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Climate Change, Political Conflict, and Democratic Resilience

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Abstract

The world is experiencing the increasingly destabilizing effects of climate change, but we currently know little about its effects on the quality of democracy. We argue that compounding climate shocks create conditions under which democratic resilience diminishes. The accelerated frequency and severity of climate-induced natural disasters and weather shocks, and their devastating economic and social consequences, have increased the likelihood and frequency of civil and political unrest, especially in contexts where climate-induced disasters compound and the government is unable to address citizen grievances. The necessity to respond to more frequent civil unrest and political instability increases the likelihood that governments rely on repressive measures that reduce democratic resilience. To test this argument, we explore whether compounded experiences with climate shocks increase the likelihood of a country experiencing a decline in democratic resilience. We find that the compounded effects of climate change significantly reduce the quality of democracy within the country, and that this is driven by increased instability and repressive measures in response. These findings have important implications for the future of democratic governance in a world increasingly confronted with the negative effects of climate change.

Keywords: Climate, democracy, unrest, disasters, backsliding

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The latest report from the Intergovernmental Panel on Climate Change (IPCC) warns that the current climate trajectory will lead to "unavoidable increases in multiple climate hazards and presents multiple risks to ecosystems and humans" (IPCC 2022). Experts and scholars have accepted that these increased risks are likely to prove destabilizing to societies, and pose significant risk to political institutions, especially democratic institutions (Di Paola and Jamieson 2017; Mittiga 2022; Wallace-Wells 2019). Whereas previous analyses had been decidedly forward-looking, the current report also points out that we are already experiencing these "widespread adverse impacts and related losses and damages to nature and people" that previous predictions had warned about (IPCC 2022). Many of the most accepted consequences of climate change, such as deviations from normal temperatures and exposure to climate-induced natural disasters, have been occurring without the influence of anthropogenic climate change for centuries and have already increased in frequency and severity.

These developments have led to a burgeoning interest in understanding the economic, social, and political consequences of accelerating climate change. In this paper, we examine the relationship between *compounded* climate shocks and the quality of democracy.[1] We argue that climate change creates conditions under which democratic decline (and even breakdown) is more likely, especially in contexts where governments have limited capacity to respond to the economic consequences of climate shocks effectively. In particular, climate change has intensified natural disasters like droughts, famines, and floods, increasing both their frequency and severity, and magnifying their social and economic toll (Arezki and Bruckner 2011; Bergholt and Lujala 2012). As these crises escalate, public confidence in the government's ability to manage such disasters and deliver essential services wanes, leading to reduced political support and heightening the risks of frequent electoral turnover, political instability, and civil unrest. While a government may be able to handle isolated climate events effectively, its capacity to respond deteriorates as these shocks occur more frequently, especially when resources are limited. As national security and regime stability come under threat, governments are more likely to resort to repressive measures to quell unrest. These responses can include prolonged states of emergency, restrictions on freedom of speech and assembly, and other constraints on democratic participation. Such actions not only weaken public trust but also erode the resilience of democratic institutions, ultimately diminishing the quality of democracy.

[1] By compounded climate effects, we refer to events such as floods, droughts, heatwaves, and storms, which occur more frequently and in conjunction due to climate change. These events do not happen in isolation but often overlap, amplifying their destructive impacts on human lives and economic systems. According to the US Global Climate Change Research Program, "compound events result from the occurrence of multiple climate drivers or hazards either in an individual location or across multiple locations that, when combined, have greater impacts than isolated hazards on ecosystems, water resources, public health, energy infrastructure, transportation, food systems, and interconnected societal networks, often straining disaster response" (Crimmins et al. 2023). We conceive of and measure compounding events as additive, rather than multiplicative.

To test this argument, we leverage data on changes in the quality of democracy across almost 100 democracies from 1970-2021. We test if recent experiences with more frequent climate-induced natural disasters reduce countries' resilience to democratic backsliding. Although scholars have argued that democracies perform better on some measures of environmental outcomes and policies, the benefits of those policies are diffuse enough with respect to climate change that experiences of natural disasters are plausibly exogenous to the nature of the individual regimes. We find that a country's experience with repeated exogenous climate shocks makes it significantly more likely to experience democratic backsliding, and that the effects are more pronounced in countries with lower capacity to respond to public grievances. Our analysis also reveals that the effect is driven by the increased use of prolonged states of emergency and government repression as a response to public grievances and anti-government protests. The results are robust to the inclusion of variables that are known to lead to democratic decline, different model specifications, and other robustness checks.

While many scholars have pointed out the worrying consequences of climate change for democratic institutions, much of this work is forward-looking (Abadi 2022; Di Paola and Jamieson 2017; Mert 2021; Mittiga 2022). Our findings build on the existing work that has explored the political effects of climate shocks to develop new insights into its recent effects on the quality of democracy.[2] This research has provided evidence that experiences of climate and weather shocks lead to more political unrest (Arezki and Bruckner 2011; Balcazar and Kennard 2023; Carlin, Love, and Zechmeister 2014; Flores and Smith 2013; Hendrix and Haggard 2015), and can increase instances of repression especially in autocracies (Wood and Wright 2016). But we know much less about the effects of climate change on the quality of democracy. In democracies, climate grievances can theoretically be solved through the electoral process, thereby limiting the threat of democratic decline. Our theoretical mechanism relies on countries experiencing the compounding consequences that stem from experiencing multiple disasters, rather than isolated events. We find that the accelerating frequency of climate shocks can exacerbate existing grievances to an extent that the electoral process is not able to deal with—with important negative consequences for democracy. At the same time, our findings highlight that democratic resilience to backsliding can be strengthened by increasing governments' capacity to protect citizens from climate change's most devastating effects.

[2] For example, existing scholarship has analyzed the negative consequences of climate change for other political phenomena such as violence (Bergholt and Lujala 2012; Hsiang, Burke, and Miguel 2013; Nel and Righarts 2008), support for right-wing populism (Buzogány and Mohamad-Klotzbach 2021; Fiorino 2018; Lockwood 2018; Marquardt and Lederer 2022), and migration (Abel et al. 2019; Benveniste, Oppenheimer, and Fleurbaey 2020; Goldstone and Diamond 2020; Reuveny and Moore 2009).

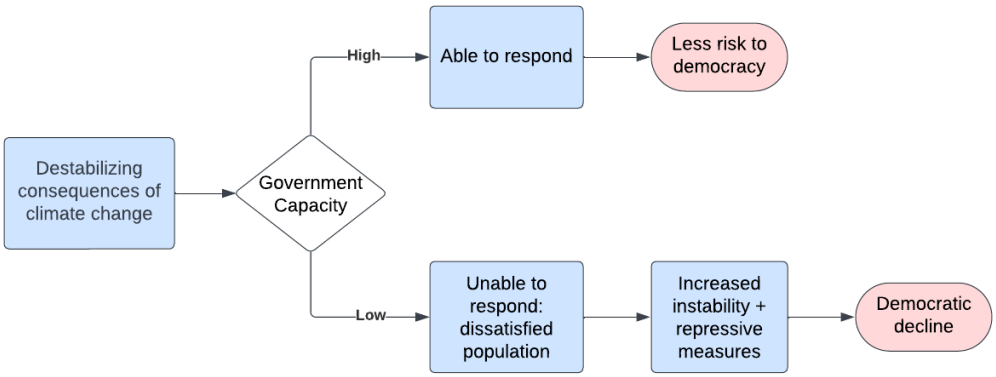
The findings also contribute to a comparative literature on the causes of democratic resilience and decline (Bermeo 2016; Farrell and Newman 2021; Levitsky and Ziblatt 2018; Linz 1978). While these studies often focus on domestic political explanations (Cinar and Nalepa 2022; Grillo and Prato 2023; Grumbach 2022; Haggard and Kaufman 2021a, 2021b; Helmke, Kroeger, and Paine 2022; Mainwaring and Pérez-Liñán 2014; Svolik 2020; Vachudova 2020), we highlight the role of a diffuse, global phenomenon (Farrell and Newman 2021; Hafner-Burton and Schneider 2023). We argue that climate change exacerbates and accelerates many of the political mechanisms that past work has found to matter.

How Compounded Climate Shocks Reduce Democratic Resilience

Our argument focuses on the consequences of climate change for democracy, but primarily operates through experiences of "climate shocks." By climate shocks, we refer to climate change's well-documented effect on weather patterns, such as increased droughts and heat weaves, as well as increased frequency of natural disasters like wildfires, floods, hurricanes, storms, landslides, and even earthquakes and volcanic eruptions (IPCC 2022; McGuire 2013). Humans have dealt with these forces for millennia, which means that their economic, health, and social consequences for societies are already well-understood.[3] Our contribution is twofold. We advance existing work that furthers the analysis to the consequences for democratic resilience but do so while highlighting that climate change creates conditions under which these climate shocks are more likely to compound, or occur in rapid succession, which we argue has an additive impact on their effects on democracy. Previous work has tended to focus on the impact of relatively isolated experiences with these shocks, but climate change means that they will be both more frequent and more severe. This exacerbates their negative consequences. Regimes that do not have the capacity to ameliorate these destabilizing consequences face greater political instability and mass dissatisfaction, and in turn become more likely to respond with repression and other acts that can lead to democratic decline. Figure 1 illustrates the argument.

[3] For our argument, it does not matter if individual shocks are considered "climate" shocks by the people who experience them. It is the effect of the shock itself rather than its association with climate change which is most important. This is what allows us to draw on time-series data, including from before climate change became a central global issue.

Figure 1. Potential Consequences of Climate Change for Democracy



We start by outlining how compounded climate shocks affect the welfare of citizens. Climate shocks have profound and multifaceted impacts on individuals living in affected areas, with economic, social, and health repercussions. For example, droughts, heat waves, and abnormal rainfall can reduce crop output (Brinkman and Hendrix 2011) and economic productivity (Bergholt and Lujala 2012; Henderson, Storeygard, and Weil 2012), potentially leading to famine. Weather shocks can also impact industrial output (Dell, Jones, and Olken 2012). Economic recessions are often the consequence, especially because agriculture has significant spillovers into other sectors of the economy (Tiffin and Irz 2006). Employment opportunities can drop and food insecurity increase, fueling social conflict. Climate change also exacerbates wealth and income inequality, because of its disproportionate impact on poorer people who are unable to adapt or migrate (Benveniste, Oppenheimer, and Fleurbaey 2022). Climate shocks can also have more direct consequences, such as destruction of property, loss of life, and forced relocation from natural disasters. All these consequences can destabilize society through degradation of the social order and economic problems. In 2022, Pakistan experienced severe flooding that covered one third of the country, affected 33 million people, displaced at least 8 million Pakistanis, and caused billions of dollars in damages. Estimates indicate that it will cost over $16 billion for the country to recover from the consequences of the floods (Ministry of Planning Development & Special Initiatives 2022). Research has suggested that these floods were directly linked to the heat waves Europe experienced that summer, demonstrating how interconnected and widespread the deleterious effects of climate change are (Hong et al. 2023).

The example suggests that climate calamities also have significant effects on individual and national budgets. According to a report by the Global Commission on Adaptation, climate change could result in global economic losses amounting to $7.9 trillion by 2050 if mitigation and adaptation measures are not taken (Gillam and Yin 2024). In the United States alone, climate-related disasters, including hurricanes, wildfires, and floods, cost

the country an average of $100 billion annually over the past decade (National Oceanic and Atmospheric Administration, 2022). Current estimates suggest that the nation experiences a billion-dollar climate disaster roughly every three weeks.

The degree to which countries experience destabilization due to climate shocks is closely tied to their government's fiscal and administrative capacity to address the resulting economic and social challenges. High government capacity enables a more effective response to climate impacts, even when the root causes of climate change remain unaddressed. For instance, in Germany, while citizens expressed dissatisfaction with the government's response following extreme floods that destroyed thousands of homes and claimed dozens of lives, the government quickly mobilized resources for reconstruction and provided support to displaced people, helping to stabilize affected regions (Nick et al. 2023).[4] This swift response mitigated potential grievances before they could become politicized and impact public support for the incumbents, illustrating how efficient response mechanisms can help maintain political stability (Healy and Malhotra 2009). Effective fiscal responses to such disasters may draw on domestic budgetary resources, allowing governments to finance rebuilding efforts and assist affected populations. Countries with a higher per capita gross domestic product (GDP) are more likely to have the fiscal space to fund such recovery efforts through domestic budgets, enabling a prompt response to disasters. However, in lower-GDP nations, where budgetary resources are limited, reliance on foreign aid is often necessary to supplement domestic funds. Access to both domestic budgets and international support thus becomes critical, as it enables governments to respond effectively to climate shocks by meeting citizens' immediate needs, minimizing grievances, and maintaining social stability (Gaikwad, Genovese, and Tingley 2022; Kono 2020).

Fiscal resources are central to this response, allowing governments to allocate national budgets or obtain foreign aid to fund recovery efforts, rebuild infrastructure, and provide direct assistance to impacted citizens. However, administrative capacity is equally crucial, ensuring that these resources are effectively deployed and monitored. A capable civil service can expedite disaster relief, manage aid distribution, and coordinate with local agencies, maximizing the impact of available funds. Furthermore, strong administrative capacity aids in managing public order by addressing grievances through proactive communication and social support programs, reducing the risk of unrest. Together, fiscal and administrative capacity strengthen a government's resilience against destabilization from climate shocks by efficiently addressing the economic and social impacts, thus sustaining public confidence and political stability.

[4] Interestingly (and worryingly), this situation may change as climate shocks accelerate and compound in the near future. Compounding climate shocks also mean that each successive shock is more difficult to respond to for the government. It may be able to effectively respond to a single flood, but experiencing multiple floods along with landslides, wildfires, and other disasters within a relatively short period of time puts a strain on financial, logistical, and human resources even in rich countries (Wood and Wright 2016).

When governments lack the fiscal and administrative capacity to address climate-induced disasters effectively, they struggle to respond swiftly to public grievances and meet basic citizen expectations for security and stability (Lin 2015). Citizens rely on their governments not only to foster prosperity but also to ensure their physical safety. Climate shocks, however, pose both direct and indirect threats to these expectations. Economic disruptions caused by climate events often lead to heightened dissatisfaction with government performance, as citizens experience firsthand the destabilizing impacts on their financial stability and personal safety (Burnell 2012). This dissatisfaction is especially intense when governments appear unable to mitigate the immediate impacts of these crises or implement measures to prevent future shocks.

Repeated climate shocks, combined with ineffective government responses, erode confidence in the political status quo. The visible inability of governments to address the economic and personal effects of these events exacerbates discontent, making their failures feel personal and urgent. In such contexts, citizens increasingly question the effectiveness and legitimacy of their leaders, particularly as their financial security, well-being, and physical safety are put at risk (Gawronski and Olson 2013; Mazepus and van Leeuwen 2020).

Of course, isolated instances of climate-induced shocks generally do not threaten the stability of a regime. In democracies, public grievances tend to be resolved through the electoral process, where affected citizens can reward or punish governments for their performance. Democracies are generally seen as less likely to respond to unrest with repressive measures because, in theory, governments can be voted out of office and can manage dissent through alternative mechanisms like political participation and addressing public grievances. This flexibility allows democratic systems to channel discontent through institutionalized processes rather than coercion, ideally reducing the need for forceful control. Yet the scholarship is very clear that, when faced with crises such as popular dissent, democracies are just as likely as other types of regimes to respond with repressive measures (Carey 2006), and that this is especially true for new democracies facing backlash movements (Aytaç, Schiumerini, and Stokes 2017).

We argue that the compounding effect of increasingly frequent climate shocks weakens the electoral process as an effective means for citizens to express dissatisfaction and drive political change within a democracy. Citizens who are repeatedly experiencing the devastating economic and personal consequences of climate shocks and receive little to no support from the government become less likely to believe that replacing one government with another offers a solution to their woes. They also become less satisfied with democratic institutions and values in general (Carlin, Love, and Zechmeister 2014). Government inaction means that the electoral process becomes an ineffective means of expressing dissatisfaction, and citizens turn to other means of expression, including protests, demonstrations, and even social unrest (Arezki and

Bruckner 2011; Brinkman and Hendrix 2011; Hendrix and Haggard 2015). Thousands protested in Derna, Libya after flooding killed thousands, claiming that the government had been warned that the city needed to improve its resilience against disasters (Al Jazeera 2023). The government, however, argued that it did not have the resources to take the recommended actions.

Widespread dissatisfaction and social instability reduce the ability of governments to stay in power (Carey 2010; Davenport 1995, 2007), but they also pose threats to national security and regime stability to which governments react. This reaction can take several forms, especially in contexts where governments are unable to address social and economic grievances directly. To establish and maintain security and order, governments often respond to street protests and other forms of civil unrest by using more force or through bureaucratic discouragement of assembly.[5] For example, in 2019, tens of thousands of farmers from the Indian state of Maharashtra protested the inadequate government response to a severe drought. The government responded, in part, by arresting protest leaders and claiming they did not have required authorization for the demonstration (The Indian Express 2019). In another example, a water crisis in Chile was one of the reasons behind massive protests in 2019 that resulted in the deaths of dozens of protesters at the hands of police and the arrest of thousands of others (Bartlett 2022).

Governments may also directly reduce freedoms using states of emergency (Hafner-Burton, Helfer, and Fariss 2011). After Hurricane Katrina in the United States, the National Guard instituted curfews and detained individuals without due process. These were ostensibly a means of re-establishing order and some semblance of social stability, but were seen by members of affected communities as a repressive measure (Amnesty International 2010). Governments can also reduce access to information to battle misinformation and clear communication channels. In the India example above, the government restricted Internet access in some places, reducing the ability of the protesters to organize (Beacham, Hafner-Burton, and Schneider 2024). Although none of these measures are undemocratic in and of themselves—and oftentimes even justified in the event of political instability—it is the increased frequency with which low-capacity governments resort to them that affects the quality of democracy within a country. These actions to roll back democracy, even if done for seemingly legitimate reasons at the time, are sticky and hard to reverse, especially in contexts where climate shocks occur with increasing frequency.

[5] These protests do not necessarily need to be about traditional "environmental" issues, but rather the devastating social and economic consequences that result from environmental shocks. For a detailed overview of the scholarship on the relationship between social mobilization and government repression, see Davenport et al. (2005).

Climate instability may also lead a government to rely more heavily on a smaller, but powerful, base of support, such as a consolidated industry group that is easier to maintain and mobilize. This reliance on a concentrated base of powerful interests could exacerbate long-term representational and wealth inequalities, increase polarization, and ultimately degrade the quality of democracy (Colgan 2023). As public discontent grows, governments may turn to influential groups—often the very "climate-forcing" industries responsible for significant emissions and environmental harm (Colgan, Green, and Hale 2021)—to sustain political support. This dependency further erodes democratic legitimacy, as policies increasingly favor these industries, deepening societal divisions and undermining public trust (Di Paola and Jamieson 2017).[6] For example, the fossil fuel-connected Liberal government in Australia refused to take decisive action against climate change in the wake of massive 2019 wildfires that sparked nationwide protests. Instead, it continued to approve new coal mines and deny the role of climate change in intensifying the fires (Timms 2020; Ward 2020). In Brazil, President Jair Bolsonaro notably denied climate change and permitted the rapid acceleration of Amazon deforestation, partly due to his heavy reliance on agribusiness for financial and political support (Fernández Milmanda 2023). This alignment with powerful agricultural interests shaped his environmental policies, allowing land clearing and exploitation to proceed with minimal restrictions, despite significant international and domestic criticism. While both governments have since been voted out of office, their positions weakened trust in democratic institutions and fostered a more divisive political environment—a dangerous combination that can result in the erosion of democracy in the medium and long term.

In sum, we expect that an increased frequency of compounded climate shocks will weaken a country's democratic resilience, making it more likely to experience democratic backsliding (Hypothesis 1). We expect this effect to work through amplifying effects of climate shocks on social and political grievances, increased use of state of emergencies, and repressive tactics by governments. We also expect the impact of compounded climate shocks to be more pronounced in countries lacking the capacity to address economic and social grievances (Hypothesis 2).

[6] Recent work in political theory suggests that even a government taking the opposite tact—addressing climate change directly—could result in antidemocratic outcomes if current patterns in public opinion continue (Mittiga 2022).

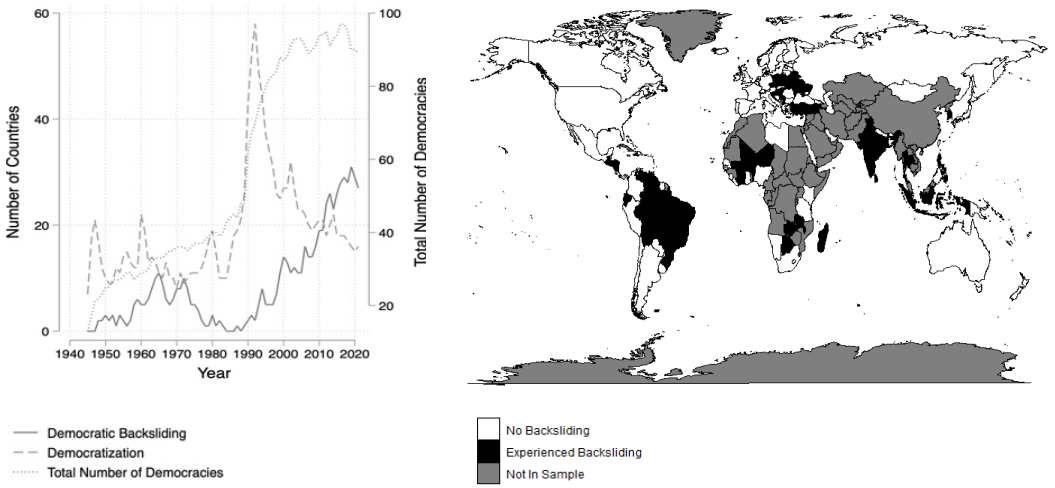
Research Design

To examine the empirical implications of our theoretical argument, we analyze comparative data on democratic decline in 97 liberal and electoral democracies.[7]

Dependent Variable

According to our argument, climate-induced disasters, while not immediately a threat to the survival of a democracy, have deleterious effects on democratic resilience. We measure decreased resilience through increased likelihood of experiencing democratic backsliding. Democratic backsliding is defined as a period of substantial and sustained decreases on V-Dem's Electoral Democracy Index (EDI). This index includes a broad set of measures for polyarchy, including freedom of expression and alternative sources of information, freedom of association, share of the population with suffrage, cleanness of elections, and a host of information about the quality of the elected official process. Following Lührmann and Lindberg (2019), *democratic backsliding* is coded as 1 if the country experiences an initial 0.01 decrease on the EDI and a total decrease of at least -0.10 throughout the entire backsliding episode. A backsliding episode ends the final year of a negative change less than or equal to the initial decrease, prior to experiencing an annual increase, cumulative increase, or stasis period. Data are from Edgell et al. (2020).

Figure 2. Democratic Backsliding, 1945-2021. Source: Lührmann and Lindberg (2019).



[7] Although we focus on established democracies, we show that our results are robust to including hybrid regimes (regimes that have both democratic and autocratic features) in Appendix C. In fact, many of the regimes that fall into the "electoral autocracy", or hybrid, category were officially regarded as full democracies by the West and the variation in their trajectory toward liberal democracies or autocracy has been a focal point in the comparative scholarship (Levitsky and Way 2010; Merkel 2010).

Figure 2 graphs the number of countries that experienced a substantial and sustained increase in the quality of democratic institutions (democratization, dashed line), the overall number of democracies in the world (dotted line), and the number of countries that experienced a backsliding event (democratic backsliding, solid line).[8] The end of the Cold War witnessed a significant increase in the number of countries with improvements in democratic resilience as well as the overall number of democracies. But although the overall number of democracies has remained relatively stable since the 2000s, democratic and hybrid regimes became more likely to experience a period of substantial and sustained decline in the quality of democratic institutions. The figure also presents a map to illustrate which countries have experienced any episodes of democratic backsliding since the end of the Cold War.

Scholars debate how significant the reduction in democratic quality has to be in order to signify democratic backsliding (Haggard and Kaufman 2021a, 2021b; Jee, Lueders, and Myrick 2022; Rovny 2023; Waldner and Lust 2018). Whereas some consider any negative change in democratic quality as democratic backsliding, others argue that democratic backsliding requires a categorical change in regime type such as from liberal democracy to electoral democracy, or from electoral democracy to electoral autocracy. Our measure accounts for significant changes in democratic quality without requiring categorical change in regime type. This strategy is appropriate to capture the incremental decline in democratic quality that has occurred in many democratic regimes since the end of the Cold War, and the kind of changes that we would expect to result from climate shocks. However, we show in Appendix C that our main results are robust to a more conservative operationalization that focuses on democratic breakdown (Model 1) and to a continuous measure of backsliding (measured as the continuous change in the democracy score, Model 3).

Some recent work has pointed to a potential bias induced in subjective measures of democracy that can lead to an artificial overestimation about the extent of global trends in democratic decline (Little and Meng 2023). This work has led to a stimulating debate, most recently published in a special issue of *Political Science & Politics* (2024), which highlights that (1) the proportion of democracies in the world is still near an all-time high, (2) many democracies experience an incremental erosion of democratic institutions and behaviors without necessarily reverting to autocracy, and (3) many of the objective indicators that perform well in capturing the democracy-autocracy nexus are less well suited to measure incremental democratic erosion within democracies (Gorokhovskaia 2024; Knutsen et al. 2024; Levitsky and Way 2024; Little and Meng 2024; Miller 2024; Treisman 2024).

[8] Countries are measured as backsliding or democratizing if they experience a significant shift on the V-Dem polyarchy index (0.1 on a scale from 0 to 1), using a sample of democracies and hybrid regimes using data from Lührmann and Lindberg (2019). Trends in democratic backsliding are similar if we only consider full democracies and if we account for the number of countries in each category.

At this point, it is important to reiterate that we do not claim that climate-induced disasters generally lead to democratic breakdown or reduce the likelihood of democratic transitions. Rather, our paper focuses on potentially problematic trends of backsliding *within* democracies, with a focus on how the compounding effects of climate change can be harmful for the health of democracy. Although it is not possible to use more objective measures to understand incremental deterioration in democracy, we can use more objective measures to analyze whether climate change may lead to more serious democratic decline because of sustained incremental backsliding. In our robustness analysis, we employ a more objective binary democracy-autocracy indicator (Cheibub, Gandhi, and Vreeland 2010), and show that our findings are robust (Appendix C, Model 2).

Main Explanatory Variables

We expect that the increased frequency of exogenous climate shocks reduces democratic resilience, making backsliding more likely. We measure *compounded climate shocks* as the number of climate-induced disasters that occurred within a country over a period of three years.[9] We focus on disasters related to landslides, storms, droughts, wildfires, and floods as climate-induced disasters. Data are from the Emergency Events Database (EM-DAT), which defines disasters as "a situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction, and human suffering." We use the number of disasters that a country experiences over a period of three years to capture our argument that climate change disruptions should be particularly problematic for democracy if they occur more frequently, making it more difficult for governments to respond. In other words, our conceptualization of compounding is focused on increased frequency and concentration of disasters, rather than empirically measuring a potentially multiplicative effect of concentrated disasters. We are not directly measuring the *effects* of the disasters, which are endogenous to capacity and other political-economic variables, but rather their occurrence.[10] While they have may have multiplicative effects, it takes increased *occurrence* of the disasters to potentially lead to them. This is in line with other literature that defines the "compounding" component of disasters as simply having multiple events occurring in a short space of time (Liu and Huang 2014; Pescaroli and Alexander 2018).[11]

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[9] The results are robust if we use the number of disasters in a one-year or five-year period.

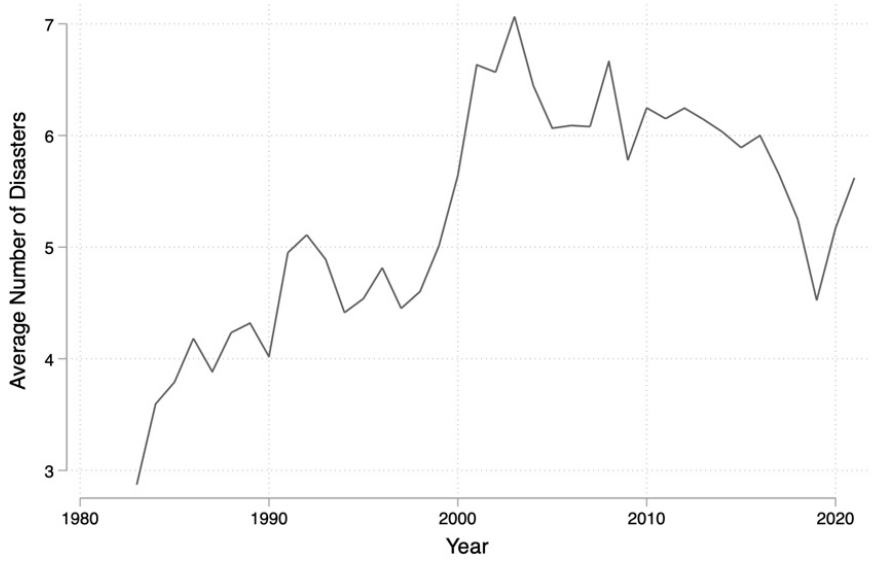
[10] For example, we do not account for the number of people affected by disasters or the number of deaths because those measures are endogenous to the response of the state (e.g. Flores and Smith 2013).

[11] This is contrast to other elements that stem from overlapping or high frequency disasters like interconnected, interacting, and cascading risks.

Using climate-induced disasters as a measure of climate shocks has the advantage that disasters are exogenous to the nature of any individual country's response or contribution to climate change. For example, low-lying island nations that have contributed little to climate change are suffering the worst effects, while some states with high capacity to respond effectively have not yet needed to, even though they have contributed more to global emissions. Disaster experiences are therefore not reflections of climate policy or national contributions to greenhouse gas emissions. In Appendix D, we show that the results are not dependent on measuring climate shocks using climate-induced disasters but robust to using extreme temperature events as an alternative operationalization. Extreme temperature events are measured as deviations from average historical temperatures, and so also represent a form of climate shock.

Figure 3 graphs the average number of climate-induced disasters experienced per year across liberal and electoral democracies over time.[12] There is a strong positive trend, indicating that countries experience an increased frequency of disasters over time. In our sample of democracies, countries on average experience 5.7 disasters each year, but their experiences with climate-induced disasters vary widely. Some countries experience no disasters some years, others have experienced up to 94 disasters in a three-year period.

Figure 3. Climate-Induced Disasters, 1980-2021, Source: EM-DAT.



[12] Taking the average total for the current year and previous two years results in the *compounded climate shocks* variable.

Aside from the main effect, we expect the effect of compounding climate-induced disasters to be stronger when countries lack the capacity to address economic and social grievances (Hypothesis 2). We analyze this conditional effect using an interaction between a country's capacity and *compounded climate shocks*. While direct data on national climate disaster response capacity is unavailable, we approximate this capacity by examining national per capita GDP, as higher-income countries are more likely to have the financial resources to address the economic and social fallout from climate disruptions. This approach aligns with existing disaster research, though per capita GDP is often used as a control rather than interacted with disaster frequency, given differing theoretical expectations (Flores and Smith 2013; Kahn 2005). Data on *GDP per capita* are sourced from the World Development Indicators. Additionally, we incorporate a measure of disaster-related foreign aid from the Organisation for Economic Co-operation and Development (OECD) as an alternative indicator. Foreign aid provides vital financial resources for recovery efforts after climate shocks, potentially reducing the need for repressive measures by relieving some of the financial pressure on the government. *Disaster-related foreign aid receipts* is measured as the log of total foreign aid commitments from foreign donors related to help recipients respond to and prepare for climate shocks, measured in U.S. dollars. It includes both multilateral aid—from international organizations and non-governmental organization (NGOs)—and bilateral aid from individual countries related to disaster risk reduction, prevention, and preparedness; reconstruction relief and rehabilitation; and emergency response. For this analysis, we restrict the sample to medium- and low-income countries, as these nations are more likely to be eligible for foreign aid in response to disasters than wealthier countries. Data are sourced from the OECD Creditor Reporting System. Finally, we integrate a more comprehensive measure of state capacity using Hanson and Sigman's (2021) Bayesian latent variable estimation, which uses 21 different indicators related to three dimensions of state capacity identified as theoretically relevant. Hanso and Sigman then use a Bayesian Markov chain Monte Carlo method to measure different dimensions of the latent variable of state capacity. This measure includes three dimensions of capacity: bureaucratic, administrative, and coercive capacity. By using the Hanson and Sigman variable, we aim to capture not only the financial resources a government may have but also its ability to mobilize these resources through a skilled bureaucracy and organized civil service. A high score on this measure suggests that a government can implement policies quickly, manage large-scale aid distribution, and address public grievances efficiently, thereby reducing the destabilizing effects of climate-induced disasters. This variable provides a more comprehensive understanding of capacity, supplementing economic indicators like per capita GDP by focusing on the operational aspects of governance that directly influence recovery and resilience.

Aside from testing the main empirical implications of our theory, we also explore whether we find support for the underlying mechanisms. We expect *compounded climate shocks* to be associated with reductions in democratic resilience through its amplifying effects on social and political grievances, increased use of state of emergencies, and repressive tactics by governments. To analyze the mechanisms through which climate shocks affect democratic quality, we employ mediation analyses.[13] We measure public grievances using variables measuring anti-government protest and overall domestic conflict from the Cross-National Time-Series (CNTS) dataset (Banks and Wilson 2024), and a variable on mass mobilizations from V-Dem. Anti-government demonstrations are measured as a count of the number of "public gatherings of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority, excluding demonstrations of a distinctly anti-foreign nature" in a given year, collected from news sources. Overall domestic conflict is a weighted measure that includes events of assassinations, strikes, guerrilla warfare, government crises, purges, riots, revolutions, and anti-government demonstrations, recorded using the same methodology. The V-Dem mass mobilization variable measures from 0-4 how frequent and large events of mass mobilization have been. We measure government repression using (1) the civil society repression variable from V-Dem, which measures from 0-4 if the government attempts to repress civil society organizations, and (2) the Latent Human Rights Score (Fariss, Kenwick, and Reuning 2020), which uses item-response theory models to dynamically measure human rights practices over time, accounting for changes in reporting standards. We also measure government response through the declaration of states of emergency, taken from V-Dem's State of Emergency variable which measures if a state of emergency was declared at any point in a given year for a given country.[14]

We also include a battery of control variables into the model, following standard models on democratic backsliding. We include variables that may confound the relationship between climate shocks and democratic backsliding. We control for the level of political polarization and the quality of democracy in a country (data for both variables are from Coppedge et al. 2022); the average populist score of the political parties that hold executive power (data are from Lindberg et al. 2022); the country's per capita GDP and GDP growth (data for both variables are from the World Development Indicators); the level of economic integration (data are from Dreher 2006); the country's natural

[13] Appendix G shows that the effects are robust if we use regression models with the mediators as dependent variables.

[14] We also use a placebo test to make sure that the results are not simply an artifact of the democracy measure. For the placebo, we use universal suffrage as a measure of democracy that should not be affected by climate disruptions. Data are from Coppedge et al. (2022)

resource rents (data are from the World Development Indicators); and a binary variable that measures whether the country is a presidential system (data are from Coppedge et al. 2022). We describe the operationalization of all variables and present descriptive statistics in Appendix A.

Model Specification

Democratic backsliding is a binary variable, and we estimate generalized linear models with a logit link function and robust standard errors. Since the data is time series and cross sectional, we follow Beck, Katz, and Tucker (1998) and correct for serial dependence by including three cubic splines. All explanatory variables are lagged by one year.

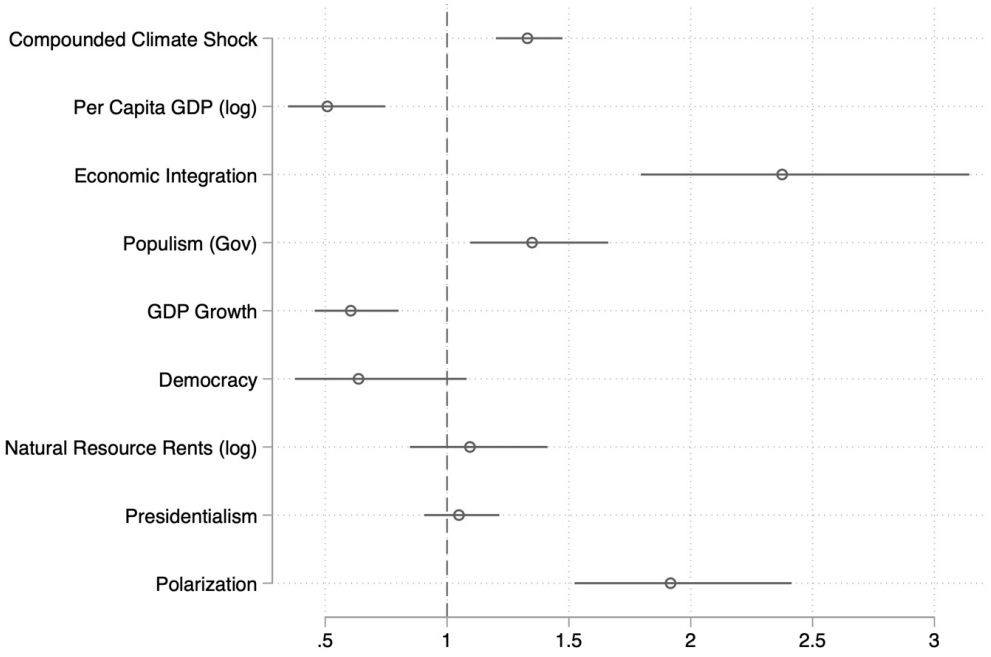
In Appendix E, we further probe the robustness of our results to including region-fixed effects (Model 2), country-fixed effects with a continuous dependent variable (Model 3), and to estimating a more parsimonious ordinary least squares (OLS) model (Model 1). Provided that climate-induced natural disasters are exogenous conditional on our vector of confounders, the estimating equation above identifies the causal impact disasters on the quality of democratic institutions.

We use interaction effects to analyze the conditional effect of per capita GDP and causal mediation analysis to assess whether the effect of compounded climate shocks occurs through the rise of domestic discontent and government response. We describe those alternative models in greater detail in the robustness section.

Comparative Analysis

The exponentiated coefficients from the model depicted in Figure 4 summarize the effects of a range of explanatory variables that have been examined in previous studies of democratic decline. For ease of interpretation, we standardize all explanatory variables to a mean of 0 and standard deviation of 1. The details of this model with numerical estimates are reported in Appendix B (Model 1).

Figure 4. The Effect of Compounded Climate Shocks on Democratic Backsliding. Notes: Graph presents odds ratios with 95 percent confidence intervals. All explanatory variables are standardized and lagged by one year. Cubic splines are omitted.

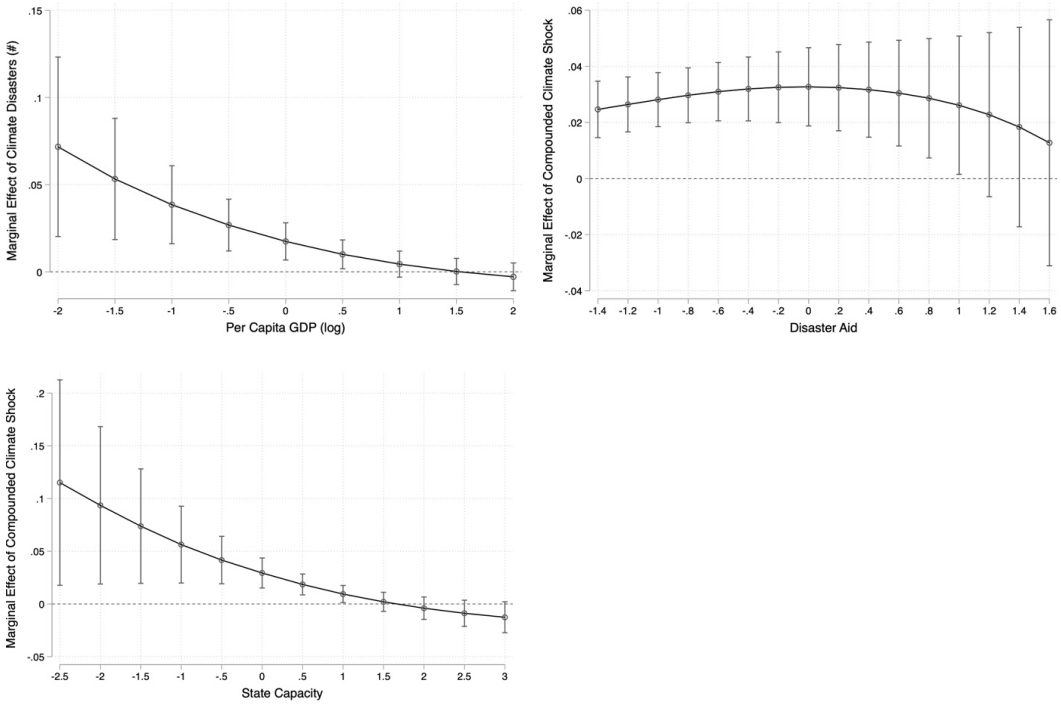


Supporting Hypothesis 1, we find that *compounded climate shocks* have a strong positive and significant association with the likelihood of democratic backsliding. A one standard deviation increase in *compounded climate shocks* makes democratic backsliding almost 1.5 times more likely. The effect size is comparable to the effect of *populism,* which also has a positive and significant association with democratic backsliding and has been the subject of recent scrutiny in the literature as a driver of reduced democratic resilience and increased democratic backsliding. The results of the control variables further lend support to the previous literature on the topic. Whereas polarization, economic integration, and populism of government leaders are positively associated with democratic backsliding, the likelihood of backsliding declines when countries have strong economies and growth. There is no indication that stronger democracies or presidential systems are more or less likely to backslide.

Compounded Climate Shocks, Government Capacity, and Democratic Backsliding

According to Hypothesis 2, the deleterious effect of *compounded climate shocks* should be limited to countries that have less capacity to respond to the consequences of climate-induced disasters, which would reduce the likelihood of domestic discontent. As discussed above, we measure government capacity to respond to climate shocks with three variables, *per capita GDP*, *disaster-related foreign aid,* and *state capacity*. Figure 5 presents the results of an estimation that includes an interaction between *per capita GDP* and *compounded climate shocks* (left sub-graph), *disaster-related foreign aid* and *compounded climate shocks* (right sub-graph), and *state capacity* and *compounded climate shocks* (lower sub-graph).[15]

Figure 5. The Marginal Effects of Climate Disasters for Different Levels of Government Capacity



The findings provide robust support for our argument on the role of state capacity in mitigating the impact of compounded climate shocks on democratic stability. The results show that compounded climate shocks significantly increase political destabilization, but this effect weakens in countries with higher per capita GDPs—specifically, those with incomes at least one standard deviation above the sample mean ($17,889). This threshold, which aligns with the World Bank's designation of high-

[15] Appendix B (Model 2) presents the numerical results in tabular form.

income economies (above $12,055), suggests that wealthier nations are better equipped to absorb and respond to the adverse political and social effects of climate shocks by drawing on substantial financial resources. This economic buffer enables these governments to implement adaptive measures, which, in turn, mitigate the destabilizing effects of climate shocks.

Foreign aid also plays a mitigating role, particularly in medium and low-income countries. When foreign aid for disaster relief reaches significant levels (1.2 standard deviations above the mean), the effect of compounded climate shocks on political instability is reduced. While foreign aid provides crucial financial support, its moderating effect is generally weaker than that of per capita GDP because it does not inherently strengthen the long-term administrative or fiscal capacities of recipient countries. Nonetheless, substantial foreign aid can be instrumental in assisting governments with immediate disaster response and recovery, helping to alleviate public grievances and stabilize political conditions by providing an external cushion to address urgent needs.

Finally, administrative capacity, measured by Hanson and Sigman's state capacity index, shows a similar moderating effect. In countries with administrative capacity one standard deviation above the sample mean, the destabilizing impact of climate shocks diminishes, highlighting that an efficient bureaucratic structure allows for effective resource deployment, disaster management, and public order maintenance during crises.

Compounded Climate Shocks, Domestic Grievances, and Repression

According to our theory, we expect *compounded climate shocks* to have a positive and significant effect on democratic backsliding, and that this effect mainly works through an increase in domestic discontent that the government may attempt to stifle, especially when their capacity to help the victims of the disaster is lower. We can test these implications by using mediation analysis (Imai, Keele, and Tingley 2010).[16] We use three different indicators to address domestic discontent: anti-government protests (Model 1), overall domestic conflict (Model 2), and mass mobilizations (Model 3), from the CNTS dataset and V-Dem, discussed above. These variables correspond to expectations in the first part of the causal chain as depicted in Figure 1. We also use three variables to measure potential repressive responses by the government: repression from V-Dem (Model 4), latent human rights scores from Farris (Model 5), and the use of prolonged state of emergencies from V-Dem (Model 6).[17] These variables, in turn, correspond to the second part of the causal chain, as illustrated in the diagram in

[16] Appendix G we use more parsimonious OLS models where we analyze the direct association of *climate disasters (number)* with the mediator variables, with consistent results.

[17] Appendix A describes the variables in detail and presents data sources.

Figure 1. To ensure that the effects are not an artifact of the mediators being associated with indicators of democracy, we also run a placebo analysis where we use universal suffrage as mediator that should not be affected by climate disruptions—at least not in the same direction as the other mediators (Model 7). Table 1 presents the results.

Table 1. Mediation Analysis.

	(1) Demonstration I	(2) Demonstration II	(3) Mobilization	(4) Repression (V)	(5) Repression (F)	(6) SoE	(7) Placebo
Indirect	0.001**	0.003***	0.004*	0.004**	0.006**	0.004**	-0.000
Effect	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.000)
Direct	0.048**	0.032	0.069***	0.061***	0.061***	0.065***	0.061***
Effect	(0.022)	(0.028)	(0.009)	(0.010)	(0.010)	(0.009)	(0.011)
TE	0.049**	0.036	0.073***	0.065***	0.067***	0.069***	0.061***
	(0.022)	(0.028)	(0.009)	(0.010)	(0.010)	(0.009)	(0.011)

For all theoretically relevant variables we find a significant indirect effect, which implies that the effect of *compounded climate shocks* on democratic backsliding works through domestic discontent and repressive responses. Theoretically, we argue that the responses are driven by the domestic discontent, but both types of responses stem from the disruptive effects of climate shocks. As expected, we do not find a statistically significant indirect effect if we use the placebo as mediator. These effects are consistent to more parsimonious OLS models that use the mediators as the dependent variables, which we present in Appendix G.

Further Robustness Checks

We have taken substantial measures to validate the robustness of our findings, which we report in the online supplementary information. In Appendix B, we present the numerical results of the main results, including the interaction models. In Appendix C, we analyze whether a more conservative threshold for democratic backsliding changes our results by measuring democratic backsliding as occurring only when the decline in democracy quality leads the regime to transition to electoral or closed autocracy (Model 1). In addition, we estimate models with a more objective binary measure of democracy from Cheibub et al. (2010) (Model 2), as well as using declines in a continuous measure of democracy as the dependent variable (Model 3).[18] Finally, we conduct a placebo test and analyze whether the compounding disruptions of climate change influence the likelihood of democratization as opposed to backsliding (Model 4).

In Appendix D, we test the robustness of our main explanatory variable. We analyze the effects of all types of climate-induced disasters separately and find that most types of disasters matter individually except for droughts and fires (Models 1-6). We also analyze climate effects over a one-year period and a five-year period, deviations from a country's normal rate of experiences of natural disasters, and an alternative variable that measures the proportion of the country's population that was affected by natural disasters within the past three years (Models 7-10). None of these alternative specifications change the substantive effects of our main results. The robustness of results to using deviations from normal disaster experiences also alleviates concerns that propensity to experience disasters could be co-determined with regime type, the propensity for backsliding, or capacity since deviations from normal experiences of disaster are unlikely to be endogenous.

In Appendix E, we present results of a more parsimonious OLS specification (Model 1), with similar results. Ideally, we would like to employ country-fixed effects to eliminate time-invariant confounding factors. However, this would reduce the sample significantly to countries that experience a change in democratic quality at some point. Rather than using country-fixed effects, we present models with region-fixed effects (Model 2), and we also present a model with the continuous measure of backsliding as the dependent variable and country-fixed effects (Model 3). The results are robust.

[18] Since the variable is a binary variable on democracy or autocracy, we include hybrid regimes in the sample and employ country fixed effects to analyze whether a change in the number of climate-induced disasters affects a change in the regime type (from democracy to autocracy).

In Appendix F, we further explore the scope of our argument. We already provided evidence that the effects do not occur in high-income countries. Here, we present analyses with samples that focus on medium and low-income countries (Model 3) and high-income countries (Model 4), with similar results to the interacted models. One could be concerned that these results are driven by the democracy quality within a country. Highly democratic countries tend to be richer and less likely to backslide. But while our results are not significant in a sample of liberal democracies (Model 2), they are significant in a sample of countries that have very high levels of democratic stock—that is, countries that have been stable democracies for a relatively long time (Model 5). This implies that climate disruptions to this point in time have mainly affected medium-high-income electoral democracies even if they have been democratic for significant periods of time. We also find that our results are robust to including electoral autocracies (Model 1).

Appendix G displays the alternative mechanism tests when the mediating variables from above are used as dependent variables.

A potential alternative explanation for our findings could be that mature democracies tend to be wealthier and, on average, face fewer disasters. While it is reasonable to assume that the timing of disasters is exogenous, their location may not be, as certain geographic regions are more prone to climate-related disasters. However, our data does not support this pattern. Appendix H demonstrates the relationship between democracy and compounded climate shocks, showing no clear correlation between the two variables. If any trend exists, it suggests that more frequent climate shocks are slightly more likely in highly democratic settings. Similarly, the relationship between GDP per capita and the incidence of compounded climate shocks does not fully align with this hypothesis. While the wealthiest countries do experience fewer shocks, many middle-income countries have faced significant climate disruptions. Our primary findings are not statistically significant for high-income countries, which may be explained by this pattern, yet our core results hold for middle-income nations. Moreover, when using an alternative measure that assesses deviations from the typical frequency of climate shocks, the results remain significant even for high-income countries. Based on these observations, our findings cannot be attributed solely to regime type, democratic experience, or a predisposition toward democratic erosion as outcomes jointly determined by levels of democracy.

Conclusion

This paper examines the destabilizing effects of climate change on democratic resilience, focusing on how repeated climate shocks intensify public discontent and strain government institutions, in turn making democratic backsliding more likely. We argue that when governments lack the capacity to mitigate the harmful consequences of climate shocks, citizens' grievances deepen, and reliance on the electoral process to address these grievances becomes insufficient. This inability to respond effectively to public needs heightens social and political tensions, increasing the likelihood of civil unrest and political instability. Consequently, governments are more likely to resort to repressive measures to manage the crisis, which undermines democratic norms and reduces institutional resilience. Our comparative quantitative analysis supports the overall relationship between compounded climate shocks and democratic resilience, highlighting the mechanisms that drive this dynamic. Specifically, the findings underscore the role of state capacity as a moderating factor; where governments possess robust fiscal and administrative capacity, the adverse effects of climate shocks on democracy are less pronounced.

This study contributes to the growing literature on climate change and political stability, illustrating the pressing need for resilient governance structures capable of managing the complex challenges posed by a changing climate. Researchers and popular commentators have been lamenting the lack of adequate response to climate change for decades now. They have mostly focused on the negative health and environmental effects, but this paper joins a growing body of work that points out the worrying consequences for democratic institutions and freedoms (Di Paola and Jamieson 2017; Mert 2021; Mittiga 2022). Unless governments address the root causes of climate change while simultaneously building the capacity to manage its adverse health and social impacts, the coming decades may see continued democratic erosion. This risk is especially high as these crises become more frequent and their effects compound, placing ever-greater strain on political institutions and public trust. This is especially concerning in combination with our findings that financial and administrative capacity can help mitigate these negative effects. It will become increasingly difficult for states to build these capacities at the same time that they are confronted by increasing climate shocks. As larger portions of national budgets go to disaster recovery, mitigation, and prevention, it will be more difficult to invest in the sorts of economy and institution-building initiatives that may be needed to boost democratic resilience in the face of climate change. Therefore, the next decade is, as often been argued, extremely critical for both slowing climate change and building institutions and capacity that can withstand its worst effects.

The findings also build on existing research into the causes of democratic resilience and backsliding. Climate change itself does not diminish democratic resilience directly—rising temperatures do not cause institutional shifts on their own. Rather, increased temperatures trigger a cascade of environmental, social, and economic effects that indirectly impact democratic stability. As climate shocks worsen and become more frequent, they intensify public grievances and place pressure on political systems to respond effectively, revealing vulnerabilities in government capacity and, ultimately, democratic resilience. These vulnerabilities can contribute to other conditions that scholars have identified as driving democratic erosion, mass protest, and repression, such as polarization (Cinar and Nalepa 2022; Haggard and Kaufman 2021a), economic downturns (Gasiorowski 1995), and political violence (Bergholt and Lujala 2012). Climate change serves as a pervasive "meta influence" that exacerbates and accelerates processes that can lead to democratic decline.

We identify two primary avenues for future research. First, different regions are vulnerable to distinct climate-related disasters, each with varying impacts on democratic resilience. Investigating why different types of disasters produce effects of differing magnitudes is a crucial next step, offering insights with direct policy relevance. Second, this research could connect with historical studies on how changing weather patterns have shaped societal and political dynamics. For instance, historians argue that the end of the "Little Ice Age" contributed to widespread social upheaval in Europe, including the French Revolution (Blom 2019). Revisiting such historical analyses with a focus on democratic resilience may illuminate how climate-induced instability has shaped political structures in the past and offer insights into potential future risks, underscoring the importance of robust governance in the face of a rapidly changing climate.

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Supplementary Information: Climate Change and Democracy

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Appendix A. List of Variables and Descriptive Statistics

Variable Name	Description	Data Source
Democratic Backsliding	Democratic Backsliding is coded as 1 if the country experiences an initial 0.01 decrease on the EDI and a total decrease of at least -0.10 throughout the entire backsliding episode, and 0 otherwise.	Edgell et al. 2021
Compounded Climate Shocks	Number of disasters related to landslides, storms, droughts, wildfires, and floods that occurred within a country over a period of three years.	EM-DAT 2023
Polarization	Extent to which society is polarized into antagonistic, political camps using V-Dem "v2cacamps" indicator.	Coppedge et al. 2022
Populism	Average V-Party populism score (v2xpa_populism) of all political parties that are either a member of the government or officially supporting the government (v2pagovsup)	Lindberg et al. 2022
Democracy	V-Dem Polyarchy Index	Coppedge et al. 2022
Per Capita GDP	Annual per capita GDP (in constant 2005 U.S. dollars)	World Development Indicators, World Economics and Politics Dataverse
GDP Growth	Annual GDP Growth (in percent).	World Development Indicators, World Economics and Politics Dataverse
Presidentialism	Binary variable that takes the value 1 if the chief executive is unitary (V-Dem v2exhoshog=1) and directly elected by the population (V-Dem v2expathhs=7)	Coppedge et al. 2022
Democratization	Democratization is coded as 1 if the country experiences an initial 0.01 increase on the EDI and a total increase	Edgell et al. 2021

	of at least -0.10 throughout the entire democratization episode, and 0 otherwise.	
States of Emergency	Indicator if a national state of emergency was enacted by the government during the year	Coppedge et al. 2022
Anti-Government Demonstrations	Any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority, excluding demonstrations of a distinctly anti-foreign nature. (count)	Banks and Wilson 2024
Weighted Conflict Index	Weight average of other domestic conflict measures from CNTS data.	Banks and Wilson 2024
Mass Mobilization	Frequency and size of mass mobilization events	Pemstein et al. 2022
Latent Human Rights Score	Estimated latent respect for human rights in a country in particular year	Fariss, Kenwick, and Reuning 2020
Latent State Capacity	Estimated state capacity from Bayesian latent variable estimator	Hanson and Sigman 2021
Disaster-Related Foreign Aid	Foreign aid receipts for disaster-related uses (rebuilding, resilience, harm reduction, etc.). Includes both bilateral and multilateral flows. Measured in U.S. dollars.	OECD Creditor Reporting System 2024

Appendix B. Main Results

	(1) Main	(2) Per Capita GDP	(3) Capacity	(4) Disaster Aid
Compounded Climate Shocks	0.285***	0.326***	0.554***	0.512***
	(0.062)	(0.100)	(0.126)	(0.140)
Per Capita GDP (log)	-0.676***	-0.585**		
	(0.233)	(0.234)		
Economic Integration	0.865***	0.886***	0.820***	0.451**
	(0.170)	(0.166)	(0.175)	(0.214)
Populism (Gov)	0.299**	0.254*	0.290**	-0.104
	(0.127)	(0.132)	(0.147)	(0.170)
GDP Growth	-0.503***	-0.541***	-0.559***	-0.106
	(0.171)	(0.173)	(0.173)	(0.246)
Democracy	-0.451	-0.479	-0.696**	0.051
	(0.321)	(0.326)	(0.315)	(0.386)
Natural Resource Rents (log)	0.090	0.174	0.322**	-0.191
	(0.155)	(0.152)	(0.147)	(0.203)
Presidentialism	0.048	0.074	-0.057	-0.085
	(0.089)	(0.089)	(0.094)	(0.122)
Polarization	0.651***	0.684***	0.639***	0.437**
	(0.140)	(0.141)	(0.155)	(0.198)
Compounded Climate Shocks # Per Capita GDP (log)		-0.212***		
		(0.069)		
State Capacity			-0.369*	
			(0.217)	
Compounded Climate Shocks # State Capacity			-0.334***	
			(0.105)	
Disaster Aid				1.263***
				(0.343)
Compounded Climate Shocks # Disaster Aid				-0.263**
				(0.125)
Constant	1.082**	1.073**	1.562***	0.082
	(0.456)	(0.460)	(0.397)	(0.525)
Wald Test	441.430***	458.551***	372.666***	187.246***
N	2318	2318	2014	759

Standard errors in parentheses. Cubic splines omitted. * p<0.1, ** p<0.05, *** p<0.01

Appendix C. Alternative Standards for Backsliding

	(1) Breakdown	(2) Objective	(3) Continuous	(4) Democratization
Compounded Climate Shocks	0.285***	-2.716***	0.032***	-0.208***
	(0.062)	(0.708)	(0.007)	(0.069)
Economic Integration	0.865***	-2.455**		-0.558***
	(0.170)	(1.118)		(0.114)
Populism (Gov)	0.299**	0.273	0.026***	-0.136*
	(0.127)	(0.334)	(0.007)	(0.080)
GDP Growth	-0.503***	-0.130	-0.017	-0.055
	(0.171)	(0.263)	(0.011)	(0.114)
Democracy	-0.451	14.774***	-0.088***	-1.727***
	(0.321)	(2.591)	(0.023)	(0.230)
Natural Resource Rents (log)	0.090	-0.669	0.007	-0.386***
	(0.155)	(0.488)	(0.009)	(0.098)
Presidentialism	0.048	-0.495	-0.017***	0.169***
	(0.089)	(0.344)	(0.005)	(0.054)
Polarization	0.651***	0.589	0.041***	0.147*
	(0.140)	(0.734)	(0.007)	(0.082)
Per Capita GDP (log)	-0.676***	11.174***	-0.028**	-0.067
	(0.233)	(3.141)	(0.013)	(0.135)
Economic Integration			0.002***	
			(0.001)	
Time Trend			0.004***	
			(0.001)	
Constant	1.082**	-16.892***	-7.700***	0.509
	(0.456)	(4.355)	(1.171)	(0.321)
Wald Test	441.430***	296.834***		364.521***
N	2318	763	2498	2318

Standard errors in parentheses. Cubic splines and time trend (Model 3) omitted. * p<0.1, ** p<0.05, *** p<0.01

Appendix D. Climate Change Disruptions

	(1) Drought	(2) Temp	(3) Flood	(4) Landslide	(5) Storm	(6) Fire
Compounded Climate Shocks	0.329	0.624***	0.202***	0.315**	0.107***	-0.045
	(0.283)	(0.177)	(0.055)	(0.143)	(0.033)	(0.249)
Economic Integration	0.811***	0.845***	0.860***	0.828***	0.843***	0.799***
	(0.167)	(0.167)	(0.165)	(0.164)	(0.169)	(0.167)
Populism (Gov)	0.311**	0.289**	0.273**	0.299**	0.314**	0.307**
	(0.125)	(0.126)	(0.128)	(0.126)	(0.126)	(0.125)
GDP Growth	-0.414**	-0.418**	-0.501***	-0.433***	-0.452***	-0.417***
	(0.161)	(0.164)	(0.169)	(0.162)	(0.162)	(0.161)
Democracy	-0.393	-0.585*	-0.520	-0.436	-0.381	-0.385
	(0.314)	(0.328)	(0.322)	(0.316)	(0.315)	(0.316)
Natural Resource Rents (log)	0.042	0.058	0.052	0.025	0.076	0.034
	(0.154)	(0.152)	(0.153)	(0.154)	(0.153)	(0.153)
Presidentialism	0.092	0.130	0.071	0.086	0.081	0.097
	(0.087)	(0.086)	(0.087)	(0.087)	(0.087)	(0.086)
Polarization	0.631***	0.612***	0.629***	0.601***	0.665***	0.631***
	(0.138)	(0.141)	(0.141)	(0.138)	(0.136)	(0.138)
Per Capita GDP (log)	-0.667***	-0.647***	-0.645***	-0.688***	-0.705***	-0.686***
	(0.228)	(0.230)	(0.228)	(0.225)	(0.229)	(0.226)
Constant	1.111**	1.250***	1.020**	1.149**	1.071**	1.151**
	(0.453)	(0.461)	(0.452)	(0.451)	(0.456)	(0.453)
Wald Test	451.542***	456.178***	448.827***	449.422***	442.601***	453.790***
N	2386	2386	2386	2386	2386	2386

Standard errors in parentheses. Cubic splines omitted. * p<0.1, ** p<0.05, *** p<0.01

	(7) 1 Year	(8) 5 Years	(9) Disaster Deviation	(10) Affected
Compounded Disaster Shock	0.021***	0.089***	0.179**	0.944***
	(0.004)	(0.021)	(0.087)	(0.350)
Economic Integration	0.823***	0.872***	0.717***	0.917***
	(0.172)	(0.169)	(0.176)	(0.276)
Populism (Gov)	0.299**	0.296**	0.300**	0.246
	(0.127)	(0.127)	(0.126)	(0.185)
GDP Growth	-0.520***	-0.505***	-0.463***	0.092
	(0.174)	(0.171)	(0.165)	(0.273)
Democracy	-0.415	-0.447	-0.289	-0.758*
	(0.318)	(0.321)	(0.320)	(0.446)
Natural Resource Rents (log)	0.091	0.077	0.029	0.291
	(0.156)	(0.155)	(0.156)	(0.231)
Presidentialism	0.036	0.055	0.064	-0.028
	(0.089)	(0.088)	(0.089)	(0.122)
Polarization	0.653***	0.652***	0.653***	0.619***
	(0.140)	(0.140)	(0.140)	(0.239)
Per Capita GDP (log)	-0.667***	-0.693***	-0.653***	-0.365
	(0.234)	(0.232)	(0.230)	(0.372)
Constant	0.889*	0.955**	0.938**	1.689**
	(0.454)	(0.457)	(0.460)	(0.663)
Wald Test	440.115***	443.105***	449.547***	182.158***
N	2251	2352	2285	900

Standard errors in parentheses. Cubic splines omitted. * p<0.1, ** p<0.05, *** p<0.01

Appendix E. Model Specification

	(1) OLS	(2) Region FE	(3) Country FE
Compounded Climate Shocks	0.018***	0.481***	0.027**
	(0.005)	(0.163)	(0.013)
Economic Integration	0.040***	0.739***	-0.001
	(0.008)	(0.174)	(0.001)
Populism (Gov)	0.015**	0.233*	0.033***
	(0.007)	(0.137)	(0.012)
GDP Growth	-0.022**	-0.513***	-0.004
	(0.010)	(0.157)	(0.009)
Democracy	-0.026	-0.249	-0.097*
	(0.020)	(0.314)	(0.050)
Natural Resource Rents (log)	0.013*	0.127	0.053**
	(0.008)	(0.142)	(0.021)
Presidentialism	0.001	-0.016	0.046
	(0.005)	(0.117)	(0.029)
Polarization	0.023***	0.610***	0.155***
	(0.007)	(0.139)	(0.018)
Per Capita GDP (log)	-0.022*	-0.294	0.203***
	(0.012)	(0.264)	(0.053)
Time Trend			0.002**
			(0.001)
Constant	0.674***	1.059**	-5.042**
	(0.039)	(0.482)	(1.977)
N	2318.000	1580.000	2498.000

Standard errors in parentheses. Cubic splines, country FE and region FE omitted. * p<0.1, ** p<0.05, *** p<0.01

Appendix F. Sample Scope

	(1) Hybrid	(2) LibDem	(3) Low-Med Income	(4) High Income	(5) Democratic Stock
Compounded Climate Shocks	0.248***	-0.037	0.483***	-0.613	0.204**
	(0.050)	(0.247)	(0.118)	(0.896)	(0.098)
Economic Integration	0.383***	0.872**	0.667***	0.968***	0.957***
	(0.109)	(0.349)	(0.172)	(0.303)	(0.244)
Populism (Gov)	0.273***	0.552	0.067	0.704**	0.481**
	(0.083)	(0.397)	(0.145)	(0.354)	(0.228)
GDP Growth	-0.064	-1.502***	-0.449***	-0.829*	-0.175
	(0.084)	(0.477)	(0.174)	(0.439)	(0.330)
Democracy	0.737***	-2.193	-0.560*	1.121	-0.329
	(0.118)	(2.279)	(0.340)	(1.084)	(0.438)
Natural Resource Rents (log)	0.158*	-0.321	0.202	0.663	-0.100
	(0.086)	(0.359)	(0.152)	(0.609)	(0.218)
Presidentialism	-0.045	-0.077	-0.030	0.277	0.074
	(0.054)	(0.324)	(0.092)	(0.357)	(0.124)
Polarization	0.430***	0.101	0.630***	0.644**	0.488**
	(0.091)	(0.338)	(0.165)	(0.290)	(0.201)
Per Capita GDP (log)	-0.571***	-1.208**	-0.461*	-3.984***	-0.994***
	(0.118)	(0.584)	(0.246)	(0.928)	(0.326)
Constant	-0.318**	5.320	0.967**	4.027*	1.423**
	(0.157)	(3.659)	(0.460)	(2.366)	(0.605)
Wald Test	717.578***	159.534***	264.352***	161.834***	308.753***
N	3872	1085	1316	1002	1632

Standard errors in parentheses. Cubic splines omitted. * p<0.1, ** p<0.05, *** p<0.01

Appendix G. Alternative Mechanism Test

	(1) Repression (V)	(2) Repression (F)	(3) Demonstration I	(4) Demonstration II	(5) Mobilization	(6) SoE
Compounded Climate Shocks	0.029***	-0.247***	1.565***	813.581***	0.104***	0.595***
	(0.011)	(0.024)	(0.433)	(241.175)	(0.015)	(0.049)
Economic Integration	0.008***	0.019***	-0.042***	-45.466***	0.002	0.023***
	(0.001)	(0.002)	(0.009)	(10.936)	(0.002)	(0.004)
Populism (Gov)	-0.084***	-0.095***	0.238*	476.322***	-0.015	-0.100**
	(0.014)	(0.027)	(0.141)	(163.546)	(0.028)	(0.047)
GDP Growth	-0.038*	0.080**	0.001	16.205	-0.181***	-0.072
	(0.020)	(0.037)	(0.201)	(170.119)	(0.038)	(0.069)
Democracy	1.276***	0.769***	-0.353	-2312.845***	0.916***	-0.407***
	(0.048)	(0.070)	(0.446)	(663.083)	(0.076)	(0.132)
Natural Resource Rents (log)	0.011	-0.052*	-0.458***	-49.731	0.030	-0.088
	(0.017)	(0.029)	(0.128)	(115.897)	(0.031)	(0.063)
Presidentialism	-0.044***	-0.170***	-0.281	-23.204	0.102***	-0.136***
	(0.011)	(0.015)	(0.189)	(143.806)	(0.021)	(0.030)
Polarization	-0.166***	-0.347***	0.743***	-27.466	0.551***	0.181***
	(0.013)	(0.025)	(0.118)	(168.955)	(0.025)	(0.045)
Time Trend	0.000	0.013***	0.108***	77.108***	0.003	0.002
	(0.001)	(0.003)	(0.016)	(18.766)	(0.003)	(0.004)
Per Capita GDP (log)	-0.299***	0.133***	0.840***	1042.949***	-0.444***	-0.201**
	(0.027)	(0.046)	(0.164)	(320.404)	(0.048)	(0.084)
Constant	-1.120	-28.212***	-211.622***	-147575.315***	-7.484	0.507
	(2.439)	(5.093)	(31.207)	(36225.936)	(5.393)	(8.625)
N	2498	2482	2489	2489	2480	2498

Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Appendix H. Alternative Explanation

Figure H-1. Scatterplot of Compounded Climate Shocks with Democracy

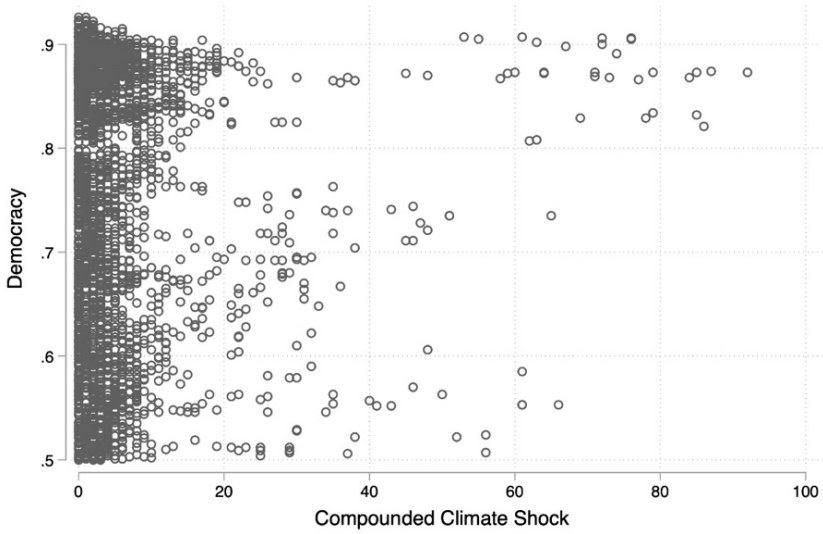

Figure H-2. Scatterplot of Compounded Climate Shocks with Per Capita GDP