The extent that the Anthropocene is represented in the Pokémon main series games reflects prominent topics within real-world public discourse. We thus refer to the era of anthropogenic change portrayed in the Pokémon world as the Anthro-Pokécene.

The first four generations (*Red/Blue/Yellow*, *Gold/Silver/Crystal*, *Ruby/Sapphire*, and *Diamond/Pearl/Platinum*), released between 1996 and 2006, represent some elements of anthropogenic change, but these are largely limited to minor game script comments, Pokédex entries, or weak inferences that players could draw from game details, like the villainous "nefarious team" plotline (e.g. Team Rocket's efforts to poach Pokémon). These games coincided with a time in history when climate change was not the most central environmental topic in virtually all discourse that it is today (Holland, 2019; Observatory, 2023). In the 1990s, anthropogenic impacts to ecological systems that were often highlighted included poaching, overhunting, overfishing, and habitat destruction via deforestation and industrial pollution, which were in turn the issues highlighted in these early games. All the game development for *Red/Blue/Yellow*, and likely a large proportion of *Gold/Silver* was completed before the Kyoto Protocol was signed in 1997, which represented a major step in terms of bringing climate change into the public awareness (Fig. 1).

As global climate discourse proliferated in the late 2000s and 2010s, the franchise grew and transitioned to better represent the nuance and complexity of environmental change. Narratives became morally ambiguous as game themes dealt with complex environmental decision-making in an increasingly politically polarized world. A clear example of this moral ambiguity is found in the 6th generation games (*X/Y, 2013*): the antagonist wishes to return the planet to a "beautiful" and "unspoiled" state, and while arguably well-intentioned, the plan included eliminating most of the world's population to lessen pressure on the natural world. This storyline mirrors fraught real-world arguments that overpopulation is a root cause of climate change. Without being sanctimonious, this

concept being presented by the game's antagonist inherently causes players to question the ethics of calls to reduce human populations as a viable solution to climate change through exposure and discussion of the subject, which they may not otherwise be witness to. The conclusion of this story notes that to create a better world, people must cooperate globally, which is often quoted as a necessary approach to lessen climate impacts, with the COP26 meeting being subtitled *Together for our planet* (TheUnitedNations, 2021), and cooperation being explicitly cited as a means of climate resilient development in recent IPCC reports (IPCC, 2023).

More recent games acknowledge real-world environmental issues more directly, especially in games set in Alola (*Sun/Moon/UltraSun/UltraMoon; 2016*) and Galar (*Sword/Shield, 2019*), which depict contrasting environmental situations in ways accessible to a general audience. These games were released following the signing of the Paris Agreement in 2015 (Fig. 1), a time when the global environmental discourse had become vocally aware of the urgent need to address the climate emergency. Alola is a Hawaiian island-inspired environmental utopia with a rich ecological diversity due to endemic island species. Galar is a UK inspired industrialized region in which the implications of pollution are evident. The most overt representations of anthropogenic influence in the franchise arose in Galar. For example, the coral Pokémon Corsola, previously depicted as a healthy pink coral, appears in Galar as a white bleached coral, and changes from rock and water type to ghost type, as the "living" version was wiped out by ocean acidification driven by climate change.

A hopeful world

While the Pokémon franchise excels in its presentation of complex environmental situations to a varied audience, the games notably present an overall hopeful representation of society's ability to respond to environmental change. The games have transitioned from including polluting power plants (*Red/Blue, 1996*) to renewable energy solutions such as wind farms (*Diamond/Pearl, 2006*), solar power (*X/Y, 2013*) and geothermal energy production (*Sun/Moon, 2016*). This transition is not restricted to the progression of generations of Pokémon games; the remakes of *Gold/Silver* (1998) named *HeartGold/SoulSilver* (2010), saw the introduction of wind turbines across the region, ultimately leading to their widespread depiction in the most recent game *Scarlet/Violet*. The games also include bicycle paths and wildlife protection zones to demonstrate how the player can respect the environment. Without ever needing to think critically about the game plotlines, in playing the games and remakes released since ~2010, players are moving through and interacting with worlds that represent examples of sustainable, renewable-based living.

For many, Pokémon is a gateway to appreciating the natural world and understanding the scope and complexity of responding to environmental change (Rangel et al., 2022). Whilst we have noted examples of negative human-ecosystem interactions, the Pokémon games expose players of all ages and demographics to ecological and environmental concepts, likely many for the first time. Pokémon has progressed to present a more hopeful balance between humans and the environment over the past few decades. In doing so they represent how popular media has come to mirror public discourse and society aiming for a better planet, albeit whilst presenting moral dilemmas through antagonists actions. The existence of utopian games such as Pokémon can be used to promote optimism that we can overcome modern environmental challenges if we continue to push for improvement, rather than collectively default to catastrophism. Post-apocalyptic games and global phenomena such as *The Last of Us* and

121   *Fallout* are incredible and ground-breaking, but we need its antithesis in the world too, and Pokémon represents

122   that. Chang (2019) aptly summarizes this sentiment:

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124   "*Given the present, fraught historical moment, in which scientists, activists, and educators are often*

125   *stymied in their efforts to depict the scope and urgency of global environmental crisis, games remain*

126   *largely untapped in terms of their potential to create meaningful interaction within artificially intelligent*

127   *environments, to model ecological dynamics based on interdependence and limitation, and to allow*

128   *players to explore manifold ecological futures— not all of them dystopian*."

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Data Availability

All data were collected through bulbapedia.bulbagarden.net and the game scripts as described in the Methods. Additional background information about the game can be found at https://corporate.pokemon.co.jp/en/ (last access: 6 December 2022, The Pokémon Company International, 2023). We do not have permission from the developers to share free access to the game. However, it is publicly accessible to purchase.

The authors explicitly state that they have no commercial ties to The Pokémon Company, Nintendo corporation, and/or its affiliates. This manuscript describes work from a copyrighted video game or otherwise copyrighted material. The copyright for it is most likely owned by either The Pokémon Company, Nintendo and/or its affiliates or the person or organization that developed the concept.

Author Contribution

Both authors contributed to all aspects of the manuscript.

Competing Interests

At least one of the (co-)authors is a member of the editorial board of Geoscience Communication

Ethical Statement

The work presented is original and reflects the authors' views. Ethics approval and informed consent were not sought; this study does not deal with sensitive data or human participants.

154   **References**

155   Adams, P. C. (1998). Teaching and learning with SimCity 2000. *Journal of Geography*, *97*, 47-55.
156   Bankhurst, A. (2020). *Three billion people worldwide now play video games, new report shows*. Retrieved
157   December 6th from https://www.ign.com/articles/three-billion-people-worldwide-now-play-video-
158   games-new-report-shows
159   Bulbapedia. (2023). *https://bulbagarden.net/*. https://bulbagarden.net/
160   Bulbapedia. (2024). Core series. Retrieved 26th July from https://bulbapedia.bulbagarden.net/wiki/Core_series

161   Bulchoz, K. (2021). *The Pokémon Franchise Caught 'Em All*. Retrieved November 25 from
162   https://www.statista.com/chart/24277/media-franchises-with-most-sales/

163   Bulfin, A. (2017). Popular culture and the "new human condition": Catastrophe narratives and climate change.
164   *Global and Planetary Change*, *156*, 140-146.
165   Chang, A. Y. (2019). *Playing Nature. Ecology in Video Games*. The University of Minnesota Press.
166   Clements, T., Atterby, J., Cleary, T., Dearden, R. P., & Rossi, V. (2022). The perception of palaeontology in
167   commercial off-the-shelf video games and an assessment of their potential as educational tools.
168   *Geoscience Communication*, *5*, 289-306.
169   De Freitas, S. (2018). Are games effective learning tools? A review of educational games. *Journal of
170   Educational Technology & Society*, *21*, 74-84.
171   Holland, P. (2019). What were the key environmental issues during the 1990s? Retrieved June 9 2024 from
172   https://www.enotes.com/topics/social-political-change-modern-america/questions/what-were-some-
173   environmental-issues-during-1990s-343179
174   Hut, R., Albers, C., Illingwirth, S., & Skinner, C. (2019). Taking a Breath of the Wild: are geoscientists more
175   effective than non-geoscientists in determining whether video game world landscapes are realistic?
176   *Geoscience Communication*, *2*, 117-124.
177   IPCC (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth
178   Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and
179   J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115, doi: 10.59327/IPCC/AR6-9789291691647
180   McCormack, C. M., Martin, J. K., & Williams, K. J. H. (2021). The full story: Understanding how films affect
181   environmental change through the lens of narrative persuasion. *People and Nature*, *3*, 1193-1204.
182   McGowan, E. G., & Alcott, L. J. (2022). The potential for using video games to teach geoscience: learning
183   about the geology and geomorphology of Hokkaido (Japan) from playing Pokémon Legends: Arceus.
184   *Geoscience Communication*, *5*, 325-337.
185   McGowan, E. G., & Scarlett, J. P. (2021). Volcanoes in video games: the portrayal of volcanoes in commercial
186   off-the-shelf (COTS) video games and their learning potential. *Geoscience Communication*, *4*, 11-31.
187   Observatory, M. a. C. C. (2023). Retrieved December 4 from
188   https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/world/index.html
189   Pérez-Latorre, Ó. & Oliva, M. (2017). Video Games, Dystopia, and Neoliberalism: The Case of BioShock
190   Infinite. *Games and Culture, 14*
191   Rangel, D, O., Lima, J. S., Da Silva, E. F. N., Ferreira, K, A. & Costa, L, L. (2022). Pokémon as a playful and
192   didactic tool for teaching about ecological interactions. *Journal of Biological Education, 58*, 119-29
193   Squire, K. D., DeVane, B., & Durga, S. (2008). Designing centers of expertise for academic learning through
194   video games. *Theory into practice*, *47*, 240-251.
195   ThePokémonCompany. (2022). *History | The Pokémon Company*. Retrieved November 23 from
196   https://corporate.pokemon.co.jp/en/aboutus/history/
197   TheUnitedNations. (2021). *COP26: Together for our planet*. https://www.un.org/en/climatechange/cop26
198   Waters, C. N. (2016). The Anthropocene is functionally and stratigraphically distinct from the Holocene.
199   *Science*, *351*.