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How climate-related events become climate governance problems: climate change attribution divergence as an interpretive mechanism

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Abstract

Climate-related events are often viewed as potential catalysts for policy learning and changes in climate governance. Floods, droughts, heatwaves, wildfires, and other environmental changes can expose vulnerabilities in infrastructure, land-use planning, and emergency preparedness, drawing attention to the need to reassess existing practices. However, events can be associated with different responses, proving that exposure and scientific information alone do not determine collective action.

Governance responses depend not only on institutional, political, and socioeconomic conditions, but also on how actors interpret experienced environmental changes in relation to anthropogenic climate change. These subjective interpretations are distinct from scientific event attribution and vary in strength across actors. Differences in attribution may contribute to divergent problem definitions, shaping which issues are prioritised and the type, scale, and temporal orientation of adaptation, mitigation, and other governance responses.

Building on empirical research documenting variation in climate change attribution strength across actors and contexts, this paper introduces climate change attribution divergence, defined as differences among actors in the strength with which experienced environmental events and impacts are attributed to anthropogenic climate change. While existing research has examined attribution primarily at the individual level, less attention has been given to how differences in attribution may matter within shared governance contexts.

The paper develops a conceptual framework specifying how subjective attribution, variation in attribution strength, and problem definition are linked, and how attribution divergence may contribute to divergent governance responses. The framework offers an interpretive mechanism for understanding why environmental events may give rise to different governance pathways.

Keywords: climate governance; climate change attribution divergence; subjective climate change attribution; problem definition; climate change adaptation; risk perception; adaptive governance

1. Introduction

Climate-related events have become increasingly prominent in environmental governance and are widely expected to stimulate learning and accelerate climate governance responses, including climate change adaptation. Floods, droughts, heatwaves, wildfires, and other climate-related changes expose vulnerabilities in infrastructure, land-use planning, and emergency preparedness while highlighting potential consequences of anthropogenic climate change. Such events are often regarded as policy windows or "teachable moments" through which societies may reassess existing practices, learn about climate change risks, and potentially implement adaptation measures (Birkland, 1997; Wallace, 2012; IPCC, 2022).

Empirical experience suggests otherwise. Similar events have produced markedly different governance responses across contexts and over time (Birkland, 2006; Berkes, 2007; IPCC, 2022). Some floods have led to major revisions of flood-risk management, including relocation of settlements and restoration of floodplains (Hegger et al., 2016; IPCC, 2022). Others have primarily resulted in reconstruction of damaged infrastructure, reinforcement of flood defences, or restoration of previous conditions (Kreibich et al., 2005; Bubeck et al., 2012; IPCC, 2022). Even repeated exposure does not necessarily produce sustained adaptation. Fanta et al. (2019) show that although flood experience initially influenced settlement decisions toward safer locations, this effect weakened across generations as direct experiential knowledge declined. Their findings demonstrate that experience alone does not automatically translate into sustained collective adaptation, highlighting that the governance relevance of environmental events depends on how experience is interpreted, retained, and transmitted over time. Comparable variation is observed across other climate-related hazards, where research shows that similar extreme events may lead to divergent policy responses depending on institutional and political context rather than event exposure alone (Birkland, 2006; Adger, 2006; Berrang-Ford et al., 2021). This suggests that the relationship between environmental change and policy change is neither linear nor automatic.

Existing explanations for this variation have emphasised institutional capacity, political leadership, governance arrangements, financial resources, and risk perception (Taylor et al., 2014; Berrang-Ford et al., 2021; IPCC, 2022). These perspectives show that policy change and governance responses emerge through interactions among political, institutional, economic, cognitive, and contextual conditions, and it should be noted in general that the process leading to policy change can be causally complex involving many interacting mechanisms, imperfect knowledge of those mechanisms, disagreement about goals, and institutional dynamics. Striking examples are to be found in the writings on explanation and statecraft in history (Butterfield, 1965; Gavin, 2025). Institutional friction must also be mentioned (Baumgartner et al, 2009). Research on adaptive capacity highlights the role of cognitive processes in how actors perceive climate change risks and appraise possible responses, including their perceived ability to implement adaptive measures (Grothmann & Patt, 2005). Research on climate risk perception and framing similarly shows that actors differ in how they perceive and conceptualise climate change and its risks (Taylor et al., 2014; IPCC, 2022). Complementing this work, a meta-analysis of adaptation behaviour identifies perceived self-efficacy, outcome efficacy, negative affect, and social norms as important correlates of adaptive behaviour (van Valkengoed & Steg, 2019). Related research shows that actors also differ in how they evaluate expected climate-change impacts, including their perceived risks and opportunities and the overall expected value of these expected consequences (Persson et al., 2020; Blennow et al., 2020; Blennow & Persson, 2021).

Climate change adaptation research focuses on how societies respond to climate-related impacts and associated risks through adjustments in practices, institutions, and decision-

making processes, while adaptive governance emphasises flexibility, learning, and cross-scale coordination in complex social-ecological systems (Folke et al., 2005; Pahl-Wostl, 2009). Together, these perspectives provide complementary accounts of why adaptation outcomes vary by highlighting psychological, institutional, and contextual conditions that shape how societies respond to environmental stress (IPCC, 2022). However, while this literature considers how risks are perceived, understood, and rendered salient for governance, less attention has been given to differences among actors in whether and to what extent environmental changes are attributed to anthropogenic climate change, and to how such attribution differences may contribute to divergent problem definitions and governance responses.

Because interpretations of environmental events can differ in their perceived relationship to ongoing climate change, attribution may also shape how governance problems are defined, including whether responses are oriented primarily towards immediate impacts or longer-term change, and towards incremental adjustments or broader interventions.

Extreme events are physical phenomena with measurable impacts, but their governance relevance depends partly on how these impacts are understood. Attribution is therefore not only a scientific question concerning the causal contribution of climate change to specific events, but also an interpretive process through which actors evaluate the significance of experienced changes and interpret whether and how they are relevant for climate governance (Hulme, 2014). The same flood may be understood differently in relation to climate change. Some actors may interpret it as evidence of an ongoing climatic trajectory, whereas others may view it primarily as an expression of natural variability or a localised event without broader implications for future conditions.

Scientific event attribution seeks to assess the causal contribution of anthropogenic climate change to specific events using probabilistic and observational methods, but such assessments also involve epistemic questions concerning uncertainty, interpretation, and use (Thorén et al., 2021; Olsson et al., 2022). Actors, however, also engage in local and subjective climate change attribution processes through which experienced events and impacts may be interpreted as evidence of anthropogenic climate change. These subjective interpretations do not replace scientific event attribution as a scientific assessment, rather, they concern how actors understand and interpret the relationship between experienced environmental changes and climate change. We refer to this interpretive assessment as subjective climate change attribution.

The net value of expected climate change impacts (NVEI), for example, captures how individuals evaluate anticipated climate impacts (Persson et al., 2020). Subjective climate change attribution represents a related but distinct interpretive process: rather than evaluating the expected consequences of climate change, it concerns the extent or strength with which experienced environmental events or impacts are interpreted as reflecting anthropogenic climate change.

Research has operationalised this interpretive process in somewhat different ways. An early contribution, Blennow et al. (2012), examined the relationship between adaptation behaviour and the strength of belief that they had experienced extreme weather conditions attributable to long-term global climate change. Although the study did not use the term subjective climate change attribution, this measure is relevant to the present conceptualisation because it captured variation in the strength of actors' perceived experience of climate change and its effects, rather than treating such beliefs as simply present or absent. Subsequent research

examined related beliefs concerning experienced environmental change and its relationship to climate change (Blennow et al., 2019; Blennow & Persson, 2021).

Other research has measured subjective attribution more explicitly using multi-item rating scales. Ogunbode et al. (2019), for example, assessed the extent to which respondents agreed that experienced flooding was partly caused by climate change, constituted a sign of current climate change impacts, and indicated what could be expected from climate change in the future. Related work has examined attribution of extreme weather and flooding to climate change (Ogunbode et al., 2020; Wong-Parodi & Berlin Rubin, 2022), while Zanocco et al. (2024) measured public confidence in attributing different types of extreme events to climate change, demonstrating variation in attribution confidence across event types and respondents. Wong-Parodi et al. (2026) similarly used a multi-item measure of subjective attribution. This literature has also connected subjective attribution to climate-policy support (Cologna et al., 2025), impact appraisal and adaptive capacity among fisheries stakeholders (Szymkowiak & Steinkruger, 2024), and evaluations of expected climate-change impacts and adaptation advocacy among Swedish forestry professionals (Blennow et al., 2026).

Taken together, this literature shows that subjective climate change attribution varies in strength across actors. Existing research has primarily examined this variation at the actor level, however, leaving less developed the question of how differences in attribution strength among actors participating in shared governance processes may shape collective interpretations of shared environmental events. We address this gap by conceptualising climate change attribution divergence as differences among actors in the strength with which they interpret experienced environmental events or impacts as reflecting anthropogenic climate change.

Attribution divergence therefore concerns variation in the interpretation of the relationship between a shared environmental event or impact and anthropogenic climate change, rather than disagreement about whether an event occurred or about its impacts.

Flood governance illustrates this challenge. Floods are highly visible environmental events that often generate expectations of learning and adaptation, yet they do not lead to uniform governance responses. The same physical hazard may support different governance pathways depending on whether it is interpreted as evidence of changing climatic conditions requiring broader adaptation or as an isolated event requiring more limited intervention (Hegger et al. 2016). Fanta et al. (2019) further show that although extreme floods initially shifted settlement decisions towards safer locations, this effect weakened across approximately two generations as direct experiential knowledge declined. These findings suggest that exposure and experience alone do not determine long-term governance responses, but that how environmental experience is interpreted, retained, and transmitted over time also matters.

This paper develops a conceptual model in which climate-related events and impacts are interpreted through subjective climate change attribution, with actors differing in the strength by which they attribute experienced changes to anthropogenic climate change (Figure 1). The framework builds on this actor-level literature linking climate change attribution and related beliefs to adaptation decision-making (Blennow et al., 2012, 2020, 2026), while extending attention to differences in attribution strength among actors within shared governance processes.

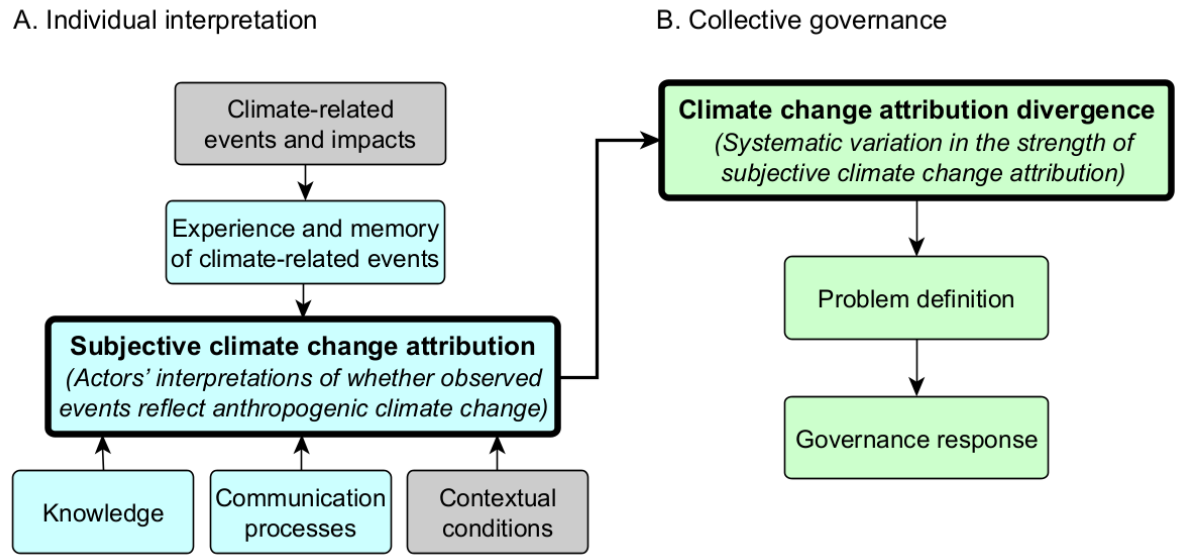


Figure 1. Climate change attribution divergence as an interpretive mechanism linking climate-related events and impacts to governance responses. (A) Climate-related events and impacts are experienced and interpreted through actors' subjective climate change attribution. Subjective attribution may be shaped by experience and memory, knowledge, communication processes, and contextual conditions. (B) Differences among actors in subjective attribution constitute climate change attribution divergence. Such divergence may contribute to differences in how events are defined as governance problems and to variation in subsequent governance responses. Grey boxes represent external factors, blue boxes individual-level processes, and green boxes collective-level processes.

The paper's contribution is to extend research on subjective climate change attribution and adaptation from the actor level to the collective level by conceptualising attribution divergence as a dimension of shared governance processes. The framework asks how differences among actors in attributing experienced environmental changes to anthropogenic climate change may contribute to divergent problem definitions and, consequently, variation in governance responses.

2. Conceptualising climate change attribution divergence as an interpretive mechanism linking events to governance decision-making

2.1 Limits of information-based governance assumptions

Climate-related events and scientific information can inform adaptation planning and decision-making, but their availability does not itself ensure effective or sustained adaptation (IPCC, 2022; Berrang-Ford et al., 2021). Environmental events can draw attention to vulnerabilities and provide opportunities to reassess existing policies and practices. However, the implications of these events for governance are not necessarily self-evident or interpreted uniformly across actors.

Research on policy learning and agenda-setting has examined how disruptive events can draw attention to policy problems and create opportunities for policy change, particularly through the concept of focusing events (Birkland, 1997, 2006). Yet the occurrence of an event does not guarantee that it will be interpreted as evidence of climate change or lead to a particular governance response. Research on risk perception has long demonstrated that exposure and information do not necessarily produce uniform interpretations or responses, as risk

judgements are shaped by cognitive, social, and contextual processes (Slovic, 1987). Similarly, environmental events and climate-related risks can be understood in different ways, contributing to variation in how problems are recognised and addressed (Hulme, 2014).

This paper therefore examines how actors interpret experienced environmental events and impacts in relation to anthropogenic climate change. It argues that understanding how environmental events become governance problems requires attention not only to exposure and available information, but also to the interpretations through which actors make sense of environmental change. The following sections develop this argument by examining subjective climate change attribution and the implications of variation in attribution strength across actors.

2.2 Climate change attribution beliefs as an analytical mechanism

To specify this interpretive step, we focus on subjective attribution to climate change, defined as the extent or strength with which individual actors interpret experienced events or impacts as reflecting ongoing anthropogenic climate change (Blennow et al., 2012, 2019; Blennow & Persson, 2021; Blennow et al. 2026).

Subjective climate change attribution is therefore understood as an actor-level interpretive belief: given an experienced environmental event or impact, actors may differ in the strength of their belief that the event or impact reflects ongoing anthropogenic climate change. This strength of attribution is analytically distinct from the occurrence or characteristics of the environmental event itself. The same event may consequently be interpreted to different degrees as climate-change related by different actors.

Such attribution does not imply that actors disregard other contributing factors. Climate-related events arise through interactions between climatic processes, natural variability, and contextual conditions (Trenberth, 2012; Hulme, 2014). Actors may therefore recognise multiple contributing factors while differing in the strength with which they interpret an event as evidence of ongoing anthropogenic climate change. This is consistent with the probabilistic and epistemic complexities of event attribution in climate science (Hulme, 2014; Thorén et al., 2021; Olsson et al., 2022).

The analytical relevance of subjective attribution lies in its potential role in connecting environmental experience to governance interpretation. When actors differ in how strongly they interpret an event as reflecting broader climatic change, they may also differ in whether and how they understand that event as a signal of longer-term climate-related risks or opportunities, and adaptation needs. Subjective attribution can therefore be conceptualised as an interpretive mechanism linking experiences of environmental change to the definition of governance problems and, potentially, to subsequent governance responses (Birkland, 2006). The next section extends this actor-level perspective to the collective setting by examining variation in attribution strength among actors involved in the same governance process.

2.3 From subjective climate change attribution to climate change attribution divergence

Events do not acquire governance significance automatically but through processes of interpretation. Because actors differ in their subjective attribution of climate-related events, shared environmental events may generate different understandings of their relationship to anthropogenic climate change. We refer to these systematic differences as climate change attribution divergence.

Climate change attribution divergence refers to variation among actors in the strength of their subjective attribution of experienced environmental events or impacts to anthropogenic

climate change. Attribution divergence therefore shifts the analytical focus how an individual actor interprets an environmental event to how interpretations vary across actors involved in the same governance process. When attribution is relatively convergent, actors may be more likely to develop shared understandings of the significance of an event. When attribution is more divergent, actors may instead develop competing understandings of its causes, significance, and implications for governance. Such divergence may contribute to differences in problem definition and, consequently, to variation in governance responses.

The governance implications of attribution divergence depend on the degree of interpretive convergence among actors. When attribution is relatively convergent, shared interpretations of environmental events as evidence of broader climatic change may facilitate common problem definitions and coordinated climate governance responses. In contrast, when attribution is highly divergent, actors may develop competing interpretations regarding the significance, causes, and implications of environmental changes. Such divergence may contribute to disagreement over whether events constitute climate-related governance problems and over which responses are considered appropriate.

Through this process, attribution divergence influences how environmental changes become defined as governance problems. It does not determine governance responses independently of institutional, political, or economic conditions, but represents an interpretive mechanism through which environmental changes acquire different governance meanings. An event interpreted as evidence of ongoing anthropogenic climate change may support problem definitions emphasising changing future conditions and broader climate governance responses, whereas an event interpreted as unrelated to climate change may be understood as a more isolated occurrence requiring more limited intervention.

3. Empirical foundation

This section reviews empirical evidence supporting the proposed mechanism that links climate-related events to governance responses through climate change attribution and problem definition. The evidence is organised around three patterns: variation in governance responses, heterogeneous effects of experience, and variation in climate change attribution beliefs.

3.1 Variation in governance responses

Empirical studies show substantial variation in governance responses to similar extreme events. Floods and related hazards have produced both transformative responses, such as relocation of settlements, managed retreat, and restoration of floodplains, and incremental responses focused on reconstruction and reinforcement of existing infrastructure (Hegger et al., 2016; IPCC, 2022). These differences occur across contexts and over time, indicating that climate-related events do not translate directly into governance responses and that exposure alone cannot explain how environmental changes become defined as governance problems, which problems are prioritised, or which responses are considered appropriate (Birkland, 2006; Berrang-Ford et al., 2021). Research also shows that how potential responses are described can influence how they are interpreted and evaluated. Meerow and Neuner (2021), for example, found differences in policy support, perceived importance, and conceptual understanding when policies were described in terms of *resilience*, *adaptation*, *sustainability*, or reducing *vulnerability*.

3.2 Variation in experience and interpretation of environmental change

Experience with climate-related events and environmental changes does not automatically translate into consistent interpretations, learning, or behavioural responses. Perceptions of

climate change vary across geographical contexts, suggesting that environmental conditions alone do not determine how climate change is recognised and evaluated (Weber, 2006; Hamilton & Keim, 2009; van der Linden, 2014). Research on risk perception and agricultural adaptation shows that experiences influence responses through cognitive, social, and contextual processes, entailing that similar environmental conditions may be interpreted differently depending on actors' knowledge, experiences, and local contexts (van der Linden, 2014; Hamilton-Webb et al., 2017, 2019). More broadly, perceived personal experiences of climate change are not direct reflections of climatic changes but are shaped by processes of recognition, interpretation, and attribution (Reser & Bradley, 2020). Fanta et al. (2019) further demonstrate that although extreme flood experiences initially shifted settlement decisions towards safer locations, this effect weakened across generations as experiential knowledge declined. Together, these findings show that environmental experience is not a fixed source of learning but depends on how knowledge is interpreted, retained, and transmitted over time.

Research examining experiences of environmental change demonstrates substantial variation in how individuals recognise and evaluate changing conditions. Studies of extreme weather experiences show that exposure can influence adaptation and mitigation responses, but that these relationships vary across individuals and contexts rather than producing uniform responses (Demski et al., 2017). Similarly, Spence et al. (2011) show that experience with flooding can influence climate change risk perceptions, although the effects of experience depend on how events are interpreted and integrated into broader understandings of climate risks. Recent work likewise emphasises that personal experience can shape climate perceptions and climate action, while noting that the implications of experience depend on how it is understood and interpreted (Wong-Parodi, 2026). Global evidence likewise indicates that experiencing climate hazards is associated with stronger perceptions of climate change risks, while also showing substantial variation across geographical and social contexts (Dablander, 2025).

Taken together, these findings indicate that experience provides an important basis for understanding climate-related responses but does not determine how environmental changes are interpreted, evaluated, or incorporated into governance problem definitions. Individuals may experience similar environmental conditions while differing in the knowledge, expectations, and contextual factors through which those changes are understood. The relationship between experienced changes and their interpretation as evidence of anthropogenic climate change therefore requires attention to attribution processes.

3.3 Subjective climate change attribution and governance relevance

Empirical research documents substantial variation in the strength of actors' subjective attribution of experienced environmental changes and events to anthropogenic climate change. Blennow et al. (2012) found that private forest owners varied in how strongly they believed they had experienced the effects of long-term global climate change through extreme weather events, with the strength of these beliefs associated with their adaptation behaviour. Blennow et al. (2019) similarly identified variation among private property owners in southern Sweden in the strength with which experienced extreme weather or climate changes were attributed to climate change. Blennow and Persson (2021) further showed how residents of Malmö, Sweden, differed in the strength with which they attributed positive and negative local environmental changes, both sudden and gradual, to climate change. Research in other contexts likewise demonstrates variation in the strength of attribution of experienced flooding and extreme weather events to climate change (Ogunbode et al., 2019, 2020; Wong-Parodi & Berlin Rubin, 2022).

Across different contexts, stronger subjective climate change attribution has been associated with differences in climate-related appraisals, behavioural intentions, and decision-making, including adaptation behaviour, adaptation and mitigation decisions, impact appraisal, adaptive capacity, and support for climate-change mitigation policies (Blennow et al., 2012; Blennow & Persson, 2021; Ogunbode et al., 2019; Szymkowiak & Steinkruger, 2024; Cologna et al., 2025). Qualitative evidence further illustrates how different interpretations of the same environmental event may relate to different understandings of adaptation needs. For example, Ibrahim and Johansson (2021) found that farmers who interpreted the 2018 drought and heat event primarily as part of a natural climatic cycle rather than as an indication of ongoing climate change often did not perceive a need to adapt their practices. Similarly, Blennow et al. (2026) found that stronger attribution of experienced forest changes to climate change was associated with more risk-dominated evaluations of expected climate-change impacts among Swedish forest professionals. Longitudinal research further suggests that attribution and climate-action intentions can change over time, and that exposure alone does not necessarily produce corresponding changes in attribution or action intentions (Wong-Parodi et al., 2026).

Taken together, this evidence indicates that subjective climate change attribution is not simply a binary belief but varies in strength and is associated with differences in how actors appraise environmental changes and consider possible responses. The existing evidence, however, predominantly examines attribution at the level of individuals or particular actor groups. Less is known about how differences in attribution among actors who encounter the same or related environmental changes may interact within shared governance processes, including whether such differences contribute to divergent understandings of the environmental problem and variation in collective governance responses.

4. Mechanism: how climate-related events become governance problems

The proposed mechanism specifies how climate-related events and impacts may be translated into governance responses through three stages: subjective climate change attribution, climate change attribution divergence, and governance problem definition.

The mechanism consists of three stages. Environmental events and impacts are experienced and interpreted through actors' subjective climate change attribution. Variation in these attribution beliefs produces climate change attribution divergence, referring to systematic differences among actors in how they interpret the relationship between experienced events and anthropogenic climate change. Divergence in attribution may contribute to differences in how environmental changes are understood, for example as signals of broader climatic change or as isolated occurrences, thereby contributing to variation in problem definition. Different problem definitions subsequently shape which governance responses are considered appropriate, legitimate, and necessary.

When events are interpreted primarily as signals of anthropogenic climate change, they are more likely to support problem definitions emphasising long-term climatic change and broader governance responses. Such interpretations may support anticipatory adaptation, mitigation-related responses, institutional reform, or changes in risk management approaches. In contrast, when events are interpreted as isolated occurrences, natural variability, or primarily as local technical problems, problem definitions may remain focused on immediate impacts and recovery, resulting in responses centred on reconstruction, reinforcement of existing infrastructure, or short-term risk reduction. Attribution therefore influences not only whether a response occurs, but also the type, scale, and temporal orientation of responses considered appropriate. The same physical hazard can consequently generate divergent

governance pathways depending on how its relationship to ongoing climate change is interpreted and incorporated into problem definition.

Communication processes and knowledge contexts influence each step of this mechanism by shaping the production, communication, and interpretation of causal information.

5. Conceptual and governance implications

The framework proposed in this paper contributes to climate change governance research by identifying an interpretive mechanism linking environmental change to governance responses. Existing climate change research has extensively examined why responses to climate change differ across institutional, political, economic, and social contexts (Adger et al., 2005; Moser & Ekstrom, 2010; Berrang-Ford et al., 2021; IPCC, 2022). This paper complements these explanations by highlighting an interpretive mechanism operating between environmental change and climate governance responses. Climate change attribution represents one interpretive process through which actors interpret experienced events and impacts as reflecting ongoing anthropogenic climate change, with variation in attribution strength reflecting differences in the strength of this attribution which can shape subsequent processes of problem definition by influencing whether environmental changes are understood as broader climate governance challenges or as more limited and context-specific problems. Attribution therefore does not replace institutional, political, or socioeconomic explanations of climate responses, but provides an additional mechanism through which similar environmental conditions may acquire different governance implications. Conceptually, the framework distinguishes climate change attribution from related but distinct processes such as risk perception, valuation of expected climate impacts, and problem definition. Attribution concerns how actors interpret the relationship between experienced events, environmental changes, and anthropogenic climate change, whereas risk perception concerns judgements about hazard probability and consequences, and valuations of expected climate impacts concern anticipated consequences and their relevance for decision-making (Slovic, 1987; Persson et al., 2020; Blennow et al., 2020, 2026; Blennow & Persson, 2021). By identifying attribution as an intermediate interpretive step, the framework extends existing attribution research, which has primarily examined subjective attribution as an actor-level belief associated with climate attitudes, behavioural intentions, and decision-making (Blennow et al., 2012, 2020; Blennow & Persson, 2021; Cologna et al., 2025). The present framework shifts attention from actor attribution alone to the collective consequences of heterogeneous attribution among actors and how these differences may contribute to problem definition and governance responses.

The concept of climate change attribution divergence provides a mechanism for understanding how similar environmental events may contribute to divergent governance pathways, in interaction with institutional, political, economic, and contextual conditions. Divergence does not refer to disagreement about whether events occurred or whether their impacts were experienced, but to differences in how actors interpret the relationship between experienced changes and ongoing anthropogenic climate change. These differences may shape whether events are understood as signals of broader climatic transformation with implications for adaptation, mitigation, or institutional change, or as isolated occurrences requiring more limited responses. In this way, the framework highlights problem definition as a link between interpretation and governance action, specifying how environmental changes may be translated into policy-relevant problems (Birkland, 1997, 2006).

The framework also integrates insights from climate change attribution research, risk perception, collective learning, and adaptive governance. Research on collective learning

highlights that environmental experience does not automatically produce sustained behavioural change, as knowledge may be lost, weakened, or transformed through processes of retention and transmission over time (Berkes, 2007; Fanta et al., 2019). Similarly, research on climate communication demonstrates that information influences responses through processes of interpretation and integration within existing knowledge contexts rather than through simple information transfer (Blennow et al., 2021; McClure et al., 2022). By incorporating these insights, the framework highlights interpretation as an analytical bridge between environmental exposure and governance response.

The framework also has practical implications for climate governance and communication. Climate responses cannot be understood solely as a problem of increasing scientific knowledge or awareness of climate risks (van Valkengoed & Steg, 2019). Scientific evidence remains essential for assessing climate change contributions to observed events and for informing governance decisions, but its influence depends partly on how evidence is interpreted alongside local experiences, contextual knowledge, institutional priorities, and perceptions of feasible action. Recognising interpretive heterogeneity does not imply that all explanations of environmental change are equally supported by evidence; rather, it acknowledges that scientific understanding enters governance through interpretive processes in which evidence is evaluated in relation to local experiences, contextual knowledge, and perceived implications for action.

This perspective suggests that climate planning and communication should pay greater attention to differences in attribution among actors. Variation in attribution may reflect and influence how climate-related risks and opportunities are interpreted and prioritised, which interventions are considered legitimate, and whether adaptation, mitigation, or other collective responses gain support. Identifying attribution divergence among stakeholders may therefore help explain disagreements in climate governance that cannot be fully accounted for by differences in exposure, resources, institutional capacity, or access to information alone.

Finally, the framework provides a basis for future empirical research. Future studies should examine how climate change attribution divergence develops following climate-related events, how competing interpretations become stabilised within governance processes, and how attribution interacts with institutional capacity, political leadership, communication strategies, and governance scales. Comparative analyses of similar climate-related hazards across different contexts may help determine whether variation in attribution systematically contributes to differences in adaptation pathways, mitigation behaviour, and broader governance outcomes.

6. Discussion

Existing climate change research has extensively examined why responses to climate change differ across institutional, political, economic, and social contexts (Adger et al., 2005; Moser & Ekstrom, 2010; Berrang-Ford et al., 2021; IPCC, 2022). This paper complements these explanations by highlighting an interpretive mechanism operating between environmental change and climate governance responses. Climate change attribution refers to the process through which actors interpret the significance of experienced events and impacts in relation to anthropogenic climate change. The strength of subjective attribution captures the degree to which actors endorse this interpretation, ranging from rejection through uncertainty to strong attribution. Where actors differ in the strength of their subjective attribution, climate change attribution divergence may emerge. Such differences may concern whether an event is understood as part of a broader and longer-term climate governance challenge, potentially calling for more extensive or anticipatory responses, or as a more limited and context-specific

problem. Attribution therefore does not replace institutional, political, or socioeconomic explanations of climate responses, but provides an additional mechanism through which similar environmental conditions may acquire different governance implications. Climate change attribution divergence thus specifies how differences in the strength of actors' attribution may contribute to different understandings of climate change relevance and, potentially, to divergent problem definitions and governance responses. The framework also helps integrate findings from research traditions that have often developed separately. Studies on subjective climate change attribution show that actors differ in how strongly they connect experienced events and impacts to anthropogenic climate change (Blennow et al., 2012, 2019, 2026; Blennow & Persson, 2021). Research on expected climate change impacts further demonstrates that responses depend on how future consequences are evaluated in terms of perceived risks, opportunities, and overall expected value (Persson et al., 2020; Blennow et al., 2020, 2026; Blennow & Persson, 2021). Similarly, research on collective learning suggests that the influence of climate-related experience depends on how environmental knowledge is retained and transmitted over time. Fanta et al. (2019), for example, show that behavioural responses to flooding weakened across generations as direct experiential knowledge declined. These processes are conceptually distinct: attribution concerns interpretations of whether experienced changes are related to anthropogenic climate change, whereas evaluations of expected impacts concern how anticipated consequences are valued and assessed in relation to decision-making. However, they may interact because attribution influences the interpretive basis through which future climate impacts are understood and evaluated. Recent evidence among Swedish forest professionals supports this connection by showing that stronger subjective attribution of experienced forest changes to climate change is associated with more risk-oriented evaluations of expected climate change impacts and with variation in adaptation advocacy (Blennow et al., 2026). The findings suggest a relationship between attribution strength and the evaluation of expected climate change impacts: stronger attribution was associated with more risk-oriented impact evaluations, while preferences for adaptation measures varied according to the temporal and evaluative dimensions of the expected impacts.

By bringing these strands together, the concept of climate change attribution divergence provides a framework for understanding how differences in the strength of actors' attribution of environmental changes to anthropogenic climate change may contribute to variation in how climate-related problems are understood and, consequently, in governance responses. The framework should therefore be understood as complementary to existing explanations rather than as a substitute for institutional, political, or socioeconomic accounts. The proposed framework also differs from explanations that primarily emphasise ideological or cultural polarisation in climate change beliefs. Research on cultural cognition has suggested that interpretations of climate-related information may reflect group identities and value-based reasoning (Kahan et al., 2012). However, climate change attribution divergence is not limited to polarised contexts or value-based disagreement. It may emerge among actors who share similar exposure to environmental changes but differ in experience, knowledge, environmental conditions, and the interpretive processes through which climate-related information is evaluated, resulting in different strengths of attribution. Recent evidence among Swedish forest professionals further illustrates this distinction. Despite broadly similar value profiles, professionals differed in their subjective attribution of experienced forest changes to climate change, and these attribution differences were associated with variation in adaptation advocacy (Blennow et al., 2026). Attribution divergence therefore represents a form of interpretive heterogeneity through which actors may develop different understandings of the relevance of climate change to experienced environmental changes, potentially contributing to differences in problem definition and governance responses. Importantly,

attribution divergence does not determine governance outcomes directly; rather, it constitutes one source of interpretive variation through which environmental changes may acquire different meanings and become defined as governance-relevant problems.

The empirical evidence reviewed here indicates that attribution differences emerge across a range of actor groups and contexts and are not restricted to settings characterised by ideological polarisation. Research among broader publics shows that perceptions of environmental change and climate impacts are shaped by processes of recognition, interpretation, and attribution rather than reflecting climatic conditions alone (Capstick et al., 2014, 2015; Ogunbode et al., 2019; Blennow et al., 2019; Blennow & Persson, 2021). Research across different actor groups further indicates that the strength of attribution, perceived impacts, knowledge, experience, and contextual conditions are associated with differences in how climate-related changes and possible responses are evaluated, while variation in responses cannot be explained by broader value orientations alone (Blennow et al., 2012, 2016, 2020, 2026; Sousa-Silva et al., 2018; Persson et al., 2020; Blennow & Persson, 2021; Ibrahim & Johansson, 2021).

The framework also has practical implications for climate governance and communication. Climate responses cannot be understood solely as a problem of improving scientific information or increasing awareness of climate risks (van Valkengoed & Steg, 2019). Scientific evidence remains essential for identifying the contribution of climate change to observed events and for understanding broader patterns of climatic change, but governance responses also depend on how such evidence is interpreted, evaluated, and incorporated into collective problem definitions. Recognising the role of locally situated knowledge does not imply that all causal explanations are equally supported by evidence but acknowledges that scientific understanding enters climate governance through processes of interpretation in which evidence is evaluated alongside local experiences, contextual knowledge, and perceived consequences (Blennow et al., 2021; Ibrahim & Johansson, 2021; McClure et al., 2022).

The framework may also help explain differences between rapid-onset climate-related extremes and gradually emerging environmental changes. Research on risk perception has long shown that hazard characteristics, including the speed with which changes become observable, influence how risks are perceived and responded to (Slovic, 1987). Rapid-onset events such as floods, storms, or heatwaves often generate salient experiences that may prompt reassessment of existing understandings, whereas gradual processes such as sea-level rise, ecosystem change, or shifts in climatic conditions may provide less immediate cues for evaluating climate change relevance. Previous work shows that responses depend not only on experiencing environmental changes but also on understanding their relationship to climate change (Blennow et al., 2012, 2020; Persson et al. 2020; Blennow & Persson, 2021). Recent evidence among Swedish forest professionals suggests that temporal characteristics of expected climate change impacts shape behavioural responses and that attribution varies between actors with different evaluations of expected impacts (Blennow et al., 2026). Future research should therefore examine whether temporal characteristics of environmental changes influence not only individual attribution processes but also the strength and persistence of attribution divergence among actors involved in collective governance processes.

The framework remains conceptual and does not specify the relative contribution of attribution divergence compared with other mechanisms shaping governance processes, including institutional arrangements, political dynamics, and economic conditions. These factors may influence not only subsequent governance responses but also the processes through which environmental changes become recognised, prioritised, and defined as

governance problems. Attribution divergence should therefore be understood as one source of interpretive variation within a broader governance process in which institutional, political, economic, and cognitive factors jointly shape how environmental changes acquire governance relevance. Future research should examine how attribution divergence interacts with these conditions, how competing interpretations become stabilised, and under what circumstances attribution-based interpretations influence problem definition and subsequent responses. Comparative analyses of similar climate-related hazards and governance challenges across different contexts would provide opportunities to assess whether differences in attribution systematically contribute to differences in climate response pathways across governance scales.

Overall, the framework developed here suggests that understanding how climate-related events are interpreted provides an additional explanation for why similar environmental changes can produce divergent governance responses. Climate governance depends not only on environmental exposure and the availability of scientific evidence, but also on the interpretive processes through which environmental changes are evaluated, attributed, and translated into governance problems and collective responses.

7. Conclusion

Climate-related events do not translate automatically into governance responses. This paper has proposed climate change attribution as an interpretive process through which actors understand the significance of experienced environmental changes in relation to anthropogenic climate change. The strength of this attribution captures the degree to which actors endorse this interpretation, while climate change attribution divergence refers to differences among actors in the strength of their attribution. The framework highlights this variation as one source of interpretive heterogeneity that may contribute to differences in how environmental changes are defined as governance problems and, consequently, in how responses are considered appropriate. Attribution therefore constitutes an intermediate interpretive process between environmental change and governance responses, operating alongside institutional, political, economic, and contextual conditions.

The empirical evidence reviewed indicates that differences in governance responses cannot be explained by exposure or access to information alone. Responses are also associated with how climate-related events and impacts are interpreted, how strongly they are attributed to anthropogenic climate change, and whether actors develop convergent or competing understanding of their significance. Where attribution is relatively convergent, environmental events may more readily support shared problem definitions. Where attribution diverges, the same or related environmental events may be understood differently in terms of their causes, significance, and implications, potentially contributing to divergent problem definitions and governance pathways. The framework therefore complements, rather than replaces, existing explanations centred on institutional capacity, political processes, and socioeconomic conditions, and other contextual factors.

The framework does not imply that interpretations override physical climate processes, scientific evidence, or institutional constraints. Rather, it highlights that these factors acquire governance significance through processes of interpretation and problem definition. Understanding variation in climate governance therefore requires attention not only to what environmental changes occur, but also to how actors interpret their significance, how strongly they connect them to anthropogenic climate change, and how these interpretations relate to collective understandings of the problem.

Future research should examine how climate change attribution divergence develops across different actor groups and contexts, how it interacts with institutional and political conditions, and under what circumstances differences in attribution strength are associated with divergent problem definitions and governance responses. Comparative research across similar climate-related events and governance settings could further examine whether variation in attribution systematically corresponds with differences in the scope, timing, and orientation of adaptation and mitigation responses.

Overall, climate change attribution divergence provides a framework for explaining how similar environmental changes may acquire different governance meanings. By drawing the attention to differences in the strength with which actors attribute environmental changes to anthropogenic climate change, the framework identifies one source of interpretive variation through which shared or competing problem definitions may emerge within climate governance processes.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process.

During the preparation of this work, the authors used ChatGPT to assist with English-language editing, readability improvements, and exploring connections to relevant literature. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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