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

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Abstract. Public perception of anthropogenic environmental impacts including climate change is primarily driven by exposure to different forms of media. Here, we show how ~~the~~ Pokémon ~~franchise~~, the largest multimedia franchise worldwide, mirrors public discourse in the video games' narratives with regard to human impacts on environmental change. ~~~~Pokémon demonstrates a trajectory towards greater acknowledgement of climate change and anthropogenic impacts in each released game, and ~~popular media as a whole.~~ 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 ~~overall~~ perception is shaped and reflected by political discourse and news media, as well as creative and narrative media, including ~~blockbuster~~ movies, television ~~series~~, 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 ~~instances~~mentions of anthropogenic impacts in the games, including in game Pokédex (Bulbapedia, 2024~~)~~). to evaluate evolving ~~anthropogenic and~~ environmental themes. ~~In order to better~~To further define the motives identified from the game, ~~representative~~ quotes were collated from each generation of games by interrogating game scripts, with themes and representative quotes ~~which can be found~~summarized at https://figshare.com/articles/dataset/Quotes_xlsx/26583709.
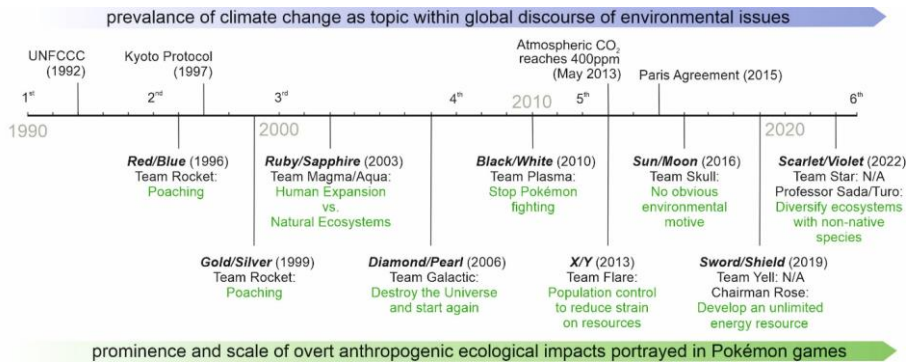
Figure 1: Original release timeline of main-series Pokémon games and the evolution of global discourse surrounding climate change ~~evidenced by environmental events since 1990 (e.g., climate meetings and agreements),~~, benchmarked using climate action or impact milestones since 1990. The qualitatively 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).

~~The~~ As global climate discourse proliferated in the late 2000s and 2010s, the franchise ~~goes through a transition~~grew and transitioned to ~~using ever-growing morally ambiguous storylines to present~~better represent the nuance and complexity of environmental change ~~and associated~~. Narratives became morally ambiguous as game themes dealt with complex environmental decision-making in an increasingly politically polarized world. ~~This trend~~A clear example of this moral ambiguity is ~~also~~ found in the ~~earlier~~ 6th generation games (*X/Y, 2013*~~), with a more extreme example of ambiguity:~~): the antagonist wishes to return the planet to a "beautiful" and "unspoiled" state. ~~While~~, and while arguably well-intentioned, the plan ~~includes wiping out~~included eliminating most of the

world's population to lessen ~~the~~ pressure on the natural world. This storyline mirrors ~~the~~ fraught real-world ~~argument~~arguments that overpopulation is a root cause of climate change. Without being sanctimonious ~~or forcing a message upon players,~~, this concept being presented by the ~~enemy~~game's antagonist inherently causes players to question the ethics of calls to reduce human populations as a viable solution to climate change~~,~~ through ~~direct~~ exposure ~~to~~ and discussion of the ~~thought.~~subject, which they may not otherwise be witness to. The conclusion of this story notes that ~~in order~~ 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 ~~however~~ 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 ~~generations of~~ 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 ~~an~~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 ~~cycle~~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, ~~often fossil free,~~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. ~~Notably,~~ Pokémon ~~presents a~~has progressed to present a more hopeful balance between humans and the environment~~, similar to other hopeful and progressive narrative worlds created in games (e.g. Anno 2070). These hopeful scenarios currently exist alongside numerous and~~ over

the past few decades. In doing so they represent how popular ~~nihilistic, post-apocalyptic games and stories (which can maintain underlying hopeful messages regarding humanity's ability~~media has come to ~~recover from apocalypse, despite rather bleak world views regarding the present climate crisis, (e.g. Perez Latorre & Oliva 2017).~~mirror public discourse and society aiming for a better planet, albeit whilst presenting moral dilemmas through antagonists actions. The existence of ~~these~~ utopian games ~~promotes and maintains hope~~such as Pokémon can be used to promote optimism that we can overcome modern environmental challenges if we ~~want to~~ continue to push for improvement, rather than collectively default to ~~hopeless~~ catastrophism. ~~Games~~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 ~~depicts~~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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