## 1

#### Interp: Debaters must not defend the hypothetical implementation of an explicit actor or action.

#### Resolved in LD means statement of values

UPitt ND University Of Pittsburgh Communications Services Webteam, copyright 2015-21, "Basic Definitions," Department of Communication , <https://www.comm.pitt.edu/basic-definitions> CHO

Affirmative/Pro. The side that “affirms” the resolution (is “pro” the issue). For example, the affirmative side in a debate using the resolution of policy, Resolved: The United States federal government should implement a poverty reduction program for its citizens, would advocate for federal government implementation of a poverty reduction program. Argument. A statement, or claim, followed by a justification, or warrant. Justifications are responses to challenges, often linked by the word “because.” Example: The sun helps people, because the sun activates photosynthesis in plants, which produce oxygen so people can breathe. Constructive Speech. The first speeches in a debate, where the debaters “construct” their cases by presenting initial positions and arguments. Cross-examination. Question and answer sessions between debaters. Debate. A deliberative exercise characterized by formal procedures of argumentation, involving a set resolution to be debated, distinct times for debaters to speak, and a regulated order of speeches given. Evidence. Supporting materials for arguments. Standards for evidence are field-specific. Evidence can range from personal testimony, statistical evidence, research findings, to other published sources. Quotations drawn from journals, books, newspapers, and other audio-visuals sources are rather common. Negative/Con. The side that “negates” the resolution (is “con” the issue). For example, the negative side in a debate using the resolution of fact, Resolved: Global warming threatens agricultural production, would argue that global warming does not threaten agricultural production. Preparation Time. Debates often necessitate time between speeches for students to gather their thoughts and consider their opponent's arguments. This preparation is generally a set period of time and can be used at any time by either side at the conclusion of a speech. Rebuttal Speech. The last speeches in a debate, where debaters summarize arguments and draw conclusions about the debate. Resolution. A specific statement or question up for debate. Resolutions usually appear as statements of policy, fact or value. Statement of policy. Involves an actor (local, national, or global) with power to decide a course of action. For example, Resolved: The United States federal government should implement a poverty reduction program for its citizens. Statement of fact. Involves a dispute about empirical phenomenon. For example, Resolved: Global warming threatens agricultural production. Statement of value. Involves conflicting moral dilemmas. For example, Resolved: The death penalty is a justified method of punishment. Topic. A general issue to debate. Topics could be “The Civil War,” “genetic engineering,” or “Great Books.”

#### Is means is Definition of is (Entry 1 of 4) present tense third-person singular of BE **dialectal present tense** first-person and third-person singular **of BE** dialectal present tense plural of BE

Webster ND Definition of IS," Merriam Webster, <https://www.merriam-webster.com/dictionary/is> IS

#### Dialectical present tense means logical coherence which implies no implementation

Your Dictionary ND, "Dialectical Meaning," No Publication, <https://www.yourdictionary.com/dialectical> Cho

The definition of dialectical is a discussion that includes logical reasoning and dialogue, or something having the sounds, vocabulary and grammar of a specific way of speaking. An example of something dialectical is a Lincoln Douglass style of debate, where both parties argue a point in a logical order. Of, or pertaining to dialectic; logically reasoned through the exchange of opposing ideas.

#### “BE” is a linking verb, not an action verb so implementation is incoherent

Grammar Monster ND "Linking Verbs," Grammar Monster, <https://www.grammar-monster.com/glossary/linking_verbs.htm> CHO

What Are Linking Verbs? (with Examples) A linking verb is used to re-identify or to describe its subject. A linking verb is called a linking verb because it links the subject to a subject complement (see graphic below). Infographic Explaining Linking Verb A linking verb tells us what the subject is, not what the subject is doing. Easy Examples of Linking Verbs In each example, the linking verb is highlighted and the subject is bold. Alan is a vampire. (Here, the subject is re-identified as a vampire.) Alan is thirsty. (Here, the subject is described as thirsty.)



#### Unjust means “an unjust decision, judgment, or action is not fair or reasonable, or is not done according to accepted legal or moral standards”

That’s Macmillan Dictionary No Date [“unjust”. Macmillan Dictionary. No Date. Accessed 1/23/2022. <https://www.macmillandictionary.com/us/dictionary/american/unjust> //Xu]

#### Definitions use “is” which is present tense per the Grammar Monster definitions above.

#### Semantics o/w –

#### a] Precision – they can arbitrarily jettison words which decks ground and preparation because there is no stasis point

#### b] Jurisdiction – the judge doesn’t have the authority to vote aff if it wasn’t legitimate

#### Violation: They cannot defend hypothetical implementation and use the state – or they are Extra-T

#### Limits - imprecisely includes thousands of affs that expand immunity and deprives us of the enforcement counterplan - makes it impossible to be neg

#### Phil Ed – creates better ethical subjectivity and critical thinking that o/ws on uniqueness to LD.

#### Unjust means that this is a values debate and that policy making *is not intrinsic*, prefer evidence from the NSDA topic analysis written when the topic came out

NSDA 2022. NSDA Topic Analysis January-February. https://www.speechanddebate.org/lincoln-douglas-topic-analysis-2022-january-february/

Unjust: Oxford languages gives us the definition “not based on or behaving according to what is morally right and fair.” It is likely, based on this wording, that justice and morality will be popular values on both sides. Even if debaters choose to use other applicable frameworks, the use of “unjust” within this resolution will likely affect the lens that they use when contextualizing their contentions.

#### TVA: a] Read a phil aff that affirms that private appropriation is unjust b] ssd is good cuz it prevents dogmatism and generates critical thinking

#### Vote on fairness – abuse skews your evaluation of substance – precedes education since if there's abuse, you can't expect me to clash.

#### Drop the debater on T – I can't respond to a new aff in the 2NR since I don't have a 3NR to defend my offense.

#### No RVIs on T: (A) The 1AR would just sit on T with frontlines so I'll always lose to the unchecked 2AR collapse.

## 2

#### Humanity has accelerated ecological destruction to a point of no return, **situating itself ontologically against the possibility of the world**

**Cohen ’12** (Tom, Professor of Literary, Cultural, and Media Studies at University of Albany, “Murmurations—“Climate Change” and the Defacement of Theory”, Telemorphosis: Theory in the Era of Climate Change, Vol. 1)

The point is, today everyone can see that the system is deeply unjust and careening out of control. Unfettered greed has trashed the global economy. And we are trashing the natural world. We are overfishing our oceans, polluting our water with fracking and deepwater drilling, turning to the dirtiest forms of energy on the planet, like the [Alberta tar sands](http://www.guardian.co.uk/commentisfree/cifamerica/2011/sep/17/oil-sands-wildlife). The atmosphere can’t absorb the amount of carbon we are putting into it, creating dangerous warming. The new normal is serial disasters: economic and ecological. —Naomi Klein, “The fight against climate change is down to us—the 99%” [2011] Carbon pollution and over-use of Earth’s natural resources have become so critical that, on current trends, we will need a second planet[to meet](http://quod.lib.umich.edu/o/ohp/10539563.0001.001/1:3/--telemorphosis-theory-in-the-era-of-climate-change-vol-1?rgn=div1;view=fulltext) our needs by 2030, the WWF said on Wednesday. —Agence France-Presse, “Time to find a second Earth, WWF says” [2010] 1. Warnings regarding the planet earth’s imminent depletion of reserves or “life as we know it” arrive today more as routine tweets than events that might give us pause, particularly as the current wars over global “sovereign debt” and economic “crises” swamp attention. The intensifying specter of megadebt—at a time of “peak everything” (peak water, peak oil, peak humans)—dumped into a future despoiled of reserves and earning capacity has a specific relation to this white-out—the “economical” and “ecological” tandem shifts all attention to the first term (or first “eco”). In a post-global present consolidating what is routinely remarked as a neo-feudal order, the titanic shift of hyperwealth to the corporatist few (the so-called 1 %) sets the stage for a shift to control societies anticipating social disruption and the implications of “Occupy” style eruptions—concerning which the U.S. congress hastily passed new unconstitutional rules to apprehend citizens or take down websites. The Ponzi scheme logics of twenty-first century earthscapes portray an array of time-bubbles, catastrophic deferrals, telecratic capture, and a voracious present that seems to practice a sort of tempophagy on itself corresponding with its structural premise of hyper-consumption and perpetual “growth. The supposed urgencies of threatened economic and monetary “collapse” occlude and defer any attention to the imperatives of the biosphere, but this apparent pause or deferral of attention covers over an irreversible mutation. A new phase of unsustainability appears in which a faux status quo ante appears to will to sustain itself as long as possible and at whatever cost; the event of the twenty-first century is that there will be no event, that no crisis will disturb the expansion of consumption beyond all supposed limits or peaks. In such an environment other materialities emerge, reference systems default, and the legacies of anthropo-narcissm go into overdrive in mechanical ways. Supposedly advanced or post-theory theory is no exception—claiming on the one hand ever more verdant comings together of redemptive communities, and discretely restoring many phenomenological tropes that 20th century thought had displaced. This has been characterized as an unfolding eco-ecodisaster—a complex at once economic and ecological. [[1]](http://quod.lib.umich.edu/o/ohp/10539563.0001.001/1:3/--telemorphosis-theory-in-the-era-of-climate-change-vol-1?rgn=div1;view=fulltext#note_1) The logics of the double oikos appear, today, caught in a self-feeding default. The present volume, in diverse ways, reclaims a certain violence that has seemed occluded or anaesthetized (it is a “present,” after all, palpably beyond “tipping points” yet shy of their fully arrived implications—hence the pop proliferation of “zombie” metaphors: zombie banks, zombie politics, zombie “theory”). It departs from a problem inherent in the “eco” as a metaphoric complex, that of the home (oikos), and the suicidal fashion in which this supposed proper ground recuperates itself from a non-existent position. The figure of an ecology that is ours and that must be saved precludes us from confronting the displacement and dispossession which conditions all production, including the production of homelands. Memory regimes have insistently, silently and anonymously prolonged and defended the construct of “homeland security” (both in its political sense, and in the epistemological sense of being secure in our modes of cognition), but these systems of security have in fact accelerated the vortices of ecocatastrophic imaginaries. This leads to what can be called the zone of telemorphosis: that is, how and whether conceptual practices and cognitive rituals, including those of critical theory, have participated in the production of these horizons, and what, today, breaks with that. If a double logic of eco-eco disaster overlaps with the epoch in deep time geologists now refer to as the “anthropocene,” what critical re-orientations, today, contest what has been characterized as a collective blind or psychotic foreclosure? Nor can one place the blame at the feet alone of an accidental and evil ‘1%’ of corporate culture alone, since an old style revolutionary model does not emerge from this exitless network of systems. More interesting is the way that ‘theory’, with its nostalgic agendas for a properly political world of genuine praxis or feeling has been complicit in its fashion. How might one read the implicit, unseen collaboration that critical agendas coming out of twentieth century master-texts unwittingly maintained with the accelerated trajectories in question? The mesmerizing fixation with cultural histories, the ethics of “others,” the enhancement of subjectivities, “human rights” and institutions of power not only partook of this occlusion but ‘we theorists’ have deferred addressing biospheric collapse, mass extinction events, or the implications of resource wars and “population” culling. It is our sense of justified propriety—our defense of cultures, affects, bodies and others—that allows us to remain secure in our homeland, unaware of all the ruses that maintain that spurious home.

#### The narrative of climate crisis oscillates between catastrophe and reform that leaves finanical militarism's global mastery unchallengered - makes ecological destruction inevitable.

**Dibley and Neilson ’09** (Ben, Research Fellow, Institute for Culture and Society at University of Western Sydney, Brett, Research Fellow, Institute for Culture and Society at University of Western Sydney, “Climate Crisis And The Actuarial Imaginary: ‘The War On Global Warming’”, New Formations, [SG]) \*\*gender modified\*\*

Has there ever been a climate crisis? Or an economic crisis? Did these ever happen? Are they happening? ‘Merry crisis and a happy new fear’ - these words, spray painted outside the Bank of Greece in Athens, as that country erupted in riots in December 2008, seemed to say it so well. There is always another crisis, a new crisis. Enjoy your crisis. But also be scared. Since the crisis perpetuates fear. In this paper we want to critically interrogate the proposition that we live in a time of crisis. What is politically at stake in such claims, as rife as they seem to have become? How do they fold into processes of subjection and subjectivation, shaping our roles as citizens, workers, migrants, consumers, activists or investors? How does the declaration of a crisis amplify, modify or detract from the underlying conditions to which it seeks to draw attention? We ask these questions not simply because we are suspicious of the terminology that circulates in venues like The Economist or Time Magazine. Our investigation is also driven by the belief that the construction, interpretation and management of the present as a time of crisis locates individuals and populations as objects of particular strategies of governance. While we explore these strategies predominantly in relation to the discourses and practices surrounding the notion of climate crisis, we do not limit our analysis to this object or even understand the term ‘climate’ in an exclusively meteorological sense. To approach climate crisis as a construct is not to do the same as regards the warming of the earth’s atmosphere or the depletion of the resources that have fuelled the development of This formulation provides the occasion to investigate how the subject of the ecological crisis is constituted not only in the rationalities of risk but also in the affective ‘atmosphere’ of societies in which risk has become a central technique of governance.2 To this end this essay proceeds in four parts. The first introduces the prevailing image of the subject of climate crisis as one oscillating between purposive reason and an avoidance of an encounter with the unimaginable. The second examines the rationalities of risk and their affective atmosphere that comes to shape the actuarial imaginary of the climate crisis. The third investigates how the strategies of security and securitisation that constitute and construct this imaginary are deployed in the prevalent claim that mobilisation against climate change demands a war footing; particularly as expressed in proposals for a green New Deal. The final section contends that any struggle to reclaim the terrestrial commons must proceed on the recognition that these strategies involve processes of enclosure, whether predicated on the absolute rent of primitive accumulation or the relative rent of finance capital. global modernity. Indeed, it is the seriousness of this situation that motivates our inquiry and leads us to ask what is at stake in the invocation of crisis, or perhaps better, yet another crisis. To invoke the notion of crisis is to construct a particular injunction to judgement and action that establishes in itself the imperative for redressing that crisis. In crisis, as it is popularly noted, we find ourselves in a moment of danger and opportunity. Unsurprisingly, much of the current discourse on climate change oscillates between these two poles: most dramatically, between imminent catastrophe and the prospect of renewal; between unimaginable humanitarian disaster and the promise of a green-tech revolution. As such the climate crisis regularly calls forth regimes of risk, since it is notions of risk that work this line between danger and opportunity, between protection and profit. This essay’s premise, that climate crisis shapes particular subjectivities, is built on the presupposition of the existence of a political economy of protection and profit that constitutes, as it constructs, that crisis. To interrogate the processes of subjection and subjectivation integral to this economy, the essay traces how the climate crisis becomes enfolded in existing logics that seek to manage contingency through risk; significantly, via those risk logics of security and securitisation by which global disorder and global threats have come to be imagined and managed in both the political and economic spheres.1 To tease out the logics of these risk regimes and investigate their modes of subjectivation this paper proposes a concept: the actuarial imaginary. Let us introduce two figures that encapsulate the relation between the climate crisis and political subjectivity: the blind citoyen and the fetishist. The first belongs to Ulrich Beck. In his work on ‘risk society’ Beck makes regular reference to climate change as one in a plethora of global risks that include nuclear accidents, environmental pollution, bio-tech hazards and financial crises.3 As the unintended consequences of modernisation, what these manufactured uncertainties share is a threat of catastrophe whose global scale renders them incalculable and irreparable and so uninsurable. Central to Beck’s thesis is the political reflexivity of global risk. Risk in late or second modernity forms the basis of socialisation through its capacity to construct risk communities that transcend national boundaries. Because global risk escapes the human sensorium, this reflexivity is conditioned on a process of bringing risk to vision through publicised science. The ‘intangibility of threats to civilization’, Beck writes, ‘only come to consciousness in scientized thought and cannot be directly related to primary experience’.4 ‘Making the threats publicly visible and arousing attention in detail in one’s own living space’, he continues, provide the ‘cultural eyes through which the “blind citoyen” can perhaps win back the autonomy of their own judgment’.5 It is this mediation of threat that gives risk its ‘essential feature: it creates a public by promoting public awareness of risk’.6 By definition this communion in risk is cosmopolitan. Beck contends: ‘global risks activate and connect actors across borders, who otherwise don’t want to have anything to do with one another’.7 In so doing they open ‘our eyes to the uncontrollable liabilities that something might happen to us, might befall us and, which at the same time could stimulate us, to make borders transcend new beginnings’.8 The politics that emerge from Beck’s analysis assume a subject of reason (of a politicised democratic science; of a second enlightenment), capable of acting rationally upon themselves and the world in the light of their ever-growing knowledge of both. It is this redemption in ‘more modernity’ - or in other words, reflexive modernisation as the modernisation of modernisation - that is at issue for his critics.9 Jeffrey Alexander and Philip Smith note that for Beck it ‘is not shifting cultural expectations, fears, or hopes that intervene between contemporary risks and their perception, but a more accurate, more demanding, less “traditionalized”, and less economically constrained form of rational scientific knowledge itself ’.10 For them this demonstrates Beck’s ‘reluctance to explore the non-rational dimensions of meaning and motivation’ that shape risk perception.11 For Žižek, this issue is less a question of perception than of ‘the impact of the emerging new societal logic’ on the status of subjectivity.12 He reproaches Beck, firstly, for ‘leaving intact the subject’s fundamental mode of subjectivity’(p342).In doing so the ‘subject remains the modern subject, able to reason and reflect freely, to decide on and select [their] set of norms, and so on’ (p342). And secondly, for ‘obfuscat[ing] the concrete socioeconomic roots of these risks … [by] conceiving of risk and manufactured uncertainty as a universal feature of contemporary life’ (p342). While, as Žižek contends, the risk society thesis calls for a radical repoliticisation that will take responsibility for crucial decisions away from administrative authorities and technical experts through a revitalisation of active citizenship, it stops ‘short of putting in question the very basics of the anonymous logic of market relations and global capitalism’ (pp351-2). Rather, ‘instead of celebrating the new freedoms and responsibilities brought about by the “second modernity”’, he continues, ‘it is much more crucial to focus on what remains the same in this global fluidity and reflexivity, on what serves as the very motor of this fluidity: the inexorable logic of Capital’ (pp351-2). More recently Žižek has articulated this position in an image of the subject of global risk: one which contests Beck’s thesis that, once given ‘cultural eyes’, the subject who can see, sees rationally and in cosmopolitan solidarity. Here Žižek identifies in prevalent responses to the ecological crisis the attitude of the fetishist, one that is precisely the opposite of Beck’s cosmopolitan citizen. It elicits not a socialising bringing-to-action, but a continuing atomised inaction. Faced with ‘the prospect of ecological catastrophe’, Žižek asks, ‘why do we not act?’ He responds: It is too short to attribute our disbelief in the catastrophe to the impregnation of our mind by scientific ideology, which leads us to dismiss the sane concerns of our common reason, i.e., the gut sense which tells us that something is fundamentally wrong with the scientifictechnological attitude. The problem is much deeper, it resides in the unreliability of our common sense itself which … finds it difficult really to accept that the flow of everyday reality can be perturbed. Our attitude here is that of the fetishist split: ‘I know very well (that the global warming is a threat to the entire humanity), but nonetheless ... (I cannot really believe it). It is enough to look at my environs to which my mind is wired: the green grass and trees, the whistle of the wind, the rising of the sun ... can one really imagine that all this will be disturbed? 13 The problem here as Žižek identifies it is: that we can rely neither on scientific mind nor on our common sense - they both mutually reinforce each other’s blindness. The scientific mind advocates a cold objective appraisal of dangers and risks involved where no such appraisal is effectively possible, while common sense finds it hard to accept that a catastrophe can really occur.14 It is not, then, that these two images - the blind citoyen brought to vision and the fetishist’s blindness - are alternative figures of the subjectivity of ecological crisis. They are complimentary. That is, between the blind citizen restored to sight through publicised risk, and, the blindness of the fetishist’s disavowal caught between the inadequacies of scientific and commonsense apprehensions of risk, we have something like a dialectical image of the subjectivity of climate change; one which appears to oscillate between purposive reason and avoidance of an encounter with the unthinkable or unimaginable. What kind of subject, then, is the political subject of climate crisis? In so far as this subject partakes in a fluctuation between cosmopolitan recognition and the fetishist’s denial, it seems to remain caught in the antinomies of modern citizenship: between membership and exclusion, rights and duties, participation and representation, formal equality and substantive inequalities, and so on. Whatever else this oscillation might imply - which is to say, however emptied of meaning it and its formal correlate of citizenship might be - it sets the terms by which crisis after crisis is defined on the cusp of modernity’s exhaustion. In the delicate environment of the earth’s atmosphere, this exhaustion manifests itself as an excess of greenhouse emissions, depletion of fossil fuels, acidification of the oceans and warming of the air. The exhaustion of modernity is not just some pretty theoretical trope. However, the ways it is figured in accounts of risk varies widely.

#### Reject their idealized construction of the world in favor of a becoming-zombie that unsettles the very possibility for human agency. The image of progress propagated by the 1AC hides its toxic underside to obfuscate its inevitable collapse. Voting negative is a strategy of pessimisitic dark ecology that centers those inhuman vectors of destruction in its analysis, fracturing the coherent narrative of Modernity.

Wallin 2015 (Jason, Professor of Education at University of Alberta. “Dark Posthumanism, Unthinking Education, and Ecology at the End of the Anthropocene,” Routledge International Studies in the Philosophy of Education : Posthumanism and Educational Research, 2015, pages 138-140)//[AC]

From its modern reconceptualization, the zombie has often figured in special relationship with a decaying Earth. Across a litany of films, including Romero’s seminal Night of the Living Dead (1968), Zombi 2 (1979), and Resident Evil: Apocalypse (2004), zombies burrow from their hidden subterranean internment into the terrestrial world, producing an anexact relation to the inhuman life of invertebrates, microbial life, and the unfathomable inhuman movements of Chthon. The emergence of the zombie’s contaminated and putrefied body might hence be delinked from the allegory of Christian resurrection and rethought as an indexical figure of the “shifting visage of the planet” beyond human history and biology (MacKay 2012, 18). This is to say that the Earth to which the zombie has become an index is not the stable and homeostatic oasis of Earthrise apprehended from a human vantage 384,400 kilometers above and beyond this planet. Rather, the unsettled ecology of the zombie portends to an unthought and inhuman world that soils the transcendent gaze of anthropos by drawing it back into material nuptials with the dark ecology of the planet (Cohen 2012; Steel 2012). It is this immanent ecological fold that is diagrammed in Return of the Living Dead (1985), Mud Zombies (2008), and The Bay (2012), each of which articulates a rapidly decoding planet accelerated through molecular forces of contamination and decay. Herein, the image of the Earth as it is for us is confronted by a subterranean dark world closer to the “strange new Earth” of leachate-contaminated soil, toxic swamps, airborne poisons, and vitriolic viral life described by McKibben (2011). As an indexical figure of this planetary geotrauma, the zombie fulminates a diagram of inhuman affective life subtending the anthropocentric conceit that the face of man constitutes a horizon of planetary life. Against correlationism, zombie-life recedes from human comprehension in articulation of an alter-life born of the horrific plastic forces of planetary decoding and its triggering of a strange ecosophical unconsciousness unthinkable under anthropocentrism (MacKay 2012, 22).

PLANETARY SCHIZOANALYSIS

Zombie-life deterritorializes the anthropocentric facialization of the planet by diagramming an unthought dark ecology, or, rather, a malevolent assemblage of the dispersed life-and-death forms subtending the image of human life, its orders of arrangement and identitarian telos (Colebrook 2011, 12). Put differently, the subterranean ecology fabulated in zombie fiction questions not only how a life might go, but also what thinks and of what things might think where we are not .

#### Interpretation - the 1AC is an object of research - the role of the neg is to refuse that object - we should be able to negate the aff in its totality by testing their justifications because those are the reasons they staked out to vote aff - otherwise vote neg on presumption because there’s no ethical framework to determine if the plan in a vacuum is a good idea which proves our interp is reciprocal and solves infinite regression

# Case

## hedge

#### Reasonability on 1AR shells – 1AR theory is very aff-biased because the 2AR gets to line-by-line every 2NR standard with new answers that never get responded to– reasonability checks 2AR sandbagging by preventing really abusive 1NCs while still giving the 2N a chance.

#### DTA on 1AR shells - They can blow up blippy 20 second shells in the 2AR while I have to split my time and can’t preempt 2AR spin which necessitates judge intervention and means 1AR theory is irresolvable so you shouldn’t stake the round on it.

## Climate

#### Antarctic positive feedback loops

* Albedo effect – alt cause bc as more ice sheets melt theres less reflective spaces that sunlight can reflect off of – makes it a sliding slope – bc then more heat is in the oceans – thermal inertia

**Spratt 17** (David Spratt – climate-policy analyst and co-founder of Carbon Equity, “Antarctic tipping points for a multi-metre sea level rise,” 23 January 2017, http://www.climatecodered.org/2017/01/antarctic-tipping-points-for-multi.html)

OVERVIEW The Amundsen Sea sector of the West Antarctic Ice Sheet has most likely been **destabilized** and **ice retreat is unstoppable** for the current conditions. **No further acceleration in climate change is necessary** to trigger the collapse of the rest of the West Antarctic Ice Sheet on decadal time scales. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100. A large fraction of West Antarctic basin ice could be gone within two centuries, causing a 3–5 metre sea level rise. Mechanisms similar to those causing deglaciation in West Antarctica are now also found in **East Antarctica**. Partial deglaciation of the East Antarctic ice sheet is likely for the **current level of atmospheric carbon dioxide**, contributing to 10 metres of more of sea level rise in the longer run, and 5 metres in the first 200 years. INTRODUCTION The West Antarctic Ice Sheet (WAIS), comprising more than two million cubic kilometres of ice, is under pressure from a warming climate, with scientists saying its break-up –– and an eventual global sea-level rise of 3–5 metres –– **is not matter of if, but when**. The West Antarctic Peninsula is now the strongest-warming region on the planet, and WAIS glaciers are discharging ice at an accelerating rate (Rignot, Velicogna at al (2011) “Acceleration of the contribution of the Greenland and Antarctic ice sheets to sea level rise”, GRL 38: L05503-7; Mouginot, Rignot and Scheuchl (2014) “Sustained increase in ice discharge from the Amundsen Sea Embayment, West Antarctica, from 1973 to 2013”, GRL 41:1576-1584). Recent studies, surveyed in this report, suggest that WAIS passed a tipping point for large-scale deglaciation **decades ago**. This should not be surprising, because such an event was foreseen almost 50 years ago. In 1968, pioneer glacier researcher John Mercer predicted that the collapse of ice shelves along the Antarctic Peninsula could herald the loss of the ice sheet. Ten years later, Mercer contended that "a major disaster — a rapid deglaciation of West Antarctica — may be in progress … within about 50 years” (“West Antarctic ice sheet and CO2 greenhouse effect: a threat of disaster”, Nature 271:321-325). He said that warming “above a critical level would remove all ice shelves, and consequently all ice grounded below sea level, resulting in the deglaciation of most of West Antarctica”. Such disintegration, once under way, would “probably be rapid, perhaps catastrophically so”, with most of the ice sheet lost in a century. Credited with coining the phrase “the greenhouse effect” in the early 1960s, Mercer’s Antarctic prognosis was widely ignored and disparaged at the time. Now in seems uncannily prescient. Climate author Fred Pearce (in his 2007 book “With Speed and Violence”) quotes the leading cryosphere scientist Richard Alley as saying a decade ago that there is “a possibility that the West Antarctic ice sheet could collapse and raise sea levels by 6 yards [5.5 metres]” this century. Pearce also interviewed NASA glaciologist Eric Rignot who has studied the Pine Island glacier in West Antarctica for decades, and concluded that “the glacier is primed for runaway destruction”. Although the much larger East Antarctic Ice Sheet (EAIS) — with potential for a 50-metre sea-level rise if all ice were lost — has generally been considered more stable than WAIS, recent evidence suggests some outlet glaciers there are displaying similar dynamics to those on West Antarctica. GEOGRAPHY An ice shelf is a floating sheet, or platform, of ice that is largely submerged and, up to two kilometres in height, that abuts a land-based glacier, and extends into the ocean. The “grounding line” marks the boundary between grounded ice (glacier) and the floating ice shelf. Generally, an ice shelf will lose volume by calving icebergs from the seaward-facing edge, but it can also be subject to rapid disintegration events, in which cracking can dislodge very large sections of ice. The formation of a huge crack — 100 kms long, half a kilometre wide and a hundred metes deep — in the Larsen C ice shelf is one recent example. Warming Antarctic waters are melting and thinning the underside of ice shelves, making them more susceptible to disintegration. Ice shelves act as a “plug” that buttresses and slow the rate at which glaciers drain into the ocean, so the loss or diminution of the ice shelf will accelerate the pace of glacier movement and hence the rate of ice mass loss. Because much of WAIS sits on bedrock that is below sea level (buttressed on two sides by mountains, and held in place on the other two sides by the Ronne and Ross ice shelves), melting of the submerged ice shelf allows warm ocean waters to proceed inland under the ice sheet. This creates hidden valleys of melting ice, puts pressure on the surface above, and contributes to large-scale rifting (cracking). This process also results in the grounding line being pushed further inland, in effect transforming the lower reaches of the glacier into an ice shelf. Over the past 40 years, glaciers flowing into the Amundsen Sea sector of WAIS (including Pine Island, Thwaites, Smith and Kohler glaciers) have thinned at an accelerating rate, and observations and several numerical models suggest that unstable and irreversible retreat of the grounding line is under way. Whilst it is traditionally considered that WAIS deglaciation would take a thousand years or more, some experts have suggested in could occur in a period as short as a couple of centuries because the rate of change in atmospheric greenhouse gases and in the global temperature are unprecedented. RECENT RESEARCH: WEST ANTARCTICA Rignot, Mouginot et al (2014) “Widespread, rapid grounding line retreat of Pine Island, Thwaites, Smith, and Kohler glaciers, West Antarctica, from 1992 to 2011”, Geophys. Res. Lett. 41:3502–3509 The researchers found that the **“tipping point” has already passed** for one of these “long-term” events. In the “Guardian” on 18 May 2014, lead researcher Dr Eric Rignot explained: “We announced that we had collected enough observations to conclude that the retreat of ice in the Amundsen sea sector of West Antarctica was **unstoppable**, with major consequences – it will mean that sea levels will rise one metre worldwide. What's more, its disappearance will likely trigger the collapse of the rest of the West Antarctic ice sheet, which comes with a sea level rise of between three and five metres. Such an event will displace millions of people worldwide” (emphasis added). This study, authored by some the world’s best cryosphere scientists, stunned the research community. Malte Meinshausen, an IPCC lead author who also developed the RCP scenarios, said this research is “a game changer, this is just one surprise with global warming of only 0.8 degrees of warming", and a “tipping point that none of us thought would pass so quickly”, showing we are ”committed already to a change in coastlines that is unprecedented for us humans” (https://vimeo.com/97926131). One of the authors of this paper was asked what conditions would be necessary to stop the loss of most of WAIS. The answer was that restoring the temperature of the 1970s might do it. On the fate of West Antartica, Rignot says “at the current rate, a large fraction of the (WAIS) basin will be gone in 200 years, but recent modelling studies indicate that the retreat rate will increase in the future… but it could be within a couple of centuries” (emphasis added). Another paper (Joughin, Smith and Medley (2014) “Marine Ice Sheet Collapse Potentially Underway for the Thwaites Glacier Basin, West Antarctica”, Science, 344:735–738) uses models which the “indicate that **early-stage collapse has begun**” of the Thwaites Glacier, and that no further acceleration of climate change and only modest extrapolations of the current increasing mass loss rate are necessary for the system eventually to collapse. “The next stable state for the West Antarctic Ice Sheet might be **no ice sheet at all**,” says the paper’s lead author, glaciologist Ian Joughin. Ted Scambos of the National Snow and Ice Data Centre and John Abraham of the University of St Paul explain: “For decades, it has been suspected that this region is particularly susceptible to rapid ice loss, through a ‘runaway retreat’. The cause of the retreat is known to be increased frequency of warm ocean water intrusions onto the continental shelf, which appears to be a consequence of increased westerly circumpolar winds over the Southern Ocean. Models suggest that increased winds are a result of increased greenhouse gas forcing in the Earth system, and ozone loss effects on stratospheric/tropospheric circulation” (“Briefing: Antarctic ice sheet mass loss and future sea-level rise”, Proceedings of the Institution of Civil Engineers, 2014). Feldman and Levermann (2015) “Collapse of the West Antarctic Ice Sheet after local destabilization of the Amundsen Basin”, PNAS 112;14191-14196 This modelling study of the Amundsen Basin finds that “a local destabilization causes a complete disintegration of the marine ice in West Antarctica… the region disequilibrates after 60 years of currently observed melt rates” (emphasis added). [The melt rates are observed to be continuing to accelerate, so the actual time line will be a good deal shorter.] The significance of the study is given as: “The Antarctic Ice Sheet is losing mass at an accelerating rate, and playing a more important role in terms of global sea-level rise. The Amundsen Sea sector of West Antarctica has most likely been destabilized. Although previous numerical modeling studies examined the short-term future evolution of this region, here we take the next step and simulate the long-term evolution of the whole West Antarctic Ice Sheet. Our results show that if the Amundsen Sea sector is destabilized, then the entire marine ice sheet will discharge into the ocean, causing a global sea-level rise of about 3 metres. We thus might be witnessing the beginning of a period of self-sustained ice discharge from West Antarctica that requires long-term global adaptation of coastal protection” (emphasis added). Hansen, Sato et al (2015) “Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2°C global warming could be dangerous”, Atmos. Chem. Phys. 16:3761-3812 This research surveys evidence from the previous warm Eemian interglacial period around 120,000 years ago. At that time there were rapid fluctuations in sea level, and the study identifies a mechanism in the Earth’s climate system not previously understood, which points to a much more rapid rise in sea levels than currently anticipated. Increasing ocean stratification occurs when cooler surface layers from melting ice sheets trap warmer waters underneath, accelerating their impact on the melting of ice shelves and outlet glaciers. This in turn increases ice sheet mass loss, and generates more cool surface melt water in a positive feedback. The consequences include the slowing or **shutting down of key ocean currents** including the Atlantic Meridional Overturning Circulation (AMOC), which **Hansen** says would **increase temperature differentials** between tropical and sub-polar waters, and **drive “super storms”** such that “All hell will break loose in the North Atlantic and neighbouring lands”. The projected cooling pattern of waters around Antarctica and the north Atlantic waters from the injection of fresh ice-melt water is already visible in the observed data (see diagram below), and is already contributing to a circulation decline of AMOC. Smith, Anderson et al (2016) “Sub-ice-shelf sediments record history of twentieth-century retreat of Pine Island Glacier”, Nature, 23 November 2016, doi:10.1038/nature20136 This study finds that the present thinning and retreat of Pine Island Glacier in West Antarctica is part of a climatically forced trend that was triggered in the 1940s when an ocean cavity formed beneath the ice shelf, and followed a period of strong warming of West Antarctica, associated with El Niño activity. The final ungrounding of the ice shelf from the seafloor ridge occurred in 1970 (see diagram below). It is interesting to compare this result with the view of researchers in the Rignot, Mouginot et al 2014 paper cited above that restoration of climate conditions of 1970s would be necessary to prevent widespread ice mass loss from WAIS. RECENT RESEARCH: EAST ANTARCTICA DeConto and Pollard (2016) “Contribution of Antarctica to past and future sea-level rise”, Nature 531:591–597 In this research, climate models that better link atmospheric warming with the fracturing of buttressing ice shelves and structural collapse of their ice cliffs are used, calibrated against past warm-period climate events and sea-level estimates, and then applied to future greenhouse gas emission scenarios. During the last interglacial (warm) period 130,000 to 115,000 years ago, the global mean sea level was 6–9.3 metres higher than it is today, at a time when atmospheric carbon dioxide concentrations were below 280 parts per million (the pre-industrial level, and 30% less than today),and global mean temperatures were only about 0–2 °C warmer. Under a high-emissions scenario, their model shows that rapidly warming summer air temperatures trigger extensive surface meltwater production and hydrofracturing of ice shelves by the middle of this century, with Larcen C the first ice shelf to be lost, and major thinning and retreat of Amundsen Sea outlet glaciers at the same time. (Note: The fracturing of the Larsen C ice shelf is a current reality!) They conclude that: “Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500”, doubling previous forecasts for total sea level rise this century to two metres or more. This estimate of Antarctica alone contributing “more than a metre of sea-level rise by 2100” is consistent with the work of Hansen, Sato et al (above). Pollard, DeConto and Alley (2015) “Potential Antarctic Ice Sheet retreat driven by hydrofracturing and ice cliff failure”, Earth Planet. Sci. Lett. 412:112–121. During the warmest part of the Pliocene (5.3 to 2.6 million years ago) atmospheric carbon dioxide concentrations were comparable to today’s (~400 parts per million), temperatures were 1–2°C warmer than now, and some sea-level reconstructions are 10–30 metres higher. Because WAIS and Greenland can supply less than 10 metres of sea level rise between them, this means there was substantial ice mass loss from East Antartica. In this study, the authors model Pliocene conditions in the Antarctic by taking the current (and Pliocene) level of 400 parts per million carbon dioxide, and impose a 2°C ocean warming to represent maximum mid-Pliocene ocean warmth. Their model also incorporates mechanisms based on recent observations and analysis: “floating ice shelves may be drastically reduced or removed completely by increased oceanic melting, and by hydrofracturing due to surface melt draining into crevasses. Ice at deep grounding lines may be weakened by hydrofracturing and reduced buttressing, and may fail structurally if stresses exceed the ice yield strength, producing rapid retreat.” The updated model “accelerates the expected collapse of the West Antarctic Ice Sheet to decadal time scales (rather than century-to-millennial time scales), and also causes retreat into major East Antarctic subglacial basins, producing ∼17 metres global sea-level rise within a few thousand years” and five metres in the first 200 years (emphasis added). [In the followup 2016 paper cited above, an updated model produces an 11.3-metre contribution to global mean sea level rise, reflecting a reduction in its sensitivity of about 6 metres relative to the formulation in this paper of ~17 metres, but within the range of plausible sea-level estimates.] Phipps, Fogwill and Turney (2016) “Impacts of marine instability across the East Antarctic Ice Sheet on Southern Ocean dynamics”, The Cryosphere, 10:2317–2328 This research concludes that local melting from the Wilkes Basin in East Antarctica “could potentially destabilise the wider Antarctic Ice Sheet” as meltwater rapidly stratifies surface waters so, whilst the surface ocean cools, the Southern Ocean warms by more than 1°C at depth. “The temperature changes propagate westwards around the coast of the Antarctic continent with increasing depth, representing a positive feedback mechanism that has the potential to amplify melting around the continent… Thus, destabilisation of large sectors of the EAIS could arise from warming and melting in just one area.” As well: “Our results suggest that melting of one sector of the EAIS could result in accelerated warming across other sectors, including the Weddell Sea sector of the West Antarctic Ice Sheet” (emphasis added). This paper is also consistent with Hansen, Sato et al in finding a process of water column stratification and warmer sub-surface waters as a **positive feedback mechanism** that has the potential to amplify melting. Mendel and Levermann (2014) “Ice plug prevents irreversible discharge from East Antarctica”, Nature Climate Change 4:451–455 Substantial sectors of the EAIS, including Wilkes Basin, are underlain by extensive marine-based subglacial basins. This study shows that the removal of an ice plug (shelf) at the margin of the Wilkes Basin, that would cause less than 80mm of global sea-level rise, would destabilize the regional ice flow and leads to a self-sustained discharge of the entire basin and a global sea-level rise of 3–4 metres. As with the DeConto and Pollard papers above, this study also discusses the analogous situation of the the mid-to late Pliocene when “massive ice discharge occurred from the unstable margins of Adélie and Wilkes Land due to ice-stream surges that were linked to rapid grounding-line retreat during a warming climate”. Lenaerts, Lhermitte et al (2016) “Meltwater produced by wind–albedo interaction stored in an East Antarctic ice shelf”, Nature Climate Change 7:58-62 This study identifies a mechanism that triggers melting deep in the Roi Baudouin ice shelf in East Antarctica. Strong winds helped heat the air and cause white ice to melt out, exposing a layer of dark ice beneath, which in turns absorbs more sunlight, further expediting the melt. In these hotspots, surface glacial lakes form and meltwater pours into moulins, that funnel surface meltwater into the heart of the ice. As well, researchers found subterranean “englacial” lakes in the ice sheet. In total, 55 lakes on or in the ice shelf were identified. This means the ice shelf has many large pockets of weakness throughout its structure, suggesting a greater potential vulnerability to collapse through hydrofracturing, especially if lake formation continues or increases. Fogwill, Turney et al (2017) “Antarctic ice sheet discharge driven by atmosphere-ocean feedbacks at the Last Glacial Termination”, Scientific Reports 7, article 39979 Antarctic ice mass loss during the end of the last ice age 14,600–12,700 yrs ago contributed several metres to sea levels which from various sources rose by tens of metres. At that time, changes in atmospheric-oceanic circulation led to a stratification in the ocean with a cold layer at the surface and a warm layer below. Under such conditions, ice sheets melt more strongly than when the surrounding ocean is thoroughly mixed. This is exactly what is presently happening around the Antarctic now. Research team member Michael E. Weber says, "The changes that are currently taking place in a disturbing manner resemble those 14,700 years ago." A NUMBER of recent studies have focussed on the Totten Glacier in East Antartica. Several lines of evidence suggest possible collapse of Totten Glacier into interior basins during past warm periods, most notably the Pliocene epoch, and the glacier is again becoming vulnerable: Totten has the largest thinning rate in East Antarctica, driven by enhanced melting of the ice shelf bottom, due to ocean processes. An ice-shelf cavity below depths of 400 to 500 metres could allow intrusions of warm water and an inland trough that connects the main ice-shelf cavity to the ocean. If thinning trends continue, a larger water body over the trough could potentially allow more warm water into the cavity, which may, eventually, lead to destabilization of the low-lying region between Totten Glacier and the similarly deep glacier flowing into the Reynolds Trough [Greenbaum, Blankenship et al (2015) “Ocean access to a cavity beneath Totten Glacier in East Antarctica”, Nature GeoScience]. Totten could become unstable if global warming continues at the present pace. As warm seas wash the ice shelf, the land-based mass of ice could begin to retreat, cross a critical threshold in the present century and then withdraw 300 kilometres inland [Aitken, Roberts et al (2016) “Repeated large-scale retreat and advance of Totten Glacier indicated by inland bed erosion”, Nature 533:385–389]. Totten is melting from below as warm ocean water flows inward powerfully towards Totten glacier, causing the ice shelf to lose between 63 and 80 billion tons of its mass to the ocean per year. Warm water enters a cavity beneath the glacier through a newly discovered deep water channel [Rintoul, Silvan et al (2016) “Ocean heat drives rapid basal melt of the Totten Ice Shelf”, Science Advances 2:e1601610]. CONCLUSION In late 2015, a chilling report by scientists for the International Cryosphere Climate Initiative on “Thresholds and closing windows: Risks of irreversible cryosphere climate change” (http://iccinet.org/thresholds) warned that the Paris commitments will not prevent the Earth **“crossing into the zone of irreversible thresholds”** in polar and mountain glacier regions, and that crossing these boundaries may “result in **processes that cannot be halted** unless temperatures return to levels below pre-industrial” (emphasis added). The report says it is not well understood outside the scientific community that **cryosphere dynamics are slow to manifest** but once triggered “**inevitably forces the Earth’s climate system into a new state**, one that most scientists believe has not existed for 35–50 million years” (emphasis added). Ian Howat, associate professor of earth sciences at Ohio State University, says: “It’s generally accepted that it’s no longer a question of whether the West Antarctic Ice Sheet will melt, **it’s a question of when**. This kind of rifting (cracking) behaviour provides another mechanism for rapid retreat of these glaciers, adding to the probability that we may see significant collapse of West Antarctica in our lifetimes.” (https://www.siliconrepublic.com/innovation/antarctic-ice-sheet-global-warming) The scientists I have communicated with take the view that Rignot, Mouginot et al. is a credible paper and, together with the evidence published since, it would be prudent to accept that WAIS has very likely passed its tipping point for mass deglaciation, with big consequences for global sea level rise (SLR). DeConto and Pollard project more than a metre of SLR from Antarctica this century. This tallies with the Hanse, Sato et al scenario, which is also consistent with the findings of Phipps, Fogwill and Turney. The reality of multi-metre SLRs is not if, but how soon. “The natural state of the Earth **with present CO2 levels** is one with sea levels about **70 feet (21 metres) higher than now**” says Prof. Kenneth G. Miller (http://news.rutgers.edu/news-releases/2012/03/global-sea-level-lik-20120316). Other research scientists agree it is likely to be more than 20 metres over the longer term (<https://www.sciencedaily.com/releases/2009/06/090622103833.htm>).

#### Triggers their impact

* Own authors like IPCC and Un concede warming inevitable
* “even if all emissions halted immediately Artic would still warm by more than 5C”

**Harvey 19** (Fiona Harvey – award-winning environment journalist for the Guardian. Prior to this, she worked for the Financial Times for more than a decade. She has reported on every major environmental issue, from as far afield as the Arctic and the Amazon. <KEN> "Sharp rise in Arctic temperatures now inevitable – UN," The Guardian. March 13, 2019. DOA: 3/25/19. https://www.theguardian.com/environment/2019/mar/13/arctic-temperature-rises-must-be-urgently-tackled-warns-un)

Sharp and potentially devastating temperature rises of 3C to **5C** in the Arctic are now **inevitable** even if the world succeeds in cutting greenhouse gas emissions in line with the **Paris** agreement, research has found. Winter temperatures at the north pole are likely to rise by at least 3C above pre-industrial levels by mid-century, and there could be further rises to between 5C and 9C above the recent average for the region, according **to the UN**. Such changes would result in rapidly melting ice and permafrost, leading to sea level rises and potentially to even more destructive levels of warming. Scientists fear Arctic heating could trigger a climate “**tipping point**” as melting permafrost releases the powerful greenhouse gas **methane** into the atmosphere, which in turn could create a **runaway warming effect**. Joyce Msuya Facebook Twitter Pinterest Joyce Msuya is the acting executive director of UN Environment. Photograph: Simon Maina/AFP/Getty Images “What happens in the Arctic does not stay in the Arctic,” said Joyce Msuya, the acting executive director of UN Environment. “We have the science. Now more urgent climate action is needed to steer away from tipping points that could be even worse for our planet than we first thought.” The findings, presented at the UN Environment assembly in Nairobi on Wednesday, give a stark picture of one of the planet’s most sensitive regions and one that is key to the fate of the world’s climate. Last year’s stark warnings from the Intergovernmental Panel on Climate Change, setting out the dramatic impacts of 1.5C of global warming, did not include the impacts of potential tipping points such as **melting permafrost**. If melting permafrost triggers a tipping point, the likely results would be global temperature rises **well in excess of the 2C** set as the limit of safety under the Paris agreement. Nearly half of Arctic permafrost could be lost even if global carbon emissions are held within the Paris agreement limits, according to the UN study. **Even if all carbon emissions were to be halted immediately**, the Arctic region would still warm by more than 5C by the century’s end, compared with the baseline average from 1986 to 2005, according to the study from UN Environment. That is because so much carbon has already been poured into the atmosphere. The oceans also have become vast stores of heat, the effect of which is being gradually revealed by changes at the poles and on global weather systems, and will continue to be felt for decades to come.

#### CO2 remains in the atmosphere for thousands of years – causes irreversible climate change

Peter U. Clark et al 16, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, Jeremy D. Shakun, Department of Earth and Environmental Sciences, Boston College, Shaun A. Marcott, Department of Geoscience, University of Wisconsin, Alan C. Mix, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University, 2-8-16, “Consequences of twenty-first-century policy for multi-millennial climate and sea-level change,” http://www.nature.com/nclimate/journal/v6/n4/full/nclimate2923.html

Anthropogenic increases in CO2, however, have effects that extend well beyond 2100; a considerable fraction of the car­bon emitted to date and in the next 100 years will remain in the atmosphere for tens to hundreds of thousands of years4–9. The long residence time of an anthropogenic CO2 perturbation in the atmos­phere, combined with the inertia of the climate system, implies that past, current, and future emissions commit the planet to long-term, irreversible climate change1,10–16. As a result, many key features of future climate change are relatively certain in the long term, even if the precise timing of their occurrence is uncertain.

#### Ocean inertia

* Oceans take forever to heat up but also take forever to cool down which means it releases heat slowly too even post aff

**Frolicher et al 2013** (Thomas Lukas, Environmental Physics @ Institute of Biogeochemistry and Pollutant Dynamics, ETH Zurich, has published over 50 articles, ; and Michael Winton, Geophysical Fluid Dynamics Laboratory, National Oceanic and Atmospheric Administration, Princeton; and Jorge Louis Sarmiento, Program in Atmospheric and Oceanic Sciences, Princeton University, “Continued global warming after CO2 emissions stoppage”, Nature Climate Change, November, p.40-43, note://// indicates par. breaks)

Recent studies have suggested that global mean surface temperature would remain approximately constant on multicentury timescales after CO2 emissions1–9 are stopped. Here **we** use Earth system model simulations of such a stoppage to **demonstrate that** in some models, **surface temperature may actually increase on multi-century timescales after an initial century-long decrease**. This occurs in spite of a decline in radiative forcing that exceeds the decline in ocean heat uptake—a circumstance that would otherwise be expected to lead to a decline in global temperature. The reason is that the warming effect of decreasing ocean heat uptake together with feedback effects arising in response to the geographic structure of ocean heat uptake10–12 overcompensates the cooling effect of decreasing atmospheric CO2 on multi-century timescales. Our study also reveals that equilibrium climate sensitivity estimates based on a widely used method of regressing the Earth’s energy imbalance against surface temperature change13,14 **are biased**. Uncertainty in the magnitude of the feedback effects associated with the magnitude and geographic distribution of ocean heat uptake therefore contributes substantially to the uncertainty in allowable carbon emissions for a given multicentury warming target.//// A large body of studies using simplified climate models1–4,6–8 and more sophisticated Earth system models5,9 find that global mean surface temperature stays roughly constant for a couple of centuries at the value attained when carbon emissions are stopped. These studies suggest that the cooling effect of reduction in radiative forcing R due to the decrease in atmospheric CO2 is roughly balanced by the warming effect of reduction in ocean heat uptake N, such that the difference R − N remains approximately constant7 . This effect is a consequence of the fact that: the ocean heat and carbon uptake are both controlled in large part by the physical mixing of shallow oceanic waters into the deeper oceans; and under higher atmospheric CO2, the reduction of the radiative forcing sensitivity to atmospheric CO2 is roughly compensated by the higher airborne fraction of anthropogenic CO2. In this paper we show that feedback effects associated with the magnitude and geographical distribution of ocean heat uptake can lead to increasing temperatures, **even if** the difference R−N decreases.//// We performed multi-century simulations using the Geophysical Fluid Dynamics Laboratory Earth System Model15,16 (GFDL ESM2M) and the National Centre for Atmospheric Research Climate System Model17,18 (NCAR CSM1; Methods). Both models are forced with a 1,800 GtC pulse so that the atmospheric CO2 concentration is instantaneously quadrupled from preindustrial conditions. Both models simulate a rapid atmospheric CO2 decrease in the first few years after the quadrupling, followed by a slow decline (Fig. 1a). Forty per cent of the initial atmospheric CO2 perturbation is removed from the atmosphere within 20 years, 60% within 100 years, and 80% within 1,000 years. The land carbon inventories peak after 120 (ESM2M) and 130 years (CSM1), and the ocean is the only carbon sink thereafter (Supplementary Fig. 1).//// Figure 1b shows the simulated global mean surface temperature responses (solid lines) to the instantaneous quadrupling of atmospheric CO2, and estimates of the equilibrium temperature changes (dashed lines) that would occur if the models were in equilibrium with the contemporaneous CO2 radiative forcing (see Methods for calculation details). The temperature peaks 15–20 years after the CO2 quadrupling and decreases to 1.5 (ESM2M) and 1.6 K (CSM1) above pre-industrial levels after 100 years. The large initial drop of atmospheric CO2 and thus radiative forcing (R in Fig. 2a, left axis) in combination with the reduction in ocean heat uptake (N in Fig. 2a, right axis) causes the initial decrease in temperature. The simulated temperature in CSM1 (blue solid line in Fig. 1b) is initially closer to thermal equilibrium with respect to the contemporaneous CO2 radiative forcing (blue dashed line in Fig. 1b) than in ESM2M (red lines in Fig. 1b), because of the smaller simulated ocean heat uptake in CSM1. This is emphasized in Fig. 1c, which shows the ratio between the simulated temperature and temperature in thermal equilibrium with the contemporaneous CO2 radiative forcing, the so-called realized warming fraction. The realized global warming fraction after a century is 74% in the CSM1, but only 46% in ESM2M.//// After the first hundred years, the simulated temperature responses between the models diverge. The CSM1 simulates a small decrease of −0.06 K until the fifth century (blue solid line in Fig. 1b; fifth column in Table 1), consistent with a previous study5 . In contrast, the ESM2M simulates a temperature increase of 0.37 K over the same time period (red solid line in Fig. 1b; fifth column in Table 1). After six (ESM2M) and nine (CSM1) hundred years, the system is close to the equilibrium temperature expected from the slowly decreasing atmospheric CO2 concentration. At this point, ocean heat uptake is near zero (N in Fig. 2a) and temperature (solid lines in Fig. 1b) is approximately the equilibrated temperature (Teq, dashed lines in Fig. 1b) that is given by the ratio of radiative forcing R and equilibrium climate feedback factor λ(Teq = R/λ). The temperature differences between the models at the end of the simulations are due to their different equilibrium climate feedback factors, as intermodel differences in radiative forcings are small. The simulated temperature (red solid line in Fig. 1b) in ESM2M slightly overshoots the estimated equilibrium temperature (red dashed line in Fig. 1b) at the end of the simulation as the perturbation ocean heat flux becomes negative (red line for N in Fig. 2a). Thus, the ocean contributes to the warming at the end of the simulation rather than opposing it. It is important to note that we use a simplified expression to estimate the CO2 radiative forcings (see equation (2)). Thus, the estimated equilibrium temperatures might be slightly different from the ‘true’ modelled values.//// The warming response in ESM2M between the second and fifth century is especially surprising, because the decline in radiative forcing due to the decrease in atmospheric CO2 exceeds the decline in ocean heat uptake over the this period (decreasing R–N in Fig. 2b). In light of earlier studies and arguments, this is expected to lead to decreasing temperatures in both models. To understand this remarkable behaviour, we make use of the modified standard ‘zero-layer’ energy balance model of the climate system10://// (note from Cornell: equation excluded) //// where 1T is the global mean surface temperature change, R is the stratospheric-adjusted19 radiative forcing, λ is the equilibrium climate feedback factor, N is the net radiation flux at the top of the atmosphere (approximately equal to ocean heat uptake on decadal and longer timescales) and ε is the ocean heat uptake efficacy. Ref. 10 showed that ocean heat uptake has a greater global mean surface temperature impact per watt per square metre than the CO2 radiative forcing, and therefore applied an efficacy factor to the ocean heat uptake. In other words, for the same watt per square metre change in ocean heat uptake and CO2 radiative forcing, the **global mean surface temperature change induced by ocean heat uptake is** (generally) **larger than that induced by atmospheric CO2.** What causes this efficacy to be greater than 1? As is the case for the efficacy of other forcing agents19, the ocean heat uptake efficacy is controlled by the relationship between the geographical pattern of ocean heat uptake and the regional climate feedbacks. The low latitudes are generally characterized by strong net negative (stabilizing) feedbacks owing to large negative Planck and lapse rate feedback, whereas the high latitudes feature weak or even positive feedbacks owing to less-negative Planck as well as positive lapse rate, cloud and albedo feedback11. Note that there is another way to produce a geographically varying feedback20 not to be confused with the local definition11 discussed here. As the ocean heat uptake occurs dominantly at high latitudes it is subject to reduced climate damping relative to geographically broad CO2 forcing. **Ocean heat uptake efficacy may be influenced** by regional radiation feedback distribution as well as by ocean circulation changes, because **changes in ocean circulation strongly impact the ocean heat uptake and storage pattern**21. The efficacies of the ESM2M (ensemble 1) and the CSM1 are 1.9 and 1.7, respectively (see equation (3) and Supplementary Table 1 for calculation details).//// Table 1 shows the temperature change budget over the period of warming differences (year 100–500). First, the decrease in radiative forcing R scaled by the equilibrium climate feedback factor λ causes a cooling of −0.60 K (ESM2M) and −0.39 K (CSM1; second column in Table 1). Second, the joint effect of the reduction in ocean heat uptake N and amplification of this reduction by the efficacy ε and the equilibrium climate feedback factor λ causes a warming of 0.86 K (ESM2M) and 0.30 K (CSM1) over the same period (third column in Table 1). As a result, the warming effect (0.86 K) due to reduction in ocean heat uptake exceeds the radiative cooling effect (−0.60 K) due to reduction in atmospheric CO2 and leads to an overall warming of 0.26 K in ESM2M (fourth column in Table 1). In contrast, the CSM1 shows a cooling of −0.09 K as the radiative cooling (−0.39 K) exceeds the ocean heat uptake warming (0.30 K). The estimated multi-century temperature changes of 0.26 K (ESM2M) and −0.09 K (CSM1) are in good agreement with the simulated temperature changes of 0.37 K (ESM2M) and −0.06 K (CSM1). The large differences between the models in −ε1N/λ are mainly caused by differences in ocean heat uptake (−0.55 W m−2 in ESM2M versus −0.34 W m−2 in CSM1) and equilibrium climate feedback factor (1.19 W m−2 K −1 in ESM2M versus 1.90 W m−2 K −1 in CSM1). The small differences in efficacy play a less dominant role here and can explain 20% of total global warming differences between the models. Note that equation (1) does not work well in the first century of the simulation as ocean heat uptake efficacy increases with time during this adjustment period, and for short-term variations as interannual variations in ocean heat uptake are not concentrated in high latitudes and are probably associated with El Niño/Southern Oscillation variability.//// Recent studies suggest that efficacy evaluated at the time of doubling in 1% CO2 increase experiments is very variable between climate models10,12, but generally greater than unity with a median value of 1.3, and values as large as 2. The wide range of possible efficacy values together with changes in the total ocean heat uptake can therefore contribute substantially to uncertainties in the short-term and multi-century warming response for a given carbon emission pulse (Supplementary Fig. 2). Even the sign of change is unclear on multi-century timescales. An efficacy closer to unity, for example, would lead to decreasing temperatures in both models between the second and fifth century (Supplementary Fig. 2) as the difference between radiative forcing and ocean heat uptake decreases in both models (Fig. 2b). //// The importance of the ocean heat uptake efficacy also becomes apparent when estimating the equilibrium climate sensitivity Teq (2×CO2) (the equilibrium global surface temperature response to doubling of CO2; see Methods). A widely used extrapolation approach to diagnose Teq (2 × CO2) (herein referred to as the ‘Gregory method’) uses 150 years of ocean heat uptake and surface temperature data from an abrupt CO2 quadrupling experiment, where atmospheric CO2 is prescribed at 4×CO2 (refs 13,14). The Gregory Teq (2 × CO2) estimate of 2.4 K for ESM2M is much smaller than the Teq (2 × CO2) estimate of 3.1 K calculated from our carbon pulse experiments because the Gregory method does not adequately assess the approach to equilibrium along high-efficacy trajectories11,22 (Supplementary Fig. 3a). The Gregory Teq (2×CO2) for CSM1 is in agreement with our carbon pulse Teq (2 × CO2), but the Gregory method largely **underestimates the radiative forcing** for a doubling of CO2 in CSM1 because of nonlinear adjustment in the first couple of years (Supplementary Fig. 3b). It is both the shortness of the experiment and the inclusion of the early adjustment in the linear estimate that cause problems for the Gregory method (see Supplementary Text for detailed discussion). As an alternative, we propose to use our carbon pulse simulation experiments with freely evolving atmospheric CO2 to calculate the Teq (2 × CO2), because: the pulse experiment is more relevant to the actual adjustment that will occur following CO2 emissions than the step CO2 experiments used at present13,14; the Teq (2 × CO2) obtained from our carbon pulse experiments of 3.1 K (ESM2M) and 2.0 K (CSM1) for a doubling of CO2 are in good agreement with the Teq (2 × CO2) estimates of 3.4 K (ESM2M; ref. 23) and 2.1 K (CSM1; ref. 24) using atmosphere/slab–ocean configurations of the same models; and the costs to run the simulations are significantly less than running a coupled model to equilibrium under constant radiative forcing. The impulse response function of atmospheric CO2 from our experiments can be used in atmosphere–ocean coupled general circulation models that do not include carbon cycle components as a forcing to run the same pulse simulations (Supplementary Table 2).//// A present study using global ocean heat uptake, atmospheric temperature and radiative forcing data from most recent climate observations suggests a relatively small transient climate response of 1.3 K (0.9–2.0 K) and a small equilibrium climate sensitivity of 2.0 K (1.2–3.9 K; ref. 25; Supplementary Fig. 3c and Text for extended discussion). Our study suggests, however, that small transient climate responses do not necessarily imply small equilibrium climate sensitivities, because of non-unity efficacy (Supplementary Fig. 3c). ESM2M simulates a transient climate response of 1.5 K, which is close to the observational-based estimate of 1.3 K, but the simulated equilibrium climate sensitivity of 3.1 K is much larger than the observational-based estimate of 2.0 K. If the real world were to behave in a similar manner as ESM2M then only a small fraction of the total warming due to past carbon emissions has thus far been realized.//// Recent research has suggested that the magnitude of CO2- induced warming that will occur and persist for the coming centuries is mainly determined by the amount of future cumulative carbon emissions and that past emissions commit us to hundreds of years at approximately the level of CO2-induced warming that has already been realized. Thus, cumulative carbon emissions are a powerful metric for climate stabilization levels and thus policy, as only the warming per unit cumulative emissions is needed to make projections of global temperature on multi-centennial timescales1,6,26. **Our study shows** that **global mean temperature may even increase after zero carbon emissions**, **because of feedback effects** arising in response to the magnitude and geographic structure of **ocean heat uptake**. Thus, estimates of allowable carbon emissions required to remain below the 2 ◦C global warming target may be significantly lower than previously thought. A better understanding and monitoring of how ocean circulation changes impact regional ocean heat uptake and thus efficacy is necessary to narrow uncertainties in climate change projections.

#### Current pledges will see 3.6°C and ag alone triggers 2°C by 2050

* Methane 72 times more potent than CO2 means ag overwhelms any CO2 cuts
* Pledges can’t solve don’t do enough

Debra L. Dona 15, Professor of Law at the University of Wyoming College of Law, 11-29-15, “Livestock Production, Climate Change, and Human Health: Closing the Awareness Gap,” http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2696741

Containing the global temperature increase within 2°C will not forestall adverse climate-related impacts—they are already occurring—but the general hope has been that holding to that limit would lessen the risk of crossing irreversible tipping points.20 Triggering climate feedbacks, where rising temperatures trigger even greater releases of GHGs that in turn increase temperatures, is one possible outcome of exceeding tipping points. For example, one scientist predicted that it “will be difficult—perhaps impossible—to avoid large methane releases in the East Siberian Sea without major reductions in global emissions of CO2.”21 The release of that methane “will bring forward by 15-35 years the average date at which the global mean temperature rise exceeds 2°C above pre-industrial levels.”22 The needed reductions are not occurring under current mitigation policies. According to the U.N. Environment Programme (UNEP), “current country pledges to reduce GHG emissions will deliver no more than one-third of what is needed by 2020 to avoid a 2°C rise in global temperature.”23 Authors of a recent article in Science assert that current policy measures “will allow a long-term increase of 3.6°C,” or nearly twice the target.24 Others warn that overall, business-as-usual agriculture related emissions alone will “almost reach the full 2°C target emissions allowance in 2050.”25 Furthermore, they caution, “even with ambitious supply-side mitigation in the agriculture sector, without radical shifts in consumption of meat and dairy products, growth in agricultural emissions will leave insufficient space within a two-degree carbon budget for other sectors.”26¶ Consensus is growing that “[o]nly with large simultaneous reductions in CO2 and non-CO2 emissions will direct radiative forcing be reduced during this century.”27 A major reason for the growing attention to livestock production is its huge role in global methane emissions. As noted in the introduction, livestock production is the largest source of methane, both globally and in the United States.28 Methane is the most abundant non-CO2 GHG and a potent one: [T]on-for-ton, methane traps 25 times more heat than CO2 over a 100-year period. Measured over 20 years, methane’s warming impact is 72 times greater than an equivalent weight of CO2. Because methane survives in the atmosphere for only 8-12 years (compared to more than a century for CO2), substantial emissions cuts today will diminish concentration levels within one to two decades—a critical time frame for slowing warming especially in the earth’s most vulnerable regions, such as the poles.29

**Two-degree warming still triggers their impacts**

* Hang time
* Ice sheets
* 2 Degree calc is wrong we don’t know enough about carbon cycles
* Feedback processes are out of control create feedback loops

James **Hansen et al. 16**, American adjunct professor in the Department of Earth and Environmental Sciences at Columbia University, Former head of the NASA Goddard Institute for Space Studies, Head of the Program on Climate Science, Awareness and Solutions at Columbia University, 3-22-16, “Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2 ◦C global warming could be dangerous,” http://www.atmos-chem-phys.net/16/3761/2016/acp-16-3761-2016.pdf

First, our conclusions suggest that a target of limiting global warming to 2 ◦C, which has sometimes been discussed, does not provide safety. We cannot be certain that multi-meter sea level rise will occur if we allow global warming of 2 ◦C. However, we know the warming would remain present for many centuries, if we allow it to occur (Solomon et al., 2010), a period exceeding the ice sheet response time implied by paleoclimate data. Sea level reached +6–9 m in the Eemian, a time that we have concluded was probably no more than a few tenths of a degree warmer than today. We observe accelerating mass losses from the Greenland and Antarctic ice sheets, and we have identified amplifying feedbacks that will increase the rates of change. We also observe changes occurring in the North Atlantic and Southern oceans, changes that we can attribute to ongoing warming and ice melt, which imply that this human-driven climate change seems poised to affect these most powerful overturning ocean circulation systems, systems that we know have had huge effects on the planetary environment in the past. We conclude that, in the common meaning of the word danger, 2 ◦C global warming is dangerous.¶ Second, our study suggests that global surface air temperature, although an important diagnostic, is a flawed metric of planetary “health”, because faster ice melt has a cooling effect for a substantial period. Earth’s energy imbalance is in some sense a more fundamental climate diagnostic. Stabilizing climate, to first order, requires restoring planetary energy balance. The UNFCCC never mentions temperature – instead it mentions stabilization of greenhouse gas concentrations at a level to avoid danger. It has been shown that the dominant climate forcing, CO2, must be reduced to no more than 350 ppm to restore planetary energy balance (Hansen et al., 2008) and keep climate near the Holocene level, if other forcings remain unchanged. Rapid phasedown of fossil fuel emissions is the crucial need, because of the millennial timescale of this carbon in the climate system. Improved understanding of the carbon cycle is needed to determine the most effective complementary actions. It may be feasible to restore planetary energy balance via improved agricultural and forestry practices and other actions to draw down atmospheric CO2 amount, if fossil fuel emissions are rapidly phased out.¶ Third, not only do we see evidence of changes beginning to happen in the climate system, as discussed above, but we have also associated these changes with amplifying feedback processes. We understand that in a system that is out of equilibrium, a system in which the equilibrium is difficult to restore rapidly, a system in which major components such as the ocean and ice sheets have great inertia but are beginning to change, the existence of such amplifying feedbacks presents a situation of great concern. There is a possibility, a real danger, that we will hand young people and future generations a climate system that is practically out of their control.¶ We conclude that the message our climate science delivers to society, policymakers, and the public alike is this: we have a global emergency. Fossil fuel CO2 emissions should be reduced as rapidly as practical.

#### Threshold is low– 1 degree Celsius ensures tipping points because of soil

* Soil stores massive amounts of carbon
* Warming means soil atoms become more active and release their carbon faster
* No return threshold and other studies suck

**Kinver 16.** (Mark Kinver – Environment Reporter @ the BBC. Citing: Thomas Crowther – British scientist specialising in ecosystem ecology and the chief scientific advisor to the UN's Trillion Tree Campaign. He is a tenure-track professor of Global Ecosystem Ecology at ETH Zürich where he formed the Crowther Lab. received a postdoctoral fellowship from the Yale Climate and Energy Institute, to pursue his postgraduate research at Yale. <KEN> "Earth warming to 'climate tipping point'," BBC News. November 30, 2016. DOA: 3/31/19. <http://www.bbc.com/news/science-environment-38146248>)

A warmer world will release vast volumes of carbon into the atmosphere, potentially **triggering dangerous climate change**, scientists warn. Writing in journal Nature, they project that an increase of 1C (1.8F) will release an additional 55 billion tonnes of carbon into the atmosphere by 2050. This could trigger a "positive feedback" and push the planet's climate system **past the point of no-return. Previous assessments have not taken carbon released by soil into account**. In their Nature paper, an international team of scientists said that **the majority** of the Earth's terrestrial store of carbon was in the soil. They warned that as the world warmed, organisms living in the planet's soils would become more active, resulting in more carbon being released into the atmosphere - exacerbating warming. "There have been concerns about this positive feedback for a long, long time," said lead author Thomas Crowther, who conducted the research while based at Yale University, US, but now at the Netherlands Institute of Ecology. "For the past two or three decades there have been literally thousands of studies trying to address this topic and trying to identify whether there are going to be increases or decreases in carbon uptake of the soil in relation to warming or increases in carbon loss." Considerable losses Dr Crowther said the uncertainty surrounding the exchange of carbon between the atmosphere and the planet's soils had led to "sizeable differences in the projections of future climate conditions". He told BBC News: "We are the first study to take a global perspective and then map the variability and able to say that in these areas there are going to be huge losses and in these areas there are going to be some gains. "Using this approach we can get a robust idea of the whole picture. We show that, actually, the losses are going to be really considerable." Using data stretching over 20 years from 49 sites across the globe, the team observed that global carbon stocks would fall by up to 55 petagrams (55 billion tonnes) under a business-as-usual scenario, which is roughly **equivalent to adding the emissions from a nation the size of the US**. Dr Crowther, whose team had produced a short video on the subject, added: "I do not positive as in 'good' but positive as in it is reinforcing, so it is a process that once it has kicked off, **it leads to the acceleration of itself**. "Carbon comes out of the soil, which leads to more warming, which leads to more carbon out of the soil, it is **a reinforcing cycle**. The concerning thing is that our projection is that we are going to lose 55 petgrams, that's **55 trillion kilograms** by 2050. This process is only going to accelerate and accelerate. Worms (Image: BBC) Image caption Increased activity of microbes and soil animals, such as worms, would be the source of the additional carbon emissions In the global carbon cycle, soils act as a depository, a place where carbon is stored in a state that does not directly influence the global climate system. He observed: "The carbon is trapped in the soil because it is taken from the atmosphere by plant material through photosynthesis. Particularly in cold places, it get stored in the soil for a very long time, and this minimises the atmospheric concentrations. "In the soil, there are microbes and soil animals, as well as plant roots, and they all use that soil carbon for their growth and activity. "Where it is really cold, the activity and growth is limited but when it warms, and warming is likely to be disproportionately happening in cold areas, then the more active they are set to become." Dr Crowther said the increased activity by the organisms would mean that they would consume greater volumes of the carbon in the soil, and this would be released as carbon dioxide, a greenhouse gas. "It is very similar to the way we respire and produce carbon dioxide. Because there is such a huge biomass of microbes and soil animals, that **respiration really can be massive**," he said.

## Neutrino

#### Their projection of nuclear fear orders their domestic politic – they bury the uncertainty of their scholarship in scary taglines, projecting traumatized affect to win a ballot through dread.

Masco 14  
(Joseph Masco is Professor of Anthropology at the University of Chicago. “The Theater of Operations: National Security Affect from the Cold War to the War on Terror,” Dec. 1, 2014. cVs)

In their historical moments, the shock of the first Soviet nuclear test and of the Communist revolution in China and later actions in Korea were driving forces for a massive expansion of the national security state in the 1950s, a radical investment in militarism not to be repeated until the first de cade of the twenty- first century, when the nuclear security state, shocked by suicide- hijacker attacks on two American cities, remade itself under the logics of counterterror. The politics of shock are central to the conceptualization of the national security state as a distinctly American form of power. We might think of the reclassification project as not only a sign of the deep commitment of the counterterror state to official secrecy and covert action in all its forms, but also as an effort to purge evidence of the inability of the national security apparatus to perfectly predict the future— to anticipate and mediate crisis and thereby produce a normalized everyday, unbroken by trauma. It is as if the failure to prevent the suicide hijackers in 2001 created a reverberating anxiety not only about the attacks but also about the concept of national security itself, connecting seemingly disparate and historically distinct expert judgments within an alternative understanding of American power, an infrastructure of failure rather than success. The failure to predict global events, let alone protect U.S. citizens and cities from violence, haunts U.S. security culture today, creating the constant drive for new technical capacities and the increasing militarization of American life. It also generates professional desires for revenge against those who have revealed the institutional weakness of the global hyperpower. These administrative commitments fuse the problem of futures, infrastructures, expertise, and international competition with affect in a new way, one that creates the expectation of a total anticipatory control of the future even as that possibility breaks down from one second to the next, producing the grounds for serial shocks (and thus, perpetual trauma). During the Cold War constituting, mobilizing, and exploiting existential danger was a central domain of national politics, with each federal election in part based on how prospective leaders would handle the production of nuclear technologies as well as manage the minute- to- minute threat of nuclear attack. Evoking existential threat became the core vehicle for building a military- industrial state, pursuing rivalries between political parties, and mobilizing ideological campaigns on both the Right and the Left. Nuclear fear was thus a total social formation in the second half of the twentieth century, mobilizing all aspects of American society through specific images of the end of the nation- state. This negative view of the future was balanced by investments in a welfare- state apparatus devoted to improving the conditions of everyday life for citizens in terms of health, education, and the environment (Light 2003). Thus, the catastrophic as well as the utopian potentials of the nuclear state were explicit terms of public discourse, making both panic and promise the basis for the domestic political sphere. Americans now live in a postwelfare state society, which is no longer so formally invested in improving the qualities of collective life through social programming; thus, terror has increasingly become the primary domain of everyday politics in the early twenty- first century. The lack of a positive vision of the collective future is pronounced in the United States today, and it is amplified by the increasingly blurred public memory of the historical evolution of the security state itself. Indeed, the proliferation of Cold War nuclear panics is rarely discussed as a model for contemporary counterterror politics, leaving largely unexamined the truth or falsity of official claims of Soviet nuclear advantage: the 1950s bomber gap, the 1960s missile gap, the 1970s window of vulnerability, and the 1980s Soviet first- strike capability. But it is important to recognize that these domestic productions, as iconic moments in American politics, were emotional recruitments before they were technological or military claims of fact. These episodes were domestic political campaigns of threat proliferation before, and sometimes even after, the technological and scientific reality of Soviet military capabilities had been determined. From this perspective, terror has a specific American logic and domestic history, one that since 1945 has drawn on the destructive capacities of nuclear weapons to focus social energies, unlock resources, and build things. In the twentieth century, the United States remade itself through the atomic bomb, using nuclear fear as a coordinating principle for U.S. institutions, citizen- state relations, and geopolitics alike (Masco 2006). The counterterror state, like the countercommunist state before it, attempts to install through domestic affective recruitments a new perception of everyday life that is unassailable. The campaign to normalize threat is the flip side of identifying and articulating new kinds of danger, allowing new forms of governance to be pursued as a necessary counterformation. Consider, for example, the following official statements about insecurity in the United States framed in the future conditional: This situation will continue as far ahead as anyone can foresee. We cannot return to “normalcy.” This is the “new normalcy.” Only by winning what at best will be a long war of endurance can we hope to avoid . . . the very possible destruction of civilization itself. (quoted in Chernus 2002, 44) Homeland security is not a temporary mea sure just to meet one crisis. Many of the steps we have now been forced to take will become permanent in American life. They represent an understanding of the world as it is, and dangers we must guard against perhaps for de cades to come. I think of it as the new normalcy. (Cheney 2001) As far as anyone can foresee. The first statement— from July 1953— is by Eisenhower administration official James Lambie, who was charged with developing a national communications strategy to mobilize citizens in the thermonuclear age. In response, he helped craft one of the largest public education campaigns in U.S. history (a program that we remember today as civil defense), devoted to teaching citizens to fear the bomb in a specific way so as to prepare them for a potentially short nuclear or long cold war. The second evocation of a “new normal”— from an October 2001 speech to the Republican Governors Association— is by Vice President Dick Cheney, who also attempts to standardize danger and to create a new psychic infrastructure capable of accommodating a permanent, imminent danger. In both cases, existential threat is presented as both novel and emergent and is then positioned as the baseline reality for a new kind of everyday American life. Future crisis is projected— as concept— to be the basis for life at institutional, technological, and affective levels, reordering domestic politics and geopolitics in a startlingly economical gesture. Declaring a “new” normal is thus anything but new as a state security practice in the United States. However, the objects, logics, and consequences of defense have significantly changed with the shift from the twentieth century’s nuclear “balance of terror” to the twenty- first century’s “War on Terror.”3 Interrogating the links between the first de cade of the Cold War and the first de cade of the War on Terror is a central project of this book, which pays specific attention to how technological revolution, surprise, normality, and terror have been used to orchestrate a new kind of security culture. I pursue these comparisons not because they are absolutely symmetrical or simply code shift s from nuclear fear to terrorism, but because each iteration of the national security state announces itself through acts of normalization and naturalization (see Der Derian 2002). It is increasingly important to understand how historically crafted images and logics of imminent danger allow feelings to be nationalized and directed to produce antidemocratic actions and policy. These affective logics constitute a specific zone of interaction between citizens and the state, one that is the very basis for the social contract (which Hobbes once defined as the exchange of public obedience for collective security). As we shall see, national security affect is a special kind of collective experience, one that is central to enabling the technological and administrative capacities of the security state. Infrastructures— affective, imaginative, and material— are linked in the production of American power today, creating an unprecedented global projection of American fears and desires in the name of existential defense.

#### No prolif impact

John Mueller 16, Woody Hayes Senior Research Scientist, Mershon Center for International Security Studies; Adjunct Professor, Department of Political Science, Ohio State University, 6/5/16, “Embracing Threatlessness: US Military Spending, Newt Gingrich, and the Costa Rica Option,” <http://politicalscience.osu.edu/faculty/jmueller/CNArestraintCato16.pdf>

For decades there has been almost wall-to-wall alarm about the dangers supposedly inherent in nuclear proliferation.

However, the proliferation of nuclear weapons has been far slower than has been commonly predicted over the decades primarily because the weapons do not generally convey much advantage to their possessor.

And, more importantly, the effect of the proliferation that has taken place has been substantially benign: those who have acquired the weapons have “used” them simply to stoke their egos or to deter real or imagined threats.67 The holds even for the proliferation of the weapons to large, important countries run by unchallenged monsters who at the time they acquired the bombs were certifiably deranged: Josef Stalin who in 1949 was planning to change the climate of the Soviet Union by planting a lot of trees, and Mao Zedong who in 1964 had just carried out a bizarre social experiment that had resulted in artificial famine in which tens of millions of Chinese perished.68

Despite this experience, an aversion to nuclear proliferation continues to impel alarmed concern, and it was a chief motivator of the Iraq War which essentially was a militarized antiproliferation effort. The war proved to be a necessary cause of the deaths of more people than were inflicted at Hiroshima and Nagasaki combined.69

The subsequent and consequent Iraq syndrome strongly suggests there will be little incentive to apply military force to prevent, or to deal with, further putative proliferation. Thus, despite nearly continuous concern—even at times hysteria—about nuclear developments in North Korea and Iran, proposals to use military force (particularly boots on the ground) to deal with these developments have been persistently undercut. The invasion of Iraq presumably did prevent that country from going nuclear—assuming it ever would have been able to put together the effort.70 However, it scarcely seems likely that there will be much sympathy for repeating that disastrous experience. Thus, maintaining huge forces-in-being to deal with the proliferation problem scarcely seems sensible, even though almost everybody still considers proliferation to be major security concern. What seems to be required in these cases, as generally with the devils du jour of the Cold War era, is judicious, watchful, and wary patience.

#### States won’t miscalculate

Harvey M. Sapolsky 16, Professor of Public Policy and Organization, Emeritus, at MIT and the former Director of the MIT Security Studies Program, 2016, “Getting Past Nonproliferation,” in Should We Let the Bomb Spread, p. 18

Nuclear-armed nations are often at war, but not with each other. Nuclear weapons sober regional tensions by giving great caution to aggressive actions. The dangers of escalation restrain the inclination to use even low levels of military force in disputes with nuclear-armed opponents. War is full of surprises, which makes it too dangerous for nuclear powers to fight one another. One miscalculation about likely opponent reactions could be one too many in any encounter.

#### Deterrence prevents every prolif impact

Harvey M. Sapolsky 16, Professor of Public Policy and Organization, Emeritus, at MIT and the former Director of the MIT Security Studies Program, 2016, “Getting Past Nonproliferation,” in Should We Let the Bomb Spread, p. 21-22

The fear, of course, is that without the NPT barrier, not just friendly nations in Europe or Asia but also hostile, unstable, and/or terrorist-supporting regimes in the Middle East will go nuclear. A nuclear weapon in their hands is more frightening than a nuclear weapon in Russian and Chinese hands. How long will a nuclear-armed Saudi Arabia survive as a kingdom? Wouldn’t Iran give some to Hezbollah or Qatar and a couple to Hamas?

Deterrence and forensics work.31 Nations that threaten the United States will discover that they face a most formidable and tenacious opponent. Post-NPT nuclear weapons will remain difficult to obtain, costly to protect, and very, very risky to gift, lend, or trade. The extreme caution that applies to attacks on nuclear powers applies also to those who would hand nuclear weapons to their terrorist enemies as the links are sure to be revealed. Often the terrorists are as much a threat to others as they are to the United States. The weapon that they steal from you may be used against you, so there is strong incentive to protect nuclear weapons from theft and against handing them to others.

#### Deployment of every nuke in existence would destroy at most 1/38th of global land mass – In a realistic deployment, that number is closer to 1/192nd

Hall 19 (Allen Hall – Expert in Aerospace Management, Manufacturing, Engineering and IT, worked closely with the military, research labs, FFRDC’s, AFRL, NAVSEA / NAVAIR, all the major ALC’s and all the aerospace OEM’s. <MKIM> “Who would win in a war between Russia and the US?”. 4/25/19. DOA: 7/17/19. https://www.quora.com/Who-would-win-in-a-war-between-Russia-and-the-US/answer/Allen-E-Hall-2)

If you take every weapon in existence today, approximately 6500 megatons between 15,000 warheads with an average yield of 433 KT, [13] and put a single bomb in its own 100 square mile grid… one bomb per grid (10 miles x 10 miles), y**ou will contain >95% of the destructive force** of each bomb on average **within the grid it is in.** [14] This means the total landmass to receive a destructive force from all the world's nuclear bombs is an area of 1.5 million square miles. Not quite half of the United States and 1/38 of the world's total land mass…. that's it! In truth it would be far less. **A** higher concentration **of detonations would** take place over military targets **and would be likely 10–30 times greater in concentration** over those areas. [15] If they were used in war **it is unlikely more than 40% would get used even in a total war situation**. So the actual area of intense destruction in a nuclear war is somewhere between 150,000 and 300,000 square miles or **1/384 to** 1/192 of the world’s land mass. These numbers are easily verifiable, and they are right. So many have bought into the endless rhetoric of the world shattering destructiveness and the inevitable end of civilization scenarios that they can no longer be objective or analytical as they have put their beliefs in front of rational thinking. I find this true even with most scientists. I challenge anyone to just do the math …it is easy. **You win wars by taking out the opposing teams ability to make war, not their population centers.** The arsenals of today are just enough to cover military objectives. There would be no wholesale war against civilians. **That is just more fear mongering and Hollywood storytelling.**