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Potential futures for the IPCC's approach to artificial intelligence

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During the first six assessment cycles of the Intergovernmental Panel on Climate Change (IPCC), generative artificial intelligence (AI) tools were not widely available. This has rapidly changed. The IPCC will need to make choices about how to use artificial intelligence powered applications in literature identification, literature assessment, and communicating the contents of the report. These are not merely technical decisions, but sociopolitical challenges, as the IPCC has a social function of creating a shared basis of reality for addressing climate change. To explore these challenges, this paper describes four scenarios of potential AI development: rapid adoption of AI agents, perceptions of superior AI reliability, caution among the research community, and public backlash to AI. If the IPCC can navigate these emergent challenges, there is an opportunity for it to serve as a learning opportunity for other institutions grappling with how to do scientific assessment in a world with generative AI.

An Intergovernmental Panel on Climate Change (IPCC) assessment report takes hundreds of people and several years of work. The sixth assessment report (AR6), in a cycle from 2015–2023, involved >700 selected authors, many more contributing authors, and thousands of expert reviewers producing three Working Group reports and a final Synthesis Report, in addition to the initial Special Reports. This collective labor, to be repeated in the seventh assessment cycle (AR7) ending in 2029/30, assesses tens of thousands of scientific articles to describe the state of knowledge about climate change, its impacts, and how to address it. In many ways, this kind of synthesis work seemingly looks like a perfect candidate for employing artificial intelligence (AI), with generative AI (GenAI) tools able to synthesize text—and increasingly, able to search the literature as well. The full AR6 assessment is also ~8000 pages long, meaning that users will need to extract information from it for details: a task well-suited to AI tools. There are three main functions where the IPCC will need to make decisions about AI use. The first concerns machine learning (ML) algorithms in literature identification, in terms of finding relevant literature and narrowing it down to the most relevant publications. The second involves using GenAI in the assessment itself—not just collecting papers, but reading and drafting a synthesis of the literature. The third is about using GenAI to communicate what is written in the reports, operating as a smart search function that could help answer questions or interpret findings for readers' particular concerns.

The potential benefits seem obvious—but their implementation will be contentious. How to incorporate AI into scientific research and assessment is already widely debated and studied, including work focusing specifically on climate change assessments[1–3]. The academic discourse surrounding GenAI in science reflects a spectrum of engagement ranging from enthusiastic adoption to cautious evaluation and skepticism[4,5], with early explorations raising questions about changing definitions and practices of authorship[6–8] and the issue of how AI will disrupt the traditional role of knowledge brokers in translating knowledge[9]. Emergent literature scrutinizes how GenAI might reshape science[10,11], including speculating on whether it spells the end of the review paper[12] given that AI agents can enable systematic reviews in hours rather than months[13–15] and cautioning that this might flood the scientific record with low-quality synthesis papers[12]. It also explores GenAI adoption by scientists, finding that AI-assisted writing is growing fastest in countries where there are language barriers to publishing in English and suggesting that AI could help mitigate linguistic inequalities[16].

Beyond literature on scientific production, research has also emerged on how AI impacts the science-public interface[17], including studies of how AI is used in scientific information retrieval[18,19] and how AI portrays scientific controversies and scientific misbehaviors[20]. Research also examines how to use AI to improve climate literacy, engagement, and empathy[21–25]; considers how AI can enable access to climate services[26], equipping stakeholders in agriculture, urban planning, and disaster management with new tools[27]; assesses the reliability of AI products to offer climate-related information, and explores potential geographic and other forms of biases from training datasets[28,29]. Scholars have also examined the environmental footprint of AI, and are studying the greenhouse gas emissions[30] and impacts on the energy transition, as well as the ethical dimensions of sustainability in AI systems[31].

If we take comprehensively assessing the ever-growing scientific literature on climate change[32] as the focus activity of the IPCC, AI seems to have incredible utility. But AI adoption within the IPCC has a particular

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socio-political challenge. Importantly, the IPCC is not a purely scientific organization but an intergovernmental United Nations (UN) body under the auspices of the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). The IPCC does not exist to simply produce a synthetic assessment of the latest scientific literature. A core function of the IPCC is to create a scientifically authoritative but politically legitimized consensus about the state of climate knowledge[33,34]. AI might excel at the former task whilst fundamentally undermining the latter. Social scientists have described how the IPCC's practices can function as "de facto governance", or an unacknowledged steering that shapes the field of scientific inquiry and the context for formal national and global climate governance[35,36]. The IPCC is policy neutral in principle, yet also has symbolic power in helping to legitimize courses of action, from informing mitigation planning to shaping adaptation policies[36,37]. Hence, the value of such a process is not just in the output but also in the discussions through which hundreds of researchers develop a shared understanding of climate change through practices of collective reasoning[38]. This process unfolds across academic disciplines in the Working Group reports and the eventual approval of Summaries for Policymakers (SPM), through which a subset of authors and IPCC member governments reach agreement on the official, consensus-based view of climate change—a view that is usually not called into question in similar consensus-based settings under the UN Framework Convention on Climate Change (UNFCCC)[34,39,40].

Thus, developing a comprehensive policy on AI for the IPCC in particular is going to be more complicated than just negotiating AI's roles in scientific knowledge production or climate communication, given the unique function the IPCC fulfils at the climate science-policy interface. In fact, any comprehensive AI policy for the IPCC must be approved in a plenary session of member governments by consensus, and this alone could be a difficult task, like any change of the ground rules in a contested field of interactions[34]. The IPCC operates within a complex sociopolitical landscape where perceptions of legitimacy matter as much as fidelity to the literature. All of this means that developing a policy on AI for the IPCC is not simply a matter of understanding the technical potential (speed, efficiency, most useful AI tools), all of which affect the practicalities of scientific consensus-building processes[2]. It is also about how such a policy affects the societal consensus-building process. AI will disrupt not just the process of writing a report and communicating its findings, but also the deep purpose of the IPCC in building a shared version of reality to work from.

Fundamentally, AI adoption in the IPCC will depend on broader contextual changes in society due to AI itself. We cannot discuss the merits of the IPCC's choices without considering the wider societal AI adoption that will shape both the landscape of options and how the IPCC's choices are interpreted. To understand how the IPCC might navigate this new terrain, we explore four scenarios about how social understanding and adoption of AI might evolve over the current assessment cycle, AR7 (2023-2029/30), along three dimensions: literature search, synthesis, assessment and communication. While the IPCC has various other activities it participates in—such as special reports and workshops—the framework we use below analyzes these three core functions because they align with the established stages of an IPCC assessment cycle (literature identification, synthesis/assessment, and communication of findings, which are well-documented in IPCC procedures and prior literature on the IPCC process)[34,39].

These scenarios are informed by two axes of assumptions about the future development of AI before 2030. The first is the spectrum of societal and scientific acceptance, ranging from a future where AI is broadly trusted and adopted to one where it is met with widespread resistance and viewed as taboo. The second axis is the degree of automation AI introduces into in knowledge processing, which could vary from tasks remaining entirely human-driven to becoming fully AI-driven; we consider a spectrum from AI-as-tool (augmenting human work) to AI-as-agent (autonomous action) (Fig. 1). The underlying rationale for choosing these axes is to illustrate that technical capability alone does not determine adoption; social trust and legitimacy are equally decisive for an institution like the IPCC. These axes thus reflect both supply-side (what AI can do) and demand-side (what society will accept) uncertainties.

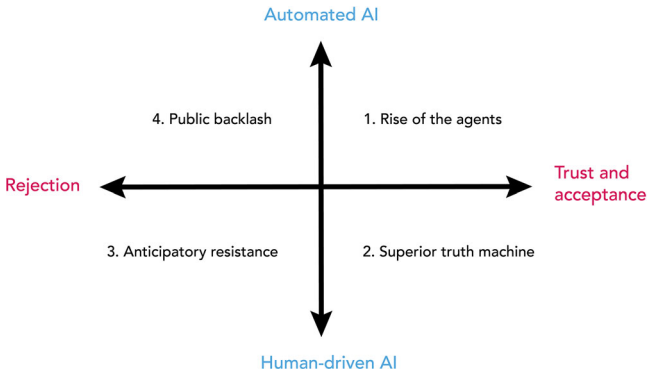

Fig. 1 | Four scenarios for AI development. Conceptual figure illustrating four scenarios of AI development, alongaxes of social resistance and acceptance, and automated AI vs. human-directed AI.

Importantly, these scenarios are not predictions about what the IPCC will or could do, but as-if thought experiments about the futures in which it might be embedded[41]. Each presents distinct challenges for maintaining both scientific rigor and wider social consensus, which includes political legitimacy.

Scenarios

Rise of the agents

In this scenario, agentic AI becomes widespread within the next few years, fundamentally changing how professionals work. Agentic AI is where artificial agents use natural language interfaces to execute sequences of actions on users' behalf[42]; bringing up questions about the agent's alignment with human priorities, the influence of the agents on their human users, and the potential need for regulatory agents to monitor other agents[43].

Literature search. As these agents become ubiquitous across academia, research, government, and the private sector, there will be implications for literature search—agents may collaborate to scout the literature. Agents could be embedded within the IPCC process, continuously screening the literature. Strict bounds for automated inclusion, such as confining agents to known databases for peer-reviewed literature, could make it challenging to include "gray" (i.e., not peer-reviewed) literature or Indigenous Knowledge. Conversely, expanding the scope to include gray literature, where AI could help break language barriers and enable cross-lingual search, would place a significant verification burden on authors, given the mixed quality of such sources.

Synthesis and assessment. Another set of agents could synthesize the literature and update draft chapters, including generating data visualizations created from the underlying data in cited papers, whilst maintaining a detailed log for authors' verifications against established benchmarks, and for expert reviewers and the public for transparency.

Communication. IPCC reports must be written with content optimized not just for human readers, but for AI consumption and processing. Consequently, much of the assessment and its communication transforms into agent-to-agent information exchange, where content is accessed, interpreted, and transmitted through AI intermediaries (i.e. Large Language Models–LLMs), in addition to humans. This requires the IPCC to consider how its assessments can be structured for optimal LLMs and human parsing and synthesis.

A critical concern emerges under such a scenario: what happens when users extract IPCC text and process it through chatbots for interpretation? Such practices are already occurring[44,45]. Should the IPCC pre-empt potentially problematic third-party interpretations by providing "official"

chatbot access? On the other hand, having a record of agentic decisions could provide a "traceability" in the IPCC's reasoning that might enhance its credibility for some. Still, there will continue to be inherent limitations in LLMs used for communicating scientific reports[2]. These include probabilistic pattern generation that can erode scientific nuance, stochastic outputs that challenge reproducibility, static parametric knowledge that may become outdated unless augmented with new knowledge retrieval (i.e, Retrieval-Augmented Generation, RAG), and hallucinations that produce plausible-sounding but false information.

Implications for IPCC as an institution. This raises fundamental questions about workflows, audience and format. First, should the IPCC develop its own agentic capabilities for IPCC authors? Second, how much should the IPCC optimize its outputs to be read and processed by AI agents, and what changes to the preparation and presentation of the report should be undertaken with agentic readers in mind? Third, should the IPCC actively house an LLM to help readers navigate the report and its data? The IPCC already produces multiple formats (PDFs, printed copies, webpages, infographics). Creating an official LLM that reproduces paragraphs verbatim would be technically straightforward, and it could essentially operate as an enhanced search functionality that could prove beneficial for accessibility, albeit this comes at the risk of hallucinations, among other limitations that are inherent to the LLM architecture. Alternatively, RAG systems, which ground responses directly in source documents rather than relying solely on parametric knowledge ("original" LLM knowledge), could mitigate hallucination risks by linking outputs back to specific passages in the reports. However, even RAG-based approaches are not immune to limitations, as the underlying language model may still misinterpret or misrepresent retrieved content[2].

Furthermore, in such a highly automated environment, the traditional human-led approval process for SPMs may suddenly appear to be 'outdated'. But any attempt at automating the generation of SPMs creates tensions with the still human-led and consensus-based negotiation mode in the UNFCCC prevalent in IPCC panel sessions. More broadly, if agentic AI is widespread in society, it may call the traditional pacing of an IPCC assessment cycle (5–7 years) into question. Frequently, there are suggestions for the IPCC to produce short, accessible reports with updated information that are more tailored to nimbly respond to knowledge needs, or even move to enabling ongoing learning processes in a dynamic approach[46,47]. With the development of agentic AI, professionals may be accustomed to tasking agents with discovering instant answers, and the speed of IPCC assessment may feel obsolete.

Implications for IPCC authors. Adoption of agentic AI would fundamentally transform the author's role from a writer to an expert verifier and agent manager.

Wider social implications. Whilst AI intermediaries could enhance access to text, they risk diluting the IPCC's carefully chosen language around uncertainty and confidence. The very authority of the IPCC, built on human expertise and deliberation, could be undermined by the perception that machines are the primary constructors, readers and interpreters of its work.

Superior truth machine

In this scenario, there is a low degree of automation in knowledge processing —humans guide the process and make the final judgments—and there is high trust in AI-generated output. AI-generated output becomes viewed as superior to human equivalents, and is often turned to as an arbiter of truth or in social and political disputes about knowledge. LLMs gain trust in terms of being perceived as more comprehensive and balanced, and free from human political biases. Users become accustomed to AI summaries that are accurate and readable, leading to higher perceptions of credibility and trustworthiness of the authors[48]. Private platforms for scientific summaries that are already being launched by scientific publishers present themselves as tools for human creators to undertake scientific synthesis and consensus building and emerge as competitors to traditional assessments, potentially offering more rapid summaries or even providing functions of assessment and knowledge synthesis.

Literature search. Humans are directing the literature search, but their expert choices are open to greater scrutiny, as anyone could use a trusted AI tool to check the same body of literature for omissions. AI augmentation could facilitate inclusion of literature in multiple languages through multilingual search and summarization, including technical reports. The IPCC has also been critiqued for having reductive approaches[49] and structural limitations that limit incorporation of Indigenous Knowledge[50] and traditional knowledge[51]; GenAI could be employed in ways that enhance or limit this incorporation, with the possibility for building AI systems that draw on Indigenous knowledge systems[52], but also risks around erosion of cultural knowledge or data-grabbing that does not accord with principles of Indigenous Data Sovereignty[53]. In this scenario, expanding the scope in this way places a verification burden on authors, making the extent of such inclusion a matter of human direction and judgment.

Synthesis and assessment. The primary challenge comes not from automation within the IPCC, but from externally produced "shadow versions" of the reports. These AI-generated alternative assessments—produced by groups with specific political or scientific agendas—could emerge to contest the IPCC's findings using the same corpus of literature. Shadow versions could also emerge during the review process, followed by claims that the IPCC ignored superior AI-assisted input. This creates an arms race dynamic. Government delegations, invested in maintaining influence over the "official" climate narrative, will aim to reinforce the IPCC version, particularly for the SPM approval.

Communication. Users will increasingly question whether they should trust human-crafted text over AI alternatives, particularly when AI versions seemingly appear to be more up to the task by updating more frequently or being more comprehensive in scope. The wide availability of competing AI-generated versions of reality allows users to "shop for" interpretations that align with their preferences.

Implications for IPCC as an institution. If different chapters or even whole Working Groups adopt varying approaches to AI integration, these differences will become publicly visible, exposing weaknesses in human-only assessment. The institution may also face pressure from "gotcha" papers that highlight discrepancies or show user preferences for AI-generated summaries, hence potentially undermining the IPCC's credibility.

If shadow assessments are inevitable, it becomes untenable for the IPCC to take a restrictive stance towards AI. It will be under pressure to develop its strategy to incorporate and respond to AI alternatives proactively. The question becomes how to maintain the authority of human-led assessment when AI output is perceived to be superior. Embedding AI with clear benchmarking criteria may be necessary for the IPCC to defend the credibility of its main products, not only the Working Group and Special Reports, but also the carefully crafted SPMs.

When it comes to the SPMs, how much they deviate from the underlying assessment will become an object of AI-supported re-analysis —and governments will deliberate them in approval plenaries with the help of the various AI agents that they can build or access. Countries that make use of technology ecosystems developed in China or the United States may have their results influenced by the technology stacks—the resources, chips, networks, applications and algorithms, data, and GenAI models—that have developed in those national contexts, and the affordances of those systems may impact their workflows. At the same time, this AI-supported deliberation doesn't affect the way the negotiated SPM can be used in the still human-led and consensus-based UNFCCC negotiations.

Implications for authors. AI's legitimacy and perceived superiority bring challenges for authors. Should each chapter team develop an official AI-generated shadow version, against which they justify their differing judgment? On the one hand, this could elucidate the value of their expertise, but equally could prove cognitively demanding and demoralizing. This would shift the authors' role from primary synthesizers and evaluators to expert adjudicators, who must develop clear technical and scientific benchmarks to justify why their conclusions should be preferred to a trusted AI output. At the same time, many authors may embrace AI models as scientific collaborators in their own research[48], which would spill over into their IPCC work.

Wider social implications. This widespread trust in AI as an arbiter of truth in science has profound social consequences. First, there is the risk that diverse forms of knowledge will be completely disregarded. Second, as social science literature points out, the struggle about policy alternatives and the meaning of climate change itself is the basis of legitimacy in democratic decision-making. If AI is used in climate governance in ways that shortcut this debate by presenting a single "correct" assessment, there is a risk of closing down policy options in ways that limit robust decision-making[54]. In a study of the challenges of AI in climate governance, Ruth Machen and Warren Pearce caution about "not just the importing of particular methods but also of particular logics, esthetics, and values into processes of environmental governance"[54].

Anticipatory resistance

In this scenario, AI augments humans, but people are also wary of it, leading to pressure to take precautionary or restrictive approaches that may underutilize AI's potential. At the same time, its augmentation capabilities are not equally accessible—leading some to bring up the equity dimensions of restrictive approaches.

Literature search. Some critics/observers/voices reframe restrictive policies on AI use as gatekeeping mechanisms through which developed countries maintain epistemic control. However, the central challenge is the escalating pressure of managing the ever-growing body of scientific literature manually. Human synthesis and assessment are viewed as a premium product; at the same time, authors face a deluge of literature, and the underlying literature's quality is under constant critique, making synthesis and assessment more difficult.

Synthesis and assessment. There remains some pressure to make use of AI tools, to save time and make participation easier, but critics are concerned about examples of bias in AI leading to biased syntheses[55] even when humans are in the driver's seat, and AI is merely augmenting their work. The credibility of any AI-generated content is increasingly questioned. Climate advocacy groups mobilize against AI overuse in the IPCC, criticizing alignment with the same techno-optimist paradigm driving ecological crisis. This creates an internal crisis: authors know that highly automated tools could process the deluge of literature more efficiently, but also believe that using them would compromise the report's credibility. Governments face pressure from constituents suspicious of AI involvement.

Communication. There is increased demand for using AI to make the IPCC reports easier for speakers of varied languages to navigate and use in policy decisions. At the same time, interfaces for querying and having conversations about the reports face questions of bias as well.

Implications for IPCC as an institution. The institution must balance real concerns about AI quality and access with the potential reputational risk that AI restrictions perpetuate existing power imbalances in the assessment process and accessibility to its findings. For member governments, the degree of involvement of AI features in different parts of the underlying assessment becomes an additional layer of scrutiny during the SPM approval.

Implications for authors. Authors from different regions experience AI tools differently. Whilst developed country authors with limited technical skills struggle with advanced features, developing country authors may view even basic AI translation and writing assistance as transformative, creating new avenues for tension within author teams. Authors also feel overtaxed by the amount of literature to synthesize and assess, and knowing that there are tools that could help becomes a source of frustration.

Wider societal implications. The IPCC's legitimacy is derived from its traditional, human-deliberative process, which is framed as a core strength. At the same time, parts of the broader climate community begin to view the IPCC as dated, or even as holding back progress, given its power to set norms.

Public backlash

Widespread backlash to GenAI in this highly automated scenario has a variety of drivers: concern within academia about using AI, perceived deskilling, surveillance applications of AI, unscrupulous behavior on the part of AI companies, environmental and energy use impacts of AI, or experience with socially damaging or misaligned AI products. AI may induce job loss, or it may lead to a speculative bubble wherein companies were not able to monetize its applications and stock market losses have ripple effects—either outcome can lead to backlash. For the IPCC, a legitimacy crisis emerges from the use of AI, and the perceived "purity" of human-led scientific assessments becomes compromised. This scenario illustrates how social norms about technology can override technical merit. Media narratives about GenAI shape public reception negatively[56], creating a context where any AI involvement taints perceived legitimacy.

Literature search. Despite the availability of automated tools capable of comprehensively scanning the literature, low trust in AI and social perceptions of AI lead to non-adoption by some authors or chapters, also reflecting disciplinary cultures. Concrete choices about workflows trigger broader cultural and ideological debates about the role of AI in society. Literature that uses GenAI may be filtered out.

Synthesis and assessment. Documentation of automated workflows becomes a major challenge because report authors have become accustomed to opacity in automated workflows for scientific production. The cognitive demands and demands on authors' time mount in comparison to other work duties.

Communication. AI detection tools may be used by critics to accuse the IPCC of using GenAI and discredit it. The IPCC Bureau and Secretariat may also invest time in developing communications interfaces only to have them not adopted, with the whole project being rejected.

Implications for IPCC as an institution. The IPCC faces attacks from multiple directions. Climate advocates hostile to AI due to its environmental impacts feel betrayed by an institution that sanctions its use, and use of AI tools becomes weaponized as evidence of corporate capture or techno-solutionism, drawing on research that suggests that AI biases perceptions of environmental challenges in terms of proposing incremental solutions rather than radical or transformative ones, and avoid associating environmental challenges with social justice issues[57]. Meanwhile, supporters of AI use criticize restrictions as evidence of the IPCC's capture by advocacy interests, and frame non-use as a Luddite stance. The institution might be forced to publicly adopt a restrictive stance on AI to maintain legitimacy with key stakeholders, even at the cost of internal efficiency and completeness. In this light, the human-led SPM approval process holds the potential to be more prominently presented as a core asset of the organization.

Implications for authors. Using AI in academic contexts becomes stigmatized, with researchers unwilling to face reputational damage from

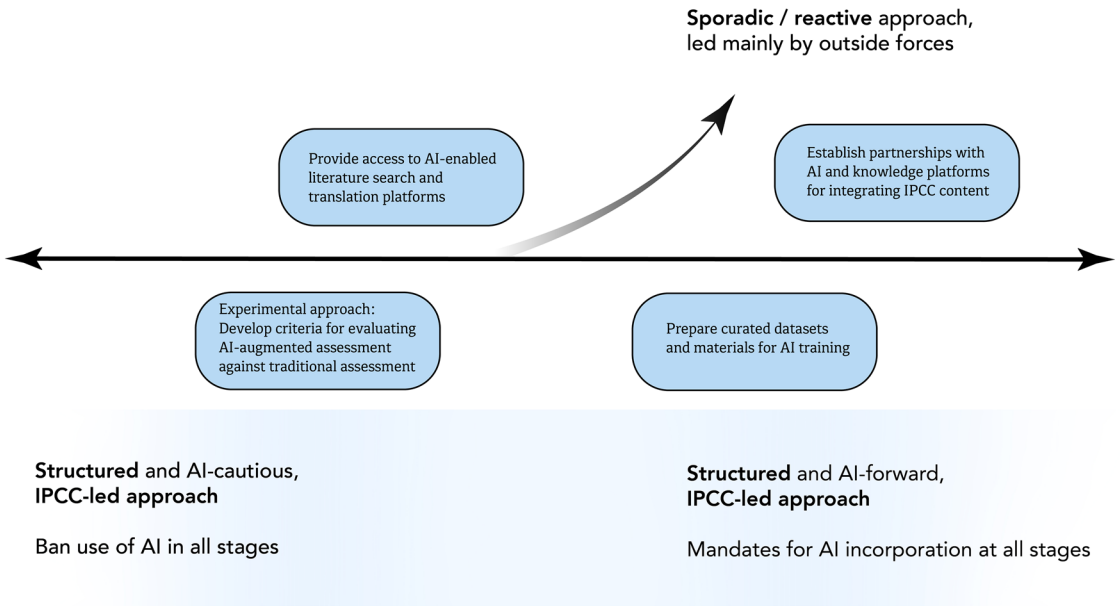

Fig. 2 | Spectrum of institutional approaches to AI integration in IPCC assessment processes. The horizontal axis represents the range of structured, IPCC-led positions, from a precautionary ban on AI use (left) to full mandated incorporation (right). Two intermediate actions sit below the axis, denoting deliberate, internally governed steps: developing evaluation criteria for AI-augmented assessment, and preparing curated training materials. A diagonal branch represents the alternative trajectory: a sporadic, reactive approach in which the IPCC cedes initiative to external actors through ad hoc adoption of third-party platforms (left of diagonal) or formal partnerships that embed external AI systems into IPCC workflows (right of diagonal). The below-line/above-line distinction illustrates a governance boundary: actions below the axis remain within IPCC institutional control, while those above it progressively transfer agency to outside forces. The fork point between the two trajectories implies that the risk of reactive drift is greatest during the transition from experimentation to systematic preparation, precisely when institutional commitment is most ambiguous.

association with AI tools. Author teams fragment between those who view AI as necessary for comprehensive assessment and those who see it as fundamentally compromising scientific integrity. The collegial spirit needed for producing an assessment erodes under such conditions.

Implications for wider society. In the public eye, the perception of division within the climate research community over the methods of assessment spills over into perceptions of divisions about the findings of climate science itself, eroding trust.

Options for the IPCC in navigating the future with AI

The future of AI is dynamic, and it is difficult to know how it will be viewed even five years from now. It is possible that AI companies will run out of money before figuring out how to monetize their products, leading to a spectacular bubble-burst with implications for the wider economy, as well as for organisations that have developed AI workflows that suddenly become unaffordable and unavailable. It is also possible that by the end of this decade, it will look inevitable that scientific understanding is maintained in a collection of "living evidence databases"[58,59], which continually capture new studies and metadata, and the IPCC evolves to become one of them rather than an organization that works in defined cycles—which may create tensions with its historically primary function of creating a shared and more stable understanding of the "state of the climate" that avoids contestation in UNFCCC negotiations. The point of the thought experiment above is merely that the IPCC should develop a way of dealing with AI that is robust to a variety of outcomes.

If there is a spectrum of choices (see Fig. 2), where one end is a ban and the other is mandating widespread adoption by author teams and for communicating reports, it is likely that in the coming years the IPCC will stay somewhere in the middle, with a common set of rules (guidelines and practices) which may be more or less enabling of AI applications use in various domains. Still, within this middle ground, there are key choices.

First, the IPCC can choose to incorporate AI in ways that could level the playing field for developing country researchers. Whilst internet access and advanced AI features remain expensive in developing countries and economies in transition, with the latest capabilities often unavailable there, AI tools could potentially address systemic barriers and inequities in science. For example, right now, language barriers systematically disadvantage the majority of the world's population. One survey indicated non-native English speakers require 91% more time to read papers and 51% more time to write them[60]; AI could help with translation[61]. Studies also demonstrate greater interest and optimistic attitudes about AI in some Global South countries, highlighting cultural or demographic differences in AI adoption[62], with middle-income countries having a disproportionately high adoption of GenAI relative to their economic scale[63]. Adopting a restrictive approach to AI use might thus be seen as another systemic barrier to epistemic equity in the IPCC, eroding its perceived legitimacy. At the same time, the emergence of AI tools from scientific publication companies that are now reformulated as insight providers or AI-enabled knowledge platforms means that should these proprietary tools for searching literature and synthesizing insight from it become commonplace, there will be even more access and equity issues than those that currently exist (i.e., not only that authors emerging economies may not have access to paywalled peer-reviewed journals, but now to the AI tools that synthesize those journals). There is an opportunity for the IPCC to think about how to provide access to AI literature synthesis capabilities if they become commonly used.

When it comes to communication, the IPCC faces another difficult choice: should it create its own official chatbot that gives stable, predictable answers, or should it allow its findings to be interpreted by a wide range of external AI tools? While the latter option is unavoidable, having an official tool could minimize the risk that the IPCC's carefully built consensus is fractured into countless different interpretations by third-party chatbots. However, even an official tool would face inherent challenges. Today's AI language models generate responses through probabilistic prediction, meaning that asking the same question twice can yield different answers[64], and there is also the risk of fabricating incorrect information. For example, two policymakers asking for a summary of permafrost melt projections could receive subtly different responses. Techniques exist to mitigate these

issues: setting temperature parameters to zero can make outputs more predictable, while RAG systems ground responses in source documents and improve traceability. Yet these do not fully resolve the problem. Temperature settings, which control the randomness of an LLM's outputs, produce seemingly deterministic outputs without altering the underlying probabilistic architecture, and RAG systems may still misinterpret retrieved content. Crucially, even deterministic outputs do not guarantee faithful interpretation of the science; they merely ensure any misrepresentation is reproduced consistently. This creates a paradox: while AI promises to make climate science more accessible, it could undermine the shared, stable foundation of facts needed for international cooperation. The IPCC's main role, providing a single, authoritative account of climate change, is weakened if every question can generate a slightly different answer.

The IPCC faces an array of potential avenues for action (Fig. 2). It could prepare curated datasets of key IPCC statements, figures, and confidence language for AI training. It could establish partnership agreements with one of the major AI providers (OpenAI, Google, etc.) to integrate authoritative IPCC content. It could develop a licensing process for IPCC-derived AI tools, distinguishing official from unofficial applications. In parallel with any of these, the IPCC could also work on developing concrete criteria for evaluating AI-augmented assessment against traditional assessment quality. Of course, while the IPCC operates under its own intergovernmentally agreed procedures, evolving AI regulatory landscapes across member states may nonetheless influence the tools available to authors and inform future institutional guidance on AI use. But there is still room for initiative-taking.

In deliberating about whether to take any of these steps, the scientists who make up the IPCC assessments must also be wary of several pitfalls in AI adoption. The first pitfall is polarization, given how divisive the topic of AI is already. One study of AI narratives found that positive and negative narratives of AI were unhelpfully polarized, with stories that were more responsible and nuanced being overlooked[65]. The second is the trap of letting projections around public or stakeholder perception drive decision-making; ungrounded ideas about how publics or politicians might react to different implementations of AI are not a sound basis for choices that are both technical and social. Research could help navigate this last challenge, such as empirical studies of how authors feel about AI and use it in their primary research activities and studies of how different audiences respond to AI usage in science. However, academic research production takes time, and decisions will need to be made soon. A third pitfall is the reasonable tendency to feel bewildered by the capacities of AI and the pressure to respond quickly. AI is advancing rapidly, but it will be with us for a long time. There is time to take a thoughtful approach, but it will require resources and attention.

Finally, AI has the potential to fundamentally transform the nature of IPCC assessment, including its scientific authority and political legitimacy—and the IPCC must recognize both the risks and benefits of AI and act proactively to navigate this contested terrain. Rather than view this simply as a challenge, we can view it as an opportunity to shape what it means to build a global consensus in the age of AI. Nearly forty years ago, the IPCC was breaking new ground in how to practically do internationally collaborative assessment of the available scientific knowledge, and its success has spurred other fields to examine whether the IPCC might be a model for assessing risk, evidence synthesis, and translation in other areas, such as pandemics or chemicals[66–68]. As a model institution, what the IPCC decides in this arena could shape more than just climate science and communication.

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