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 and sustainable practices 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 Pokédex (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. Finally, positive representations of sustainable practices are also identified and summarized in the supplementary file.
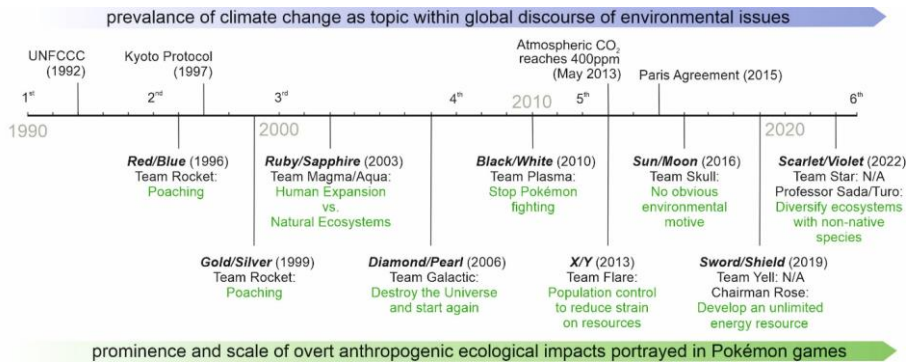
Figure 1: Original release timeline of main-series Pokémon games and the evolution of global discourse surrounding climate change, benchmarked using climate action or impact milestones since 1990. The qualitatively coded themes of the antagonists' motives are highlighted in green. Numbered IPCC reports 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

82   concept being presented by the game's antagonist inherently causes players to question the ethics of calls to reduce

83   human populations as a viable solution to climate change through exposure and discussion of the subject, which

84   they may not otherwise be witness to. The conclusion of this story notes that to create a better world, people must

85   cooperate globally, which is often quoted as a necessary approach to lessen climate impacts, with the COP26

86   meeting being subtitled *Together for our planet* (TheUnitedNations, 2021), and cooperation being explicitly cited

87   as a means of climate resilient development in recent IPCC reports (IPCC, 2023).

88

89   More recent games acknowledge real-world environmental issues more directly, especially in games set in Alola

90   (*Sun/Moon/UltraSun/UltraMoon; 2016*) and Galar (*Sword/Shield, 2019*), which depict contrasting environmental

91   situations in ways accessible to a general audience. These games were released following the signing of the Paris

92   Agreement in 2015 (Fig. 1), a time when the global environmental discourse had become vocally aware of the

93   urgent need to address the climate emergency. Alola is a Hawaiian island-inspired environmental utopia with a

94   rich ecological diversity due to endemic island species. Galar is a UK inspired industrialized region in which the

95   implications of pollution are evident. The most overt representations of anthropogenic influence in the franchise

96   arose in Galar. For example, the coral Pokémon Corsola, previously depicted as a healthy pink coral, appears in

97   Galar as a white bleached coral, and changes from rock and water type to ghost type, as the "living" version was

98   wiped out by ocean acidification driven by climate change.

99

100   **A hopeful world**

101   While the Pokémon franchise excels in its presentation of complex environmental situations to a varied audience,

102   the games notably present an overall hopeful representation of society's ability to respond to environmental

103   change (examples listed in the supplementary file). The games have transitioned from including polluting power

104   plants (*Red/Blue, 1996*) to renewable energy solutions such as wind farms (*Diamond/Pearl, 2006*), solar power

105   (*X/Y, 2013*) and geothermal energy production (*Sun/Moon, 2016*). This transition is not restricted to the

106   progression of generations of Pokémon games; the remakes of *Gold/Silver* (1998) named *HeartGold/SoulSilver*

107   (2010), saw the introduction of wind turbines across the region, ultimately leading to their widespread depiction

108   in the most recent game *Scarlet/Violet*. ~~The~~ Several games also include bicycle paths and wildlife protection zones

109   to demonstrate how the player can respect the environment. Without ever needing to think critically about the

110   game plotlines, in playing the games and remakes released since ~2010, players are moving through and

111   interacting with worlds that represent examples of sustainable, renewable-based living.

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113   For many, Pokémon is a gateway to appreciating the natural world and understanding the scope and complexity

114   of responding to environmental change (Rangel et al., 2022). Whilst we have noted examples of negative human-

115   ecosystem interactions, the Pokémon games expose players of all ages and demographics to ecological and

116   environmental concepts, likely many for the first time. Pokémon has progressed to present a more hopeful balance

117   between humans and the environment over the past few decades. In doing so they represent how popular media

118   has come to mirror public discourse and society aiming for a better planet, albeit whilst presenting moral dilemmas

119   through antagonists actions. ~~The existence of utopian games such as Pokémon can be used to promote optimism~~

120   ~~that we can overcome modern environmental challenges if we continue to push for improvement, rather than~~

121   ~~collectively default to catastrophism. Post apocalyptic games and global phenomena such as *The Last of Us* and~~

Fallout are incredible and ground-breaking, but we need its antithesis in the world too, and Pokémon represents that. Chang (2019) aptly summarizes this sentiment:

"Given the present, fraught historical moment, in which scientists, activists, and educators are often stymied in their efforts to depict the scope and urgency of global environmental crisis, games remain largely untapped in terms of their potential to create meaningful interaction within artificially intelligent environments, to model ecological dynamics based on interdependence and limitation, and to allow players to explore manifold ecological futures — not all of them dystopian."

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.

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