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)

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

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

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

18   environmental change, demonstrating a trajectory towards greater and more explicit acknowledgement of climate

19   change and anthropogenic impacts in each released game.

Introduction

21 The perception and societal importance of anthropogenic impacts, including climate change, has evolved over
22 recent decades. This overall perception is both shaped and reflected not only by political discourse and news
23 media, but also by creative and narrative media, with ubiquitous blockbuster movies, television series and popular
24 literature illustrating climate and environmental change (Bulfin, 2017; McCormack et al., 2021). Video games
25 take over 3 billion players to virtual worlds where they can assimilate information as they see and interact with
26 virtual environments (Bankhurst, 2020), and have been recognized for their potential to teach and expose players
27 to concepts for decades (Adams, 1998; De Freitas, 2018; Squire et al., 2008). An investigation into Earth and
28 environmental science's representation in video games is still a growing field (Clements et al., 2022; Hut et al.,
29 2019; McGowan & Alcott, 2022; McGowan & Scarlett, 2021), with many video games taking place in
30 environments that are based on real world settings, events or locations, making them ideal settings to facilitate
31 learning related to environmental features, processes and interactions. In many cases, the graphical quality of
32 games has made it possible for game environments to be indistinguishable from their real-world counterparts (Hut
33 et al., 2019).

34

35 Pokémon is the largest media franchise worldwide with a total revenue near $100 billion USD (Bulchoz, 2021),
36 with 122 games including 36 main series games, merchandise, trading cards, numerous theatrical film releases
37 and a TV series spanning decades (ThePokémonCompany, 2022). Through gameplay, players can explore
38 interactions between anthropogenic and natural settings, showcasing and exposing human impacts on ecosystems,
39 both local and global, to audiences of all ages. As is well documented, climate change is a global challenge, and
40 with Pokémon media available across 192 countries (ThePokémonCompany, 2022), it is uniquely poised to be a
41 valuable resource as a climate change knowledge distributor. In doing so, we ask the questions: how have the
42 Pokémon video game's representations of environmental change evolved over the past three decades, and how
43 have they mirror public discourse and priorities?

44

Methods

46 We played and/or read game scripts of all the main series Pokémon games released from 1996 to 2023, to interpret
47 the overall narratives and design and compare how they have evolved through time. We additionally queried the
48 online Pokémon database Bulbapedia (Bulbapedia, 2023) with the following search terms for individual Pokémon:
49 endangered, climate, extinct, environment, ecology, ecosystem, adapt, hunt, extinct, fishing, and pollution/pollute.
50 We then compared them against the timeline of public perception and growing acknowledgement of
51 anthropogenic change and major events in climate policy, benchmarked using IPCC Assessment Reports and
52 major UN decisions including the signing of the Kyoto Protocol and the Paris Agreement.

53

54
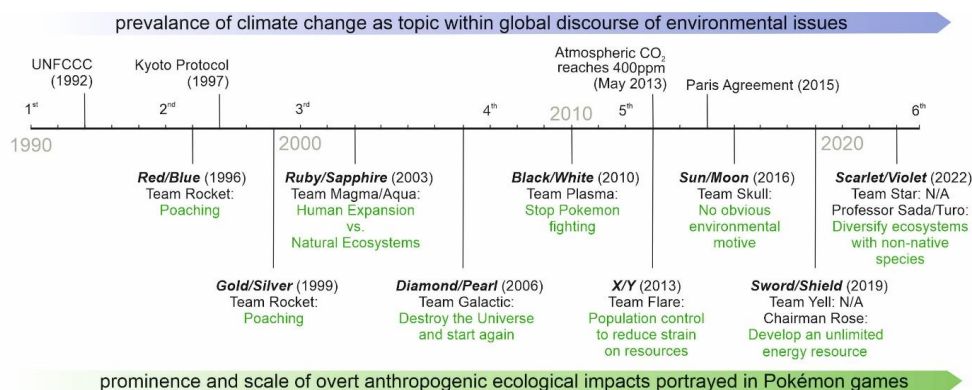
Figure 1: Timeline showing the original release dates of the main-series Pokémon games (the earlier Japanese release
dates are given for the first three games). As an example of the escalation of anthropogenic impacts portrayed in
Pokémon games, summaries of the antagonists' motives are provided in green and how they relate to a human impact
context. Above the timeline there are key events that have occurred since 1990 including the numbered IPCC
Assessment Reports and key UN climate change agreements, which we show to benchmark the general trajectory of
climate change as a topic and growing priority within global discourses and decision-making.

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 main series 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 (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* 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).

The "nefarious team" plotline of the first game following the Kyoto Protocol, *Ruby/Sapphire* (2002), represents a
real-world conflict based on the Isahaya Tidal Flats in the Japanese region Kyushu, which began in 1997 when
the flats were drained to increase arable land area for agriculture (Kaliroff, 2022). The game represents the parties
involved in this dispute as two antagonistic teams wishing to expand agricultural land or support marine
biodiversity and health by expanding aquatic areas. This storyline was one of the first instances where the
Pokémon franchise presented a morally ambiguous dilemma related to environmental change, whereby both
parties were inherently trying to do the "right thing". The short period of time between when the conflict occurred

4

85 and the game's production highlights how the developers were paying attention to present day events and choosing
86 to represent them in the game.

87

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

98

99 The franchise's use of morally ambiguous storylines to present the nuance and complexity of environmental
100 change and associated decision-making in an increasingly politically polarized world. This trend is also found in
101 the earlier 6th generation games (*X/Y, 2013*), with a more extreme example of ambiguity: the antagonist wishes to
102 return the planet to a beautiful and unspoiled state. While arguably well-intentioned, the plan includes wiping out
103 most of the world's population to lessen the pressure on the natural world. This storyline mirrors the fraught real-
104 world argument that overpopulation is a root cause of climate change. Without being sanctimonious or forcing a
105 message upon players, the enemy inherently causes players to question the ethics of calls to reduce human
106 populations as a viable solution to climate change. The conclusion of this story notes that in order to create a better
107 world, people must cooperate globally, which is often quoted as a necessary approach to lessen climate impacts,
108 with the COP26 meeting being subtitled *Together for our planet* (TheUnitedNations, 2021).

109

110 **A hopeful world**
111 While the Pokémon franchise excels in its presentation of complex environmental situations to a varied audience,
112 the games notably present an overall hopeful representation of society's ability to respond to environmental
113 change. The games have transitioned from including polluting power plants (*Red/Blue, 1996*) to renewable energy
114 solutions such as wind farms (*Diamond/Pearl, 2006*), solar power (*X/Y, 2013*) and geothermal energy production
115 (*Sun/Moon, 2016*). This transition is not restricted to the progression of generations of Pokémon games; the
116 remakes of *Gold/Silver* (1998) named *HeartGold/SoulSilver* (2010), saw the introduction of wind turbines across
117 the region, ultimately leading to their widespread depiction in the most recent game *Scarlet/Violet*. The games
118 also include cycle paths and wildlife protection zones to demonstrate how the player can respect the environment.
119 Without ever needing to think critically about the game plotlines, in playing the games and remakes released since
120 ~2010, players are moving through and interacting with worlds that represent examples of sustainable, often fossil-
121 free, living.

122

123 For many, Pokémon is a gateway to appreciating the natural world and understanding the scope and complexity
124 of responding to environmental change. Whilst we have noted examples of negative human-ecosystem

5

125   interactions, the Pokémon games expose players of all ages and demographics to ecological and environmental

126   concepts, likely many for the first time. Notably, Pokémon presents a hopeful balance between humans and the

127   environment, which is a rare depiction in an age of nihilistic, post-apocalyptic games and stories. Maintaining

128   hope that we can overcome modern environmental challenges if we want to continue to push for improvement,

129   rather than collectively default to hopeless catastrophism. Games and global phenomena such as *The Last of Us*

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

131   represents that. Chang (2019) aptly summarizes this sentiment:

132

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

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

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

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

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

138

139
140
141

142

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 depicts 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.

Acknowledgement

References

Adams, P. C. (1998). Teaching and learning with SimCity 2000. *Journal of Geography*, *97*, 47-55.

Bankhurst, A. (2020). *Three billion people worldwide now play video games, new report shows*. Retrieved December 6th from https://www.ign.com/articles/three-billion-people-worldwide-now-play-video-games-new-report-shows

Bulbapedia. (2023). *https://bulbagarden.net/*. https://bulbagarden.net/

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

Bulfin, A. (2017). Popular culture and the "new human condition": Catastrophe narratives and climate change. *Global and Planetary Change*, *156*, 140-146.

Chang, A. Y. (2019). *Playing Nature. Ecology in Video Games*. The University of Minnesota Press.

Clements, T., Atterby, J., Cleary, T., Dearden, R. P., & Rossi, V. (2022). The perception of palaeontology in commercial off-the-shelf video games and an assessment of their potential as educational tools. *Geoscience Communication*, *5*, 289-306.

De Freitas, S. (2018). Are games effective learning tools? A review of educational games. *Journal of Educational Technology & Society*, *21*, 74-84.

Hut, R., Albers, C., Illingwirth, S., & Skinner, C. (2019). Taking a Breath of the Wild: are geoscientists more effective than non-geoscientists in determining whether video game world landscapes are realistic? *Geoscience Communication*, *2*, 117-124.

Kaliroff, M. (2022). *20 Years Later - The Message of Pokémon Ruby & Sapphire*. Retrieved December 4 from https://goombastomp.com/the-message-of-pokemon-ruby-sapphire/

McCormack, C. M., Martin, J. K., & Williams, K. J. H. (2021). The full story: Understanding how films affect environmental change through the lens of narrative persuasion. *People and Nature*, *3*, 1193-1204.

McGowan, E. G., & Alcott, L. J. (2022). The potential for using video games to teach geoscience: learning about the geology and geomorphology of Hokkaido (Japan) from playing Pokémon Legends: Arceus. *Geoscience Communication*, *5*, 325-337.

McGowan, E. G., & Scarlett, J. P. (2021). Volcanoes in video games: the portrayal of volcanoes in commercial off-the-shelf (COTS) video games and their learning potential. *Geoscience Communication*, *4*, 11-31.

Observatory, M. a. C. C. (2023). Retrieved December 4 from https://sciencepolicy.colorado.edu/icecaps/research/media_coverage/world/index.html

Squire, K. D., DeVane, B., & Durga, S. (2008). Designing centers of expertise for academic learning through video games. *Theory into practice*, *47*, 240-251.

ThePokémonCompany. (2022). *History | The Pokémon Company*. Retrieved November 23 from https://corporate.pokemon.co.jp/en/aboutus/history/

TheUnitedNations. (2021). *COP26: Together for our planet*. https://www.un.org/en/climatechange/cop26

Waters, C. N. (2016). The Anthropocene is functionally and stratigraphically distinct from the Holocene. *Science*, *351*.