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#### International Relations is the royal science of empire – the aff engineers “sustainable warfare” through a mutating geopolitics of violence.

Grove ‘19

[Jarius, PoliSci at the University of Hawai’i. 2019. “Savage Ecology: War and Geopolitics in the Anthropocene.”] pat – ask me for the PDF!

Because I wanted this book to inspire curiosity beyond the boundaries of international relations (ir), I considered ignoring the field altogether, removing all mentions of ir or ir theory. However, upon closer reflection, I have decided to keep these references as I think they are relevant for those outside the discipline and for those who, like myself, often feel alienated within its disciplinary boundaries. In the former case, it is important to know that, unlike some more humble fields, ir has always held itself to be a kind of royal science. Scholarship in ir, particularly in the United States, is half research, and half biding time until you have the prince’s ear. The hallowed names in the mainstream of the field are still known because they somehow changed the behavior of their intended clients—those being states, militaries, and international organizations. Therefore, some attention to ir is necessary because it has an all-too-casual relationship with institutional power that directly impacts the lives of real people, and ir is all too often lethal theory. As an American discipline, the political economy of the field is impossible without Department of Defense money, and its semiotic economy would be equally dwarfed without contributory figures like Woodrow Wilson, Henry Kissinger, and Samuel Huntington. The ubiquity of Huntington’s “clash of civilizations” thesis and Kissinger’s particular brand of realpolitik are undeniable throughout the field, as well as the world. Each, in their own way, has saturated the watchwords and nomenclature of geopolitics from an American perspective so thoroughly that both political parties in the United States fight over who gets to claim the heritage of each. Although many other fields such as anthropology and even comparative literature have found themselves in the gravitational pull of geopolitics, international relations is meant to be scholarship as statecraft by other means. That is, ir was meant to improve the global order and ensure the place of its guarantor, the United States of America. Having spent the better part of a decade listening to national security analysts and diplomats from the United States, South Korea, Japan, Europe, China, Brazil, and Russia, as well as military strategists around the planet, I found their vocabulary and worldview strikingly homogeneous.

If this seems too general a claim, one should take a peek at John Mearsheimer’s essay “Benign Hegemony,” which defends the Americanness of the ir field. What is most telling in this essay is not a defense of the U.S. as a benign hegemonic power, which Mearsheimer has done at length elsewhere. Rather, it is his vigorous defense that as a field, ir theory has done well by the world in setting the intellectual agenda for global challenges, and for creating useful theoretical approaches to addressing those problems. For Mearsheimer, the proof that American scholarly hegemony has been benign is that there is nothing important that has been left out. A quick scan of the last ten or twenty International Studies Association conferences would suggest otherwise.

That issues like rape as a weapon of war, postcolonial violence, global racism, and climate change are not squarely in the main of ir demonstrates just how benign American scholarly hegemony is not. As one prominent anthropologist said to me at dinner after touring the isa conference in 2014, “it was surreal, like a tour through the Cold War. People were giving papers and arguing as if nothing had ever changed.” These same provincial scholars aspire and succeed at filling the advisory roles of each successive American presidency. One cannot help but see a connection between the history of the ir field, and the catastrophes of U.S. foreign policy during the twentieth and twenty-first centuries. One could repeat the words of the anthropologist I mentioned to describe the 2016 presidential campaign debates over the future of U.S. foreign policy: it is as if “nothing had ever changed.” And yet these old white men still strut around the halls of America’s “best” institutions as if they saved us from the Cold War, even as the planet crumbles under the weight of their failed imperial dreams.

If international relations was meant to be the science of making the world something other than what it would be if we were all left to our own worst devices, then it has failed monumentally. The United States is once again in fierce nuclear competition with Russia. We are no closer to any significant action on climate change. We have not met any of the Millennium Development Goals determined by the United Nations on eradicating poverty. War and security are the most significant financial, creative, social, cultural, technological, and political investments of almost every nation-state on Earth. The general intellect is a martial intellect.

Despite all this failure, pessimism does not exist in international relations, at least not on paper. The seething doom of our current predicament thrives at the conference bar and in hushed office conversations but not in our research. In public, the darkness disavowed possesses and inflames the petty cynicisms and hatreds that are often turned outward at tired and predictable scapegoats.

After the fury of three decades of critique, most ir scholars still camp out either on the hill of liberal internationalism or in the dark woods of political realism. Neither offers much that is new by way of answers or even explanations, and each dominant school has failed to account for our current apocalyptic condition. One is left wondering what it is exactly that they think they do. Despite the seeming opposition between the two, one idealistic about the future of international order (liberals) and the other self-satisfied with the tragedy of cycles of war and dominance (realists), both positions are optimists of the positivist variety.

For both warring parties, ir optimism is expressed through a romantic empiricism. For all those who toil away looking for the next theory of international politics, order is out there somewhere, and dutifully recording reality will find it—or at least bring us closer to its discovery. For liberal internationalism, this will bring the long-heralded maturity of Immanuel Kant’s perpetual peace. For second-order sociopaths known as offensive realists, crumbs of “useful strategic insight” and the endless details that amplify their epistemophilia for force projection and violence capability represent a potential “advantage,” that is, the possibility to move one step forward on the global political board game of snakes and ladders. Still, the cynicism of ir always creeps back in because the world never quite lives up to the empirical findings it is commanded to obey. Disappointment here is not without reason, but we cynically continue to make the same policy recommendations, catastrophe after catastrophe.

I have an idea about where ir’s recent malaise comes from. I think it is a moment, just before the awareness of the Anthropocene, after the Cold War and before September 11, when the end of everything was only a hypothetical problem for those of a certain coddled and privileged modern form of life. The catastrophe of the human predicament was that there was no catastrophe, no reason, no generation-defining challenge or war. Now the fate of this form of life is actually imperiled, and it is too much to bear. The weird denial of sexism, racism, climate change, the sixth extinction, and loose nukes, all by a field of scholars tasked with studying geopolitics, is more than irrationalism or ignorance. This animosity toward reality is a deep and corrosive nihilism, a denial of the world. Thus ir as a strategic field is demonstrative of a civilization with nothing left to do, nothing left to destroy. All that is left is to make meaning out of being incapable of undoing the world that Euro-American geopolitics created. Emo geopolitics is not pretty, but it is real. The letdown, the failure, the apocalypse-that-was-not finally arrived, and we are too late.

Still, the United States of America continues to follow the advice of “the best and the brightest,” testing the imperial waters, not quite ready to commit out loud to empire but completely unwilling to abandon it. Stuck in between, contemporary geopolitics—as curated by the United States—is in a permanent beta phase. Neuro-torture, algorithmic warfare, drone strikes, and cybernetic nation-building are not means or ends but rather are tests. Can a polis be engineered? Can the human operating system be reformatted? Can violence be modulated until legally invisible while all the more lethal? Each incursion, each new actor or actant, and new terrains from brains to transatlantic cables—all find themselves part of a grand experiment to see if a benign or at least sustainable empire is possible. There is no seeming regard for the fact that each experiment directly competes with Thomas Jefferson’s democratic experiment. One wonders if freedom can even exist anywhere other than temporarily on the fringe of some neglected order. Is this some metaphysical condition of freedom, or is the world so supersaturated with martial orders that the ragged edges between imperial orders are all that we have left? It feels like freedom’s remains persist only in the ruins of everything else. No space is left that can be truly indifferent to the law, security, or economy. Such is the new life of a human in debt. The social contract has been refinanced as what is owed and nothing more: politics without equity. Inequity without equality.

What about the impending collapse of the post–World War II order, the self-destruction of the United States, the rise of China and a new world order? If humanity lasts long enough for China to put its stamp on the human apocalypse, I will write a new introduction. Until then, we live in the death rattle of Pax Americana. While I think the totality of this claim is true, I do not want to rule out that many of us throughout the world still make lives otherwise. Many of us even thrive in spite of it all. And yet, no form of life can be made that escapes the fact that everything can come to a sudden and arbitrary end thanks to the whim of an American drone operator, nuclear catastrophe, or macroeconomic manipulation like sanctions. There are other ways to die and other organized forms of killing outside the control of the United States; however, no other single apparatus can make everyone or anyone die irrespective of citizenship or geographic location. For me, this is the most inescapable philosophical provocation of our moment in time.

The haphazard and seemingly limitless nature of U.S. violence means that even the core principles of the great political realist concepts like order and national interest are being displaced by subterranean violence entrepreneurs that populate transversal battlefields, security corridors, and border zones. Mercenaries, drug lords, chief executive officers, presidents, and sports commissioners are more alike than ever. Doomsayers like Paul Virilio, Lewis Mumford, and Martin Heidegger foretold a kind of terminal and self-annihilating velocity for geopolitics’ technological saturation, but even their lack of imagination appears optimistic. American geopolitics does not know totality or finality; it bleeds, mutates, and reforms. Furthermore, the peril of biopolitics seems now almost romantic. To make life live? Perchance to dream. The care and concern for life’s productivity is increasingly subsumed by plasticity—forming and reforming without regard to the telos of productivity, division, or normative order.

There are, of course, still orders in our geoplastic age, but they are almost unrecognizable as such. When so many citizens and states are directly invested in sabotaging publicly stated strategic ends, then concepts like national interest seem equally quaint. We are witnessing creative and horrifying experiments in the affirmative production of dying, which also deprive those targeted and in some cases whole populations from the relief of death. To follow Rucker, I want to try to see the world for what it is. We can only say that tragedy is no longer a genre of geopolitics. Tragedy redeems. The occluded character of contemporary geopolitics shoehorned into experience produces the feeling that there is no relief, no reason, no victory, no defeats, and no exit within the confines of national security’s constricted world. This is not tragedy: it is horror. We live in an age of horror that, like the victims of gore movies who never quite die so that they can be tortured more, furthers our practice of collective violence and goes on for decades as a kind of sustainable warfare.

#### The aff’s managerial concerns over space is techno-nationalism – liberal governance over space as a “commons” is the exclusive domain of space-faring nations

Stroikos ‘16

[Dimitrios, University of York. 2016. “China, India in Space and the Orbit of International Society: Power, Status, and Order on the High Frontier.”] Pat

Moreover, it is necessary to briefly say something about how techno-nationalism as a primary institution interacts with some of the other institutions of international space society. First, in many ways, techno-nationalism is complimentary to sovereign statehood because sovereignty in space is largely embedded in cosmopolitan and solidarist conceptions. This is partly why highly visible space projects define spacefaring hierarchies. Second, and consequently, techno-nationalism is also closely linked to great power status and great power management in the sense that different space capabilities also confer different levels of status and responsibilities in the management of international order in space. Likewise, in relation to diplomacy, highly visible techno-nationalist space feats can also offer a seat at the table of diplomatic initiatives and negotiations. Seen in this light, ‘high-visibility’ projects, such as space programmes are part of ‘recognition games’, which states play in order to acquire the status of a great power (Suzuki, 2008). As Cunningham (2009: 74) notes, ‘to be a superpower, one must be a “spacefaring” nation’. The Space Market Arguably, the economic factor has been one of the most neglected issues in the English School literature. Discussing some of the shortcomings of Bull’s work, Miller (1990: 74) pointed out in 1990, ‘a basic criticism of Bull’s account of international society’ is ‘that it does not include a strong economic component’ dealing with rules regarding trade, navigation, and investment and the common interests that permeate the sphere of economic activities. Since then, some important work has been done to bring together the economic sector and the English School, especially in the context of globalisation (Buzan, 2004; Buzan, 2005; Hurrell, 2007: 194-215). However, the question of how to consider the economic sector within the English School remains rather underdeveloped. According to Buzan, one response is to treat capitalism as a master institution, but he prefers the use of the market as a more neutral term, which has the additional merit of encompassing other practices, such as trade (Buzan, 2004: 193-4, Buzan, 2014a: 136). Consequently, given the growing globalisation and commercialisation of space activities (OECD, 2014: 9-10), there are good reasons for considering the space market as an emerging primary institution of international space society. Significantly, in some ways, since the advent of the Space Age, the space market has followed a parallel trajectory to the market as a distinctive institution at the global level. In particular, although the market was a key primary institution of the Western global international society during much of the Cold War, it has emerged as a sort of a global institution in the post-Cold War era (Buzan, 2014a: 138). Likewise, the space market was initially confined to American-led space activities, beginning as a US government initiative with the Communications Satellite Act in 1962, which led to the creation of the International Telecommunications Satellite Consortium (Intelsat) in 1964 (Moltz, 2014: 94). However, during the early Cold War, commercial activities were largely limited to the field of satellite communications and even commercial transatlantic cooperation in space was determined to a large extent by political and strategic factors and technology transfer considerations (Krige, 2013b). Equally, the idea of the commercialisation of space remained contested not the least because of the opposition of the Soviet Union and communist China to the market in general. This began to change only in the 1980s, when a number of space players emerged, including Europe and Japan, that challenged the US leadership in the fields of satellite manufacturing, launching capability, and other commercial space services. It was also during this period that the Soviet Union and China became less reluctant to get involved with commercial space activities (Krige, 2013a: 16-7). But it was after the end of the Cold War that the globalisation and commercialisation of space activities gradually led to the emergence of a global space market, which points to its inclusion as a primary institution of the international space society. According to a recent report by the Space Foundation (2015: 2), the global space economy grew up by 9 percent in 2014, totalling $330 billion, with commercial space activities accounting for the 76 percent of the global space economy and direct-to-home television services accounting for more than three-quarters of the commercial space sector. Even in the launch field, which has been traditionally reserved to the state largely due to national security and cost considerations, US small private companies have emerged like Space Exploration Technologies Corporation, known as SpaceX, and XCOR Aerospace. As Newlove-Eriksson and Eriksson (2013) argue, the globalisation of space activities has been underpinned by the growing importance of private authority and transnational Public-Private Partnerships (PPPs) and the blurred distinction between the military and civilian uses of space. Therefore, it makes sense to think of the space market as an institution of international space society. Yet, a number of points are worth noting here as they help to highlight the possibilities and limits of this move. First, despite all the attention paid to the privatisation of space travel promoted by space entrepreneurs of the likes of Elon Musk (SpaceX), Jeff Bezos (Blue Origin), and Richard Branson (Virgin Galactic), the privatisation of space should not be overstated. Not only does the degree of privatisation vary across space services and products (Moltz, 2014: 102-12), but governments also remain central actors in the space industry as key sources of initial investment and as customers for several space products and services (Brennan and Vecchi, 2011: 18, OECD, 2014: 17). Second, while it is clear that the argument over whether to have the market or not ended with the collapse of the Soviet Union, the tension between economic nationalism and economic liberalism is far from over, as there are not many states fully open to the forces of the global economy and many states support a form of capitalism that is embedded in economic nationalism. This points to the contested nature of the market as a primary institution in the sense that for many states the challenge of how to relate to the global market and make it more effective remains (Buzan, 2014a: 138). As far as international space society is concerned, it is necessary to note that the contested nature of the space market as an institution is reflected in the continuing dialectics between techno-nationalism and techno-globalism. It is commonplace among scholars to argue that Japan and China are two key examples of states that privilege a techno-nationalist approach to technology and innovation, including space technology. But even the United States has not been immune to techno-nationalist impulses. As Weiss (2014) shows, the enduring lead in high technology that the United States still enjoys is largely explained by the creation of not a liberal, but a hybrid political economy, whereby the national security state is interwoven with the commercial sector. NASA, of course, has been a key institution of the national security state since the beginning of the Space Age. But this has also been manifested in its recent efforts to catalyse the development of a commercial space industry through inviting competitive innovation (Weiss, 2014: 119-20, 27-8). This leads to the third point to make about how to understand the relationship between techno-nationalism and the space market. Because of the enduring influence of the former, it is tempting to see techno-nationalism as containing the space market (at least for the time being). Clearly, at one level, the space market can be understood as complementary to techno-nationalism in the ever-globalising international space society. Yet, at another level, the space market as a solidarist institution is staged as opposed to techno-nationalism. This tension is compounded by the fact that, in many ways, techno-nationalism occupies the crucial place of national sovereignty and territoriality in the sector of space considering that sovereignty in international space society is largely understood in cosmopolitan terms. Fourth, in discussing the market as a primary institution, Beeson and Breslin (2014) suggest that it makes more sense to treat the ‘developmental state’ and ‘regional production structures’ as primary institutions in East Asia rather than focusing on the market. This is an important consideration that serves to highlight how the global political economy is underpinned by significant regional derivations. Following from this, although it is apparent that the space market is a key feature of the social structure of international space society, it is possible to say that there are significant regional derivations. Perhaps the best expression of this is the Chinese and Indian variants of postcolonial techno-nationalism that still shape how the two rising Asian space powers relate to the space market. In light of the above, for now, it seems that there is some sort of hierarchy between techno-nationalism and the space market with the former subsuming the latter, especially with regards to space programmes in a postcolonial context. Certainly, the integration of China and India into the global space economy has accelerated over the last decades, but, as we shall see, techno-nationalism is still prominent in the ways in which the two Asian space powers approach space technology. Moreover, the space market remains contested as an emerging institution due to the ambiguity embedded in space law regarding space activities carried on by private actors. This process is further complicated by the inherent dual-use nature of space technology and the blurring of the distinction between the private and public realms (Newlove-Eriksson and Eriksson 2013). Environmental Stewardship There is now a burgeoning literature that deals with the relationship between international society and global environmentalism and assesses the extent to which environmental stewardship can be seen as a nascent institution of international society. Recent efforts to find ways to mitigate space debris as well as to create a normative framework for the sustainability of space are illustrative of how environmental stewardship is gradually becoming an institution in space. For example, in 2007, COPUOS adopted the ‘Space Debris Mitigation Guidelines’, which were wrought by the international Inter-Agency Debris Coordination Committee (IADC), consisting of experts from thirteen space agencies (United Nations Office for Outer Space Affairs, 2010). Moreover, as discussed earlier, in 2010, COPUOS formed the Working Group on the Long-term Sustainability of Outer Space Activities. Notably, the European Union proposal for a Code of Conduct for Outer Space also includes provisions on space debris control and mitigation (Council of the European Union, 2008: 9; Dickow, 2009: 159). Thus, there are grounds for considering environmental stewardship as an emerging institution of international space society. Indeed, the growing number of governments, private firms, and non-state actors that emphasise the importance of the sustainable utilisation of space suggests that space sustainability has emerged as a key norm. However, what should be noted is that these developments reflect a more pragmatic approach to maintain the space environment sustainable for the effective use of space rather than an expression of cosmopolitan values. Consequently, in the subsequent chapters, rather than examining in detail the engagement of China and India with environmental stewardship as a nascent institution in space, the focus will be on the emerging norm of space sustainability as a key great power responsibility in managing international space order and the implications of this development for China and India as aspiring great powers. Concluding Remarks Although it is clear that there are a number of ways of understanding the international politics of space, it may be worth going beyond standard theoretical approaches to understand how order is maintained in space. Drawing on key English School concepts, this chapter suggests that it is possible to conceptualise space not merely as a system, but also as an international society with a distinct social structure. This exercise of concept development is important both analytically and hermeneutically, given the notion of an exclusive club of space-faring countries. The chapter developed this argument further by highlighting how the nature of outer space as a distinctive sectoral interstate society is manifested in the ways in which its primary institutions are differentiated from such institutions at the global level (space war, space law, cosmopolitan sovereignty, space diplomacy, balance of power, great power management, techno-nationalism, space market, and environmental stewardship) in a historical and comparative context. In doing so, the chapter helps to highlight the constitutive impact of these institutions on the norms that shape the behaviour of the space-faring states.

#### Voting negative adopts failed IR for a healthy dose of pessimism – at the end of the world, all we can do is hope to be buried alive together.

Grove ‘19

[Jarius, PoliSci at the University of Hawai’i. 2019. “Savage Ecology: War and Geopolitics in the Anthropocene.”] pat – ask me for the PDF!

Failed ir affirms the power of this kind of negative thinking as an alternative to the endless rehearsing of moralizing insights and strategic foresight. The negative is not “against” or reacting to something. Rather, it is the affirmation of a freedom beyond the limits of life and death. That is, it is making a life by continuing to think about the world, even if that thinking is not recuperative, and even if nothing we think can save us. In the face of it all, one celebrates useless thinking, useless scholarship, and useless forms of life at the very moment we are told to throw them all under the bus in the name of survival at all costs. This is a logic referred to lately as hope and it is as cruel as it is anxiety inducing. Hope is a form of extortion. We are told that it is our obligation to bear the weight of making things better while being chided that the failure of our efforts is the result of not believing in the possibility of real change. In such an environment, pessimism is often treated as a form of treason, as if only neoliberals and moral degenerates give up—or so goes the op-ed’s insisting upon the renewed possibility of redemption.

In response to these exhortations, pessimism offers a historical atheism, both methodologically and morally. The universe does not bend toward justice. Sometimes the universe bends toward the indifference of gravity wells and black holes. Affirming negativity, inspired by Achille Mbembe, is grounds for freedom, even if that freedom or relief is only fleeting and always insecure. I am not arrogant enough to think a book can attain freedom of this sort, but this book is inspired by refusals of critique as redemption in favor of useless critique and critique for its own sake.

That the pursuit of knowledge without immediate application is so thoroughly useless, even profane, is a diagnosis of our current moment. The neoliberal assault on the university is evidence of this condition, as is the current pitch of American politics. Our indifference as intellectuals to maximizing value has not gone unnoticed. We are still dangerous, worthy of vilification, of attack, sabotage, and derision because we fail so decadently. We are parasites according to Scott Walker, Donald Trump, and the rest. So be it. We are and shall remain irascible irritants to a worldwide assault on thinking that is well underway and facing few obstacles in other jurisdictions.

What would failed scholarship do? Learn to die, learn to live, learn to listen, learn to be together, and learn to be generous. These virtues are useless in that they do not prevent or manage things. They do not translate into learning objectives or metrics. Virtues of this order are selfsame, nontransferable experiences. They are meaningful but not useful. These are luxurious virtues. Like grieving or joy, they are ends unto themselves. But how will these ideas seek extramural grants, contribute to an outcomes-based education system, or become a policy recommendation? They will not, and that is part of their virtue.

Even if there is no straight line to where we are and where we ought to be, I think we should get over the idea that somehow the U.S. project of liberal empire is conflicted, or “more right than it is wrong,” or pragmatically preferable to the alternatives. I hope this book can contribute to the urgent necessity to get out of the way by reveling in the catastrophic failure that should inspire humility but instead seems to embolden too many to seek global control yet again. Demolition may be an affirmative act if it means insurgents and others can be better heard. And yet this may fail too. If we can accomplish nothing at all, we can at least, as Ta-Nehisi Coates and other pessimists have said, refuse to suborn the lie of America any longer. Telling the truth, even if it cannot change the outcome of history, is a certain kind of solace. In Coates’s words, there is a kind of rapture “when you can no longer be lied to, when you have rejected the dream.” Saying the truth out loud brings with it the relief that we are not crazy. Things really are as bad as we think.

If there are those of us who want to break from this one-hundred-year-old race to be the next Henry Kissinger, then why do we continue to seek respect in the form of recognizable standards of excellence? I am not sure where the answer finally lies, but I do know that professionalization will not save us. To appear as normal and recognizably rigorous will not be enough to stave off the neoliberal drive to monetize scholarship, or to demand of us strategically useful insights. The least we can do in the face of such a battle is to find comfort in meaningful ideas and the friendships they build rather than try to perform for those we know are the problem. Some will ask, who is this “we” or is that “they”—where is your evidence? More will know exactly what I am talking about.

The virtues I seek are oriented toward an academy of refuge, a place we can still live, no matter how dire the conditions of the university and the classroom. It is not the think tank, boardroom, or command center. We are, those of us who wish to be included, the last of the philosophers, the last of the lovers of knowledge, the deviants who should revel in what Harney and Moten have called the undercommons.

In one of his final lectures, Bataille speaks of the remnants of a different human species, something not quite so doomed, something that wasted its newly discovered consciousness and tool-being on the art that still marks the walls of prehistoric caves. This lingering minor or vestigial heritage is philosophy’s beginning. Philosophy survives war, atrocity, famine, and crusades. Thinking matters in a very unusual way. Thinking is not power or emancipation. Thinking matters for a sense of belonging to the world, and for believing in the fecundity of the world despite evidence to the contrary.

How do you get all this from pessimism, from failure? Because willing failure is a temptation, a lure to think otherwise, to think dangerous thoughts. Pessimism is a threat to indifferentism and nihilism in the sense of the phenomenon of Donald Trump. Pessimism is a provocation and an enemy of skepticism, particularly of the metaphysical variety. It is not redemption from these afflictions, but in pessimism there is solace in the real. To put it another way, to study the world as it is means to care for it.

The exhortation that our care or interest should be contingent on how useful the world is and how much of it conforms to our designs is as much opposed to care as it is to empiricism. We can study airports, poetry, endurance races, borders, bombs, plastic, and warfare, and find them all in the world. To consider the depth of their existence can be an invitation to the world rather than a prelude to another policy report. One cannot make a successful political career out of such pursuits, but you might be able to make a life out of it, a life worth repeating even if nothing else happens.

At the end of Jack Halberstam’s The Queer Art of Failure, we are presented with the Fantastic Mr. Fox’s toast as an exemple of something meaningful in these dark times of ours.

They say all foxes are slightly allergic to linoleum, but it’s cool to the paw—try it. They say my tail needs to be dry cleaned twice a month, but now it’s fully detachable—see? They say our tree may never grow back, but one day, something will. Yes, these crackles are made of synthetic goose and these giblets come from artificial squab and even these apples look fake—but at least they’ve got stars on them. I guess my point is, we’ll eat tonight, and we’ll eat together. And even in this not particularly flattering light, you are without a doubt the five and a half most wonderful wild animals I’ve ever met in my life. So let’s raise our boxes—to our survival.

Halberstam says of this queer moment:

Not quite a credo, something short of a toast, a little less than a speech, but Mr. Fox gives here one of the best and most moving—both emotionally and in stop-motion terms—addresses in the history of cinema. Unlike Coraline, where survival is predicated upon a rejection of the theatrical, the queer, and the improvised, and like Where the Wild Things Are, where the disappointment of deliverance must be leavened with the pragmatism of possibility, Fantastic Mr. Fox is a queerly animated classic in that it teaches us, as Finding Nemo, Chicken Run, and so many other revolting animations before it, to believe in detachable tails, fake apples, eating together, adapting to the lighting, risk, sissy sons, and the sheer importance of survival for all those wild souls that the farmers, the teachers, the preachers, and the politicians would like to bury alive.

Although not as much fun as Halberstam’s monument to low theory, Savage Ecology is for all the other wild animals out there studying global politics. May we be buried alive together.

#### The Role of the Judge is to adopt martial empiricism.

Bousquet et al ‘20

[Antoine Bousquet, University of London, Jairus Grove, University of Hawai‘i at Manoa, and Nisha Shah University of Ottawa. 2020. “Becoming war: Towards a martial empiricism,” <https://journals.sagepub.com/doi/full/10.1177/0967010619895660>] pat

Haunting the formations and deformations of global life, war confronts us as an abyss in the face of which cherished interpretative frameworks perilously buckle and warp. Indeed, Tarak Barkawi and Shane Brighton (2011: 129) accurately identify a ‘conceptual black hole surrounding the notion of war’ that has insistently gnawed at the study of the phenomenon. Locating the source of this lacuna in the absence of an ‘ontology of war’, they propose to ground one in ‘fighting’ (Barkawi and Brighton, 2011: 136). Although we concur on the diagnosis, we take issue with the suggested remedy. War does not obey any neat philosophical division between epistemology and ontology. For us, the resolute elusiveness of any definitive understanding of war is inherent in that very object. Every attempt to conceptually shackle war is undone by the creative advance of its new modes, residences and intensities. This speaks against the value of ontology per se less than it calls for a strange, paradoxical and provisional ontology that is consonant with the confounding mutability of war. Such an ontology, suspended between infinity and totality, being and nothingness, the sheer fecundity and utter catastrophe of war, may not be too uncanny for its object. In fairness, Barkawi and Brighton (2011: 133) gesture towards this in acknowledging ‘war’s recalcitrance as an object of knowledge’ and allowing for war to unmake any truth. Yet they seem unwilling to embrace the full force of their own insight, which Marc von Boemcken (2016: 239) ultimately declares: ‘even the statement that “war is fighting” may well be eventually undone by war. In a very fundamental manner, war escapes human intelligibility.’

This special issue on ‘Becoming War’ grapples with war as obdurate mystery. In its recurring persistence yet constant reinvention, its paradoxical ordering of life for the generation of death, or its stubborn affront to the better world we all purport to want, war never ceases to perplex us. Our world is one shot through by war, manifest in the nation-states we inhabit, the ecologies of technics that bind us to one another, and the very thoughts ricocheting through our communities of sense. And yet we still do not know war.

Rather than endeavour yet again to ‘say something fundamental about what war is’ (Barkawi and Brighton, 2011: 134, emphasis in original), we choose to explore how war becomes. This is not to say that we deny any durability or regularities in the phenomenon of war over time. Simply that, as Alfred Whitehead (1978: 35) puts it, ‘there is a becoming of continuity, but no continuity of becoming’. Accordingly, we seek to trace the lines of becoming that congeal into what comes to count as war, even as it continually frays at the edges and insolently defies habituated frames of reference. We do not, therefore, offer a theory of continuity, a formula for what all lines of becoming war might have in common, but instead sketch a style of investigation that encompasses both the enduring cohesion and the radical dispersion of war. We call this endeavour ‘martial empiricism’ to renounce attempts to devise a definitive theory of war. Instead, we favour an open-ended conceptual arsenal for following the trail of war wherever it leads us, as opposed to camping in the places where we already expect to find it.

Although we do not aim to circumscribe the remit of its investigations, martial empiricism is nonetheless inherently situational, spurred by the impulse to grasp the present martial condition we inhabit in all its calamity and promise. We would be far from the first to point out the growing inadequacy of the conceptual frameworks of war inherited from the Westphalian historical interval. Yet we still collectively flounder in the face of a combined and uneven landscape of armed conflict populated by metastasizing war machines encompassing overseas contingency operations, fullspectrum hybrid theatres, ethno-supremacist militias, crowd-sourced paramilitaries, Incel shooters and narco-state assassins. The game is definitely up when a task force led by the former head of United States Central Command can write that ‘basic categories such as “battlefield,” “combatant” and “hostilities” no longer have clear or stable meaning’ (Abizaid and Brooks, 2014: 35). Confronted with this reality and the persistent bewilderment it induces, we contend that a certain epistemic humility is in order. Rather than professing to know where war begins and ends, martial empiricism starts in the middle, with only the barest tentative intuitions necessary to explore the logistics, operations and embodiments that engender armed conflict as an unremitting condition of global life.

## Case

### 1NC – Util

#### Utilitarian calculus doesn’t account for the geopolitical structure of aggregate conceptions of the good – that makes it incapable of grappling with the causes of apocalypse.

Grove ‘19

[Jarius, PoliSci at the University of Hawai’i. 2019. “Savage Ecology: War and Geopolitics in the Anthropocene.”] pat – ask me for the PDF!

Rather than see these two career trajectories as opposed, I think Crutzen’s thinking displays a continuous concern for the Northern Hemisphere and a particular cartography, rather than a geography, of human survival. Crutzen, as well as the concept of the Anthropocene itself, cannot escape preceding geopolitical conceptions of the Earth. Crutzen and others who rush so quickly to the necessity to transition efforts from climate abatement to climate modification are unsurprisingly not moved by claims that artificial cooling will likely cause droughts and famines in the tropics and subtropical zones of the global south; nor are they moved by how such plans may accelerate ocean acidification. The utilitarian risk calculus that favors the greatest good for the greatest number has no geographical or historical sensibility of how unequally aggregate conceptions of the good are distributed around the planet.

Global thinking, even in its scientific and seemingly universalist claims to an atmosphere that “we” all share, belies the geopolitics that enlivens scientific concern, as well as the global public policy agenda of geoengineering that seeks to act on behalf of it. Saving humanity as an aggregate, whether from nuclear war, Styrofoam, or climate turbulence, has never meant an egalitarian distribution of survivors and sacrifices. Instead, our new cosmopolitanism—the global environment—follows almost exactly the drawn lines, that is, the cartography or racialized and selective solidarities and zones of indifference that characterize economic development, the selective application of combat, and, before that, the zones of settlement and colonization. More than a result of contemporary white supremacy or lingering white privilege, the territorialization of who lives and who dies, who matters and who must be left behind for the sake of humanity, represents a five-hundred-year geopolitical tradition of conquest, colonization, extraction, and the martial forms of life that made them all possible through war and through more subtle and languid forms of organized killing.

I am not suggesting that Crutzen and others are part of a vast conspiracy; rather, I want to outline how climate change, species loss, slavery, the elimination of native peoples, and the globalization of extractive capitalism are all part of the same global ordering. That is, all of these crises are geopolitical. The particular geopolitical arrangement of what others have called the longue durée, and what I am calling the Eurocene, is geologically significant but is not universally part of “human activity” despite the false syllogism at the heart of popular ecological thinking that a global threat to humanity must be shared in cause and crisis by all of humanity.

Departing from Sloterdijk, I am hesitant to so easily locate modernity or explication as the root or cause of the global catastrophe. No single strategy, war, act of colonization, technological breakthrough, or worldview fully explains the apocalypse before us. However, there is something like what Gilles Deleuze and Félix Guattari call a refrain that holds the vast assemblage together, a geopolitical melody hummed along with the global expansion of a form of life characterized by homogenization rather than diversification. Accordingly, if we are to make some sense of such a vast world that is, even for Crutzen and Birks, “quite complex and difficult to model,” I think we must consider the particular refrain of geopolitics that is capable of, by scientific as well as more humbly embodied standards, destroying worlds along with the world. To eschew geopolitics simply because, as a refrain, it is too big, too grand, or too universal would ignore the conditions of possibility for nuclear weapons, power politics, and carbon-based globalization, and would greatly impoverish the explanatory capability of even the best climate models. So maybe it is not so strange that Crutzen and others’ attention to the nuclear threat of great powers has all but disappeared despite the fact that Russia and the United States still possess thousands of nuclear weapons, and as of late have been all too vocal about using them. Instead, the Anthropocene, as envisioned by Crutzen as a universal concern, requires with it a depoliticization of the causes of that concern.

### 1NC – Warming

#### Lunar observation fails and interplanetary space observation solves

Siegel 18. Ethan Siegel (Siegel is a Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. He has won numerous awards for science writing since 2008), 10-25-2018, "Why Don't We Put A Space Telescope On The Moon?," Forbes, https://www.forbes.com/sites/startswithabang/2018/10/25/why-dont-we-put-a-space-telescope-on-the-moon/?sh=78be159a777f sean!

Yet observatories like Hubble, Chandra, Fermi, Spitzer and more have showcased how remarkably effective a space telescope can be. The views and data they've returned to Earth have taught us more than any similar observatory could have revealed from the ground. So why not put a telescope on the Moon, then? Believe it or not, it's a terrible idea in all ways except one. Here's why. The transmittance or opacity of the electromagnetic spectrum through the atmosphere. Note all the... [+] absorption features in gamma rays, X-rays, and the infrared, which is why they are best viewed from space. Over many wavelengths, such as in the radio, the ground is just as good, while others are simply impossible. The transmittance or opacity of the electromagnetic spectrum through the atmosphere. Note all the... [+] NASA The Moon, at first glance, seems like the ideal location for a telescope. There's practically no atmosphere at all, which removes all the light pollution concerns. It's far away from the Earth, which should greatly reduce the interference from any signals that humans produce. The ultra-long nights mean that you can observe the same target, continuously, for as long as 14 days at a time with no interruptions. And because you have solid ground to brace yourself against, you don't need to rely on gyroscopes or reaction wheels for pointing. It sounds like a really good deal. But if you start thinking about the way the Moon orbits the Earth, with the entire Moon-Earth system orbiting the Sun, you might start to realize some of the problems that a setup like this would inevitably encounter. First, if you put your telescope on the Moon, which side do you pick: the near side or the far side? Either one has drawbacks. If you place your telescope on the near (Earth-facing) side of the Moon, you will always have a view of the Earth. This means you can send-and-receive signals, control your telescope, and download-upload data in nearly real-time, with only the light-travel-time of signals across space limiting you. But it also means that Earth-produced interference, like radio broadcast signals, will always be a problem you need to shield yourself from. On the other hand, if you're on the far side of the Moon, you shield yourself from everything coming from Earth quite effectively, but you also have no direct path for data transfer or signal transmittance. There would have to be an additional mechanism set up, like a lunar orbiter or a link to a transmitter/receiver on the near side, just to operate it. The near and far sides of the Moon, as reconstructed with imagery from NASA's Clementine mission. The near and far sides of the Moon, as reconstructed with imagery from NASA's Clementine mission. NASA / CLEMENTINE MISSION / LUNAR & PLANETARY INSTITUTE / USRA Either way, you're going to have a slew of problems to contend with that you wouldn't encounter simply from going into the lonely abyss of interplanetary space. The two biggest are: Moonquakes. You think the Moon's a big deal because it's responsible for Earth's tides? The tidal forces that the Earth exerts on the Moon are more than 20 times greater than the Moon's tidal forces on Earth, enough to cause the Moon to experience considerable moonquakes. Temperature extremes. Because of the Moon's tidal locking to Earth and its extremely slow rotation, it's bathed in sunlight constantly for 14 days at a time, followed by 14 days of total darkness. Daytime temperatures can reach over 200 °F (nearly 100 °C), while night brings cold down to -280 °F (-173 °C). While a space-based telescope can control its temperature through either active or passive cooling (or a combination of both), a telescope must cool down below the temperature of the wavelengths it's trying to observe, or noise will swamp your intended signal. This would be a tremendous drawback for ultraviolet, optical, or infrared astronomy, all of which would have severe problems on the Moon for anything other than the goal of Earth (or Sun) observing. Engineering a telescope that can survive those temperature extremes and still function optimally is an extraordinary challenge. It's no wonder that the only lunar-based telescope we have, at present, is a UV-telescope on the Moon's near side, at wavelengths where the Earth's atmosphere absorbs almost all of the light. For most applications, going to space is going to be a superior option to going to the Moon. The lunar surface, in terms of temperature extremes and difficulties communicating with Earth, offers more drawbacks than having a surface to push against/build on offers.

#### They have two moon key warrants. Their evidence has zero highlighted warrants for either of these so default to 1NC explanation:

#### First, angular rotation – we have that tech already

Siegel 18-2. Ethan Siegel (Siegel is a Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. He has won numerous awards for science writing since 2008), 10-16-2018, "This Is How Hubble Will Use Its Remaining Gyroscopes To Maneuver In Space," Forbes, https://www.forbes.com/sites/startswithabang/2018/10/16/this-is-how-hubble-will-use-its-remaining-gyroscopes-to-maneuver-in-space/?sh=2427594b2ba8 sean!

In a space telescope, we don't have different components of our bodies to work with, but we do have different components of the telescope. And in the case of Hubble, we have an entire guidance system built on this principle. The reaction wheels allow it to change its orientation, and the fine-guidance sensor allows it to determine how to orient itself. According to NASA itself: To change angles, it uses Newton’s third law by spinning its wheels in the opposite direction. It turns at about the speed of a minute hand on a clock, taking 15 minutes to turn 90 degrees. But keeping the telescope stable needs a key ingredient: gyroscopes. Without those gyroscopes, tiny external forces would cause Hubble's orientation to drift over time, and would make long-exposure images impossible. But with them, we can keep the telescope stable.

#### Second is gas analysis – we have that too:

NASA 18. NASA, 7-11-2018, "NASA’s Webb Telescope to Inspect Atmospheres of Gas Giant Exoplanets," https://www.nasa.gov/feature/goddard/2018/nasa-s-webb-space-telescope-to-inspect-atmospheres-of-gas-giant-exoplanets/ sean!

When a planet crosses in front of, or transits, its host star, the star’s light is filtered through the planet’s atmosphere. Molecules within the atmosphere absorb certain wavelengths, or colors, of light. By splitting the star’s light into a rainbow spectrum, astronomers can detect those sections of missing light and determine what molecules are in the planet’s atmosphere. For these observations, the project team selected WASP-79b, a Jupiter-sized planet located about 780 light-years from Earth. The team expects to detect and measure the abundances of water, carbon monoxide, and carbon dioxide in WASP-79b. Webb also might detect new molecules not yet seen in exoplanet atmospheres.

#### Your authors concluded a year later that lunar observation is infeasible

Guo et al 18. Huadong Guo, Hanlin Ye, Changyong Duo, Jing Huang (All authors are researchers at the Key Laboratory of Digital Earth Science, Institute of Remote Sensing and Digital Earth), 2-28-2018, "Error analysis of exterior orientation elements on geolocation for a Moon-based Earth observation optical sensor," Taylor & Francis, https://www.tandfonline.com/doi/full/10.1080/17538947.2018.1513088 sean!

For a Moon-based optical sensor, the effect of the errors of exterior orientation elements has some characteristics. First, since the Earth–Moon distance is very large, a small error caused by the exterior orientation elements would lead to large geolocation errors and the image distort. Actually, one-second position error in both latitudinal and longitudinal direction can lead to geolocation error on kilometres level (Figure 7). One-second angular error of a Moon-based sensor will also result in thousands of metres error (Figures 8 and 9), while 0.1° angular error of an optical sensor onboard space-borne platform can only cause hundreds of metres geolocation error (Dou et al. 2014). Second, with the orbit and attitude of the Moon changing, the observation geometry is also different. The geolocation error varies with the changing Earth–Moon distance and angle (Figures 11 and 12). It’s worth noting that, the sensors can be equipped in the near-side of the Moon. The different locations on the lunar surface, the different look vector that the Moon-based optical sensor would have (Ye, Guo, and Liu 2017a). Similar to the look vector, equipping sensors at different positions of the Moon will also lead to different geolocation error (Figures 5 and 6). Third, some unique factors can lead to the error of the exterior orientation elements, such as lunar position and lunar libration (Folkner et al. 2014; Yang et al. 2017). A very small angular error (0.1″) of lunar libration can result in significant geolocation error (Figure 15). With the increasing concern of the lunar exploration, more and more sensors have been equipped on the lunar orbit or on the surface of the Moon, such as Lunar-based Ultraviolet Telescope (LUT) and Moon-based Extreme Ultraviolet (EUV) imager (He et al. 2011; Wen et al. 2014). Some researchers studied the geolocation error. Qi presented the astrometric solution of LUT devised to solve the problem of accurate pointing and tracking of celestial objects (Qi et al. 2015). Yan analysed the observational data from EUV onboard Chang’E-3 mission (Yan et al. 2016). The effect of exterior orientation elements on geolocation here is different as from those studies. Since the observation target isn’t the same, when observing the Earth surface features, the EUV or LUT cannot offer the direct reference value for Moon-based optical sensors. According to the effect analysis of the exterior orientation elements, the results that we obtained can further give support to the study of the Moon-based Earth observation optical sensor from the perspective of the observation geometry and geolocation error. 5. Conclusions Geolocation error analysis, based on the observation geometry of the Moon-based platform and the Moon-based geometric image model, is proposed. We first performed a detailed image model applied to the Moon-based Earth observation. According to the model, a detailed explanation for the peculiarities of the observation geometry including the observation distance and the observation angle are shown. To analyse the geolocation error caused by the errors of the exterior orientation elements, we utilised some parameters such as RMSE and MAE to measure the offsets. Our analysis showed that equipping sensors at different positions of the Moon has different geolocation error under the condition of the same error of exterior orientation elements (Figure 6). The effect of the position errors showed the systematic feature in the image (Figure 7). The geolocation error will be larger when equipping sensors near the centre of the lunar disc under the condition of the same pointing error (Figures 6 and 7). We analysed the geolocation error variation during one orbital period and drew the conclusion that the geolocation error is not obviously influenced by the observation distance and Earth–Moon angle, especially in the mid-high latitude of the Moon. In addition, the spatial resolution magnitude associated with the geolocation error is investigated so as to give support to the image geometric correction and the spatial resolution determination. We find that, the image offsets have significant linear correlation with the increasing errors of exterior orientation elements. According to this regularity, a suitable spatial resolution can be evaluated from the perspective of error estimation. We also evaluated the error effects of the lunar position and lunar libration on geolocation and discussed the characteristics of the error effect of exterior orientation elements. Compared to the space-borne platform case, Moon-based Earth observations have larger distance and require higher pointing accuracy of the optical sensor. Besides, some unique factors need to be considered, such as lunar position and lunar libration. The effect of these errors cannot be neglected. Overall, these results and analysis reveal the pecularities of the error effect on geolocation for a Moon-based optical sensor. This will provide evidence for the study of the Moon-based optical sensors in the following.

#### AI prediction methods coming now and solve.

Joshi 19 “How AI Can And Will Predict Disasters” NAVEEN JOSHI [Naveen Joshi, columnist, is Founder and CEO of Allerin, which develops engineering and technology solutions focused on optimal customer experiences. Naveen works in AI, Big Data, IoT and Blockchain.] 3/15/2019 <https://www.forbes.com/sites/cognitiveworld/2019/03/15/how-ai-can-and-will-predict-disasters/?sh=57a309075be2> SM

How AI Can And Will Predict Disasters Recently, the regions around the Dead Sea in Jordan were flooded, causing the death of 21 children who were on a school trip, and injuring 35 more. Such disasters affect millions of people every year and cause property damage worth hundreds of billions. In 2017 alone, almost 335 natural disasters have affected more than 95.6 million people, and killed 9,697, costing around US $335 billion. But, the impact of these phenomena can be reduced if we were able to predict their occurrence. AI-powered systems can already predict the prices of stocks, which involve the analysis of numerous variables. Likewise, researchers are applying artificial intelligence to accurately predict natural disasters. By predicting the occurrence of natural disasters, we can save thousands of lives and take appropriate measures to reduce property damage. Using AI to predict natural disasters Artificial intelligence has been helping us in various applications such as customer service, trading and healthcare. And now, researchers have found that AI can be used to predict natural disasters. With enormous amounts of good quality datasets, AI can predict the occurrence of numerous natural disasters, which can be the difference between life and death for thousands of people. Some of the natural disasters that can be predicted by AI are: Earthquakes Researchers are collecting enormous amounts of seismic data for analysis using deep learning systems. Artificial intelligence can use the seismic data to analyze the magnitude and patterns of earthquakes. Such data can prove beneficial to predict the occurrence of earthquakes. For example, Google and Harvard are developing an AI system that can predict the aftershocks of an earthquake. Scientists have studied more than 131,000 earthquakes and aftershocks to build a neural network. The researchers tested the neural network on 30,000 events, and the system predicted the aftershock locations more precisely when compared to traditional methods. Similarly, multiple researchers are creating their own applications to predict earthquakes and aftershocks. In the future, we may be able to foresee earthquakes and authorities can start evacuation operations accordingly. Currently, Japan is using satellites to analyze images of the earth to predict natural disasters. AI-based systems look for changes in the images to predict the risk of disasters such as earthquakes and tsunamis. Moreover, these systems also monitor aging infrastructure. Artificial intelligence systems can detect deformations in structures, which can be used to reduce the damage caused by collapsing buildings and bridges, or subsiding roads. Floods Google is building an AI platform to predict floods in India and warn users via Google Maps and Google Search. The data for training the AI system is collected with the help of rainfall records and flood simulations. Similarly, researchers are developing AI-based systems that can learn from rainfall and climate records and tested with flood simulations, which can predict floods better than the traditional systems. Alternatively, AI can also be used to monitor urban flooding. Researchers at the University of Dundee in the United Kingdom are monitoring urban flooding by collecting crowd-sourced data with Twitter and other mobile apps. The data contains images and information about the location and situations in a locality, which is recognized by the AI. Such systems can be used to monitor and predict the damage done by floods along with other methods. Likewise, applications based on artificial intelligence and deep learning is useful for disaster management. Volcanic eruptions Researchers have always struggled with finding methods to effectively predict natural disasters such as volcanic eruptions. But now, scientists are training AI to recognize tiny ash particles from volcanoes. The shape of the ash particles can be used to identify the type of volcano. Such developments can help in predicting eruptions and creating volcanic hazard mitigation techniques. IBM is developing Watson that will predict volcanic eruptions using seismic sensors and geological data. IBM is aiming to forecast the locations and the intensity of eruptions with the help of Watson. Such applications can help to prevent the loss of life in areas surrounding active volcanoes.Hurricanes Every year hurricanes cost property damage worth millions of dollars. Hence, meteorological departments are looking for better techniques to predict natural disasters like hurricanes and cyclones, and track their path and intensity. With more effective prediction techniques, the concerned authorities can save more lives and reduce property damage. Recently, NASA and Development Seed tracked Hurricane Harvey using satellite images and machine learning. The method proved to be six times better than the usual techniques, as the hurricane can be tracked every hour instead of every six hours with the traditional methods. Therefore, the developments in technology are helping in monitoring hurricanes and foreseeing the path of hurricanes, which can assist in mitigation efforts.

#### Their missing data evidence is citing a study from 22 years ago which means we postdate

#### Dust destroys moon basing.

Niiler 21 Eric Niiler “The Next Big Challenge for Lunar Astronauts? Moon Dust” 08.19.2021 <https://www.wired.com/story/the-next-big-challenge-for-lunar-astronauts-moon-dust/> SM

AS NASA AND private space companies prepare to send equipment—and eventually astronauts—back to the moon, they are facing a nearly invisible threat to any future lunar outpost: tiny particles of dust. Ground-up lunar rock, known as regolith, clogs drills and other delicate instruments, and it's so sharp that it scratches space suits. Because the dust absorbs sunlight, it can also overheat sensitive electronics. Dust particles also pose a health risk. Even though Apollo-era astronauts only went outside during a few days on each mission, some reported burning eyes and stuffy nasal passages when they returned from moon walks and took off their dust-covered space suits inside the capsule. Images from the Apollo 17 mission, which focused on geology and featured seven-hour trips in the lunar rover, show astronaut Gene Cernan’s face covered in dust, like some outer space coal miner. During a technical briefing when he returned to Earth, Cernan told NASA officials that lunar dust was nothing to sneeze at. "I think dust is probably one of our greatest inhibitors to a nominal operation on the moon,” Cernan said. “I think we can overcome other physiological or physical or mechanical problems, except dust." The grit clogged the radiators that removed heat and carbon dioxide from space suits and wore a hole in the knee of Cernan’s outer space suit, according to Phil Abel, who researches moon dust as manager of the Tribology and Mechanical Components Branch at NASA’s Glenn Research Center. (Tribology is the study of wear and friction.) The Apollo 17 astronauts brought dust into the capsule, where it smelled like gunpowder and caused lunar module pilot Harrison Schmitt to have hay fever symptoms, according to a report from a NASA workshop on lunar dust in 2020. Here’s how one Apollo 12 astronaut described what happened when he returned to the lunar module after a walk on the moon: “The [module] was filthy dirty and had so much dust that when I took my helmet off, I was almost blinded. Junk immediately got into my eyes.” (The quote appears in a 2009 NASA report entitled “The Risk of Adverse Health Effects From Lunar Dust Exposure.”) Researchers at Stony Brook University exposed human lung and brain cells to lunar dust and found that it killed 90 percent of the cells, according to a study published in the journal GeoHealth in 2018. In fact, respiratory health is a top concern if and when humans return to the moon, according to Abel. “These particles get lodged down deep in your lungs, and that’s a long-term health risk,” Abel says. “There was some concern at the time that if we had needed to do more on the moon’s surface, some of the space suits would have started to leak at too high a rate. It’s something we have been working on to improve.”

#### Rood and Gibbons says adaptation is good, not that it solves warming

#### Their evidence concedes adaptation doesn’t solve – Sidwell reads yellow

1AC Sears (, N., 2021. Great Powers, Polarity, and Existential Threats to Humanity: An Analysis of the Distribution of the Forces of Total Destruction in International Security. [online] ResearchGate. Available at: <https://www.researchgate.net/publication/350500094> [Accessed 22 November 2021] Nathan Alexander Sears is a PhD Candidate in Political Science at The University of Toronto. Before beginning his PhD, he was a Professor of International Relations at the Universidad de Las Américas, Quito. His research focuses on international security and the existential threats to humanity posed by nuclear weapons, climate change, biotechnology, and artificial intelligence. His PhD dissertation is entitled, “International Politics in the Age of Existential Threats”)-re-cut rahulpenu

Climate Change Humanity faces existential risks from the large-scale destruction of Earth’s natural environment making the planet less hospitable for humankind (Wallace-Wells 2019). The decline of some of Earth’s natural systems may already exceed the “planetary boundaries” that represent a “safe operating space for humanity” (Rockstrom et al. 2009). Humanity has become one of the driving forces behind Earth’s climate system (Crutzen 2002). The major anthropogenic drivers of climate change are the burning of fossil fuels (e.g., coal, oil, and gas), combined with the degradation of Earth’s natural systems for absorbing carbon dioxide, such as deforestation for agriculture (e.g., livestock and monocultures) and resource extraction (e.g., mining and oil), and the warming of the oceans (Kump et al. 2003). While humanity has influenced Earth’s climate since at least the Industrial Revolution, the dramatic increase in greenhouse gas emissions since the mid-twentieth century—the “Great Acceleration” (Steffen et al. 2007; 2015; McNeill & Engelke 2016)— is responsible for contemporary climate change, which has reached approximately 1°C above preindustrial levels (IPCC 2018). Climate change could become an existential threat to humanity if the planet’s climate reaches a “Hothouse Earth” state (Ripple et al. 2020). What are the dangers? There are two mechanisms of climate change that threaten humankind. The direct threat is extreme heat. While human societies possesses some capacity for adaptation and resilience to climate change, the physiological response of humans to heat stress imposes physical limits—with a hard limit at roughly 35°C wet-bulb temperature (Sherwood et al. 2010). A rise in global average temperatures by 3–4°C would increase the risk of heat stress, while 7°C could render some regions uninhabitable, and 11–12°C would leave much of the planet too hot for human habitation (Sherwood et al. 2010). The indirect effects of climate change could include, inter alia, rising sea levels affecting coastal regions (e.g., Miami and Shanghai), or even swallowing entire countries (e.g., Bangladesh and the Maldives); extreme and unpredictable weather and natural disasters (e.g., hurricanes and forest fires); environmental pressures on water and food scarcity (e.g., droughts from less-dispersed rainfall, and lower wheat-yields at higher temperatures); the possible inception of new bacteria and viruses; and, of course, large-scale human migration (World Bank 2012; Wallace-Well 2019; Richards, Lupton & Allywood 2001). While it is difficult to determine the existential implications of extreme environmental conditions, there are historic precedents for the collapse of human societies under environmental pressures (Diamond 2005). Earth’s “big five” mass extinction events have been linked to dramatic shifts in Earth’s climate (Ward 2008; Payne & Clapham 2012; Kolbert 2014; Brannen 2017), and a Hothouse Earth climate would represent terra incognita for humanity. Thus, the assumption here is that a Hothouse Earth climate could pose an existential threat to the habitability of the planet for humanity (Steffen et al. 2018., 5). At what point could climate change cross the threshold of an existential threat to humankind? The complexity of Earth’s natural systems makes it extremely difficult to give a precise figure (Rockstrom et al. 2009; ). However, much of the concern about climate change is over the danger of crossing “tipping points,” whereby positive feedback loops in Earth’s climate system could lead to potentially irreversible and self-reinforcing “runaway” climate change. For example, the melting of Arctic “permafrost” could produce additional warming, as glacial retreat reduces the refractory effect of the ice and releases huge quantities of methane currently trapped beneath it. A recent study suggests that a “planetary threshold” could exist at global average temperature of 2°C above preindustrial levels (Steffen et al. 2018; also IPCC 2018). Therefore, the analysis here takes the 2°C rise in global average temperatures as representing the lower-boundary of an existential threat to humanity, with higher temperatures increasing the risk of runaway climate change leading to a Hothouse Earth. The Paris Agreement on Climate Change set the goal of limiting the increase in global average temperatures to “well below” 2°C and to pursue efforts to limit the increase to 1.5°C. If the Paris Agreement goals are met, then nations would likely keep climate change below the threshold of an existential threat to humanity. According to Climate Action Tracker (2020), however, current policies of states are expected to produce global average temperatures of 2.9°C above preindustrial levels by 2100 (range between +2.1 and +3.9°C), while if states succeed in meeting their pledges and targets, global average temperatures are still projected to increase by 2.6°C (range between +2.1 and +3.3°C). Thus, while the Paris Agreements sets a goal 6 that would reduce the existential risk of climate change, the actual policies of states could easily cross the threshold that would constitute an existential threat to humanity (CAT 2020).

#### But we’ll line by line it:

#### The Antarctic positive feedback loop is locked in. That makes broader climate disruptions inevitable!!

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>).

#### No acidification impact – key studies they cite have major flaws, and species adaptation and ocean buffering prevent their impacts

Delingpole, 2016 (James, citing Patrick Moore, co-founder of Greenpeace and Howard Broman, marine scientist with 35 years of experience, “Ocean acidification: yet another wobbly pillar of climate alarmism”, The Spectator, 4/30/2016, http://www.spectator.co.uk/2016/04/ocean-acidification-yet-another-wobbly-pillar-of-climate-alarmism/)//JBS

No indeed. Ocean acidification is the terrifying threat whereby all that man-made CO2 we’ve been pumping into the atmosphere may react with the sea to form a sort of giant acid bath. First it will kill off all the calcified marine life, such as shellfish, corals and plankton. Then it will destroy all the species that depend on it — causing an almighty mass extinction which will wipe out the fishing industry and turn our oceans into a barren zone of death. **Or so runs the scaremongering theory**. The reality may be rather more prosaic. Ocean acidification — the evidence increasingly suggests — is a trivial, misleadingly named, and **not remotely worrying phenomenon** which has been hyped up beyond all measure for political, ideological and financial reasons. Some of us have suspected this for some time. According to Patrick Moore, a co-founder of Greenpeace, long one of ocean acidification theory’s fiercest critics, the term is ‘just short of propaganda’. The pH of the world’s oceans ranges between 7.5 and 8.3 — well above the acid zone (which starts below ‘neutral’ pH7) — so more correctly it should be stated that the seas are becoming slightly less alkaline. ‘Acid’ was chosen, Moore believes, because it has ‘strong negative connotations for most people’. Matt Ridley, too, has been scathing on the topic. In The Rational Optimist he wrote, ‘Ocean acidification looks suspiciously like a back-up plan by the environmental pressure groups in case the climate fails to warm.’ I agree. That’s why I like to call it the alarmists’ Siegfried Line — their last redoubt should it prove, as looks increasingly to be the case, that the man-made global warming theory is a busted flush. To the alarmist camp, of course, this is yet further evidence that ‘deniers’ are heartless, anti-scientific conspiracy theorists who don’t read peer-reviewed papers and couldn’t give a toss if the world’s marine life is dissolved in a pool of acid due to man’s selfishness and greed. Unfortunately for the doom-mongers, we sceptics have just received some heavy fire-support from a neutral authority. Howard Browman, a marine scientist for 35 years, has published a review in the ICES Journal of Marine Science of all the papers published on the subject. **His verdict could hardly be more damning**. The **methodology used by the studies was often flawed**; contrary studies suggesting that ocean acidification wasn’t a threat had sometimes had difficulty finding a publisher. There was, he said, an ‘**inherent bias’ in scientific journals** which predisposed them to publish ‘doom and gloom stories’. **Ocean acidification theory appears to have been fatally flawed** almost from the start. In 2004, two NOAA scientists, Richard Feely and Christopher Sabine, produced a chart showing a strong correlation between rising atmospheric CO2 levels and falling oceanic pH levels. But then, just over a year ago, Mike Wallace, a hydrologist with 30 years’ experience, noticed while researching his PhD that they had omitted some key information. Their chart only started in 1988 but, as Wallace knew, there were records dating back to at least 100 years before. So why had they ignored the real-world evidence in favour of computer-modelled projections? When Wallace plotted a chart of his own, incorporating all the available data, covering the period from 1910 to the present, his results were surprising: **there has been no reduction in oceanic pH levels in the last -century**. Even if the oceans were ‘acidifying’, though, it wouldn’t be a disaster for a number of reasons — as recently outlined in a paper by Patrick Moore for the Frontier Centre for Public Policy. First, marine species that calcify have survived through millions of years when CO2 was at much higher levels; second, **they are more than capable of adapting — even in the short term** — to environmental change; third, seawater has a **large buffering capacity** which **prevents dramatic shifts in pH**; fourth, if oceans do become warmer due to ‘climate change’, the effect will be for them to ‘outgas’ CO2, not absorb more of it. Finally, and perhaps most damningly, Moore quotes a killer analysis conducted by Craig Idso of all the studies which have been done on the effects of reduced pH levels on marine life. The impact on calcification, metabolism, growth, fertility and survival of calcifying marine species when pH is lowered up to 0.3 units (beyond what is considered a plausible reduction this century) is **beneficial, not damaging**. **Marine life has nothing whatsoever to fear from ocean acidification**.

#### Arctic ice is stable—alarmist predictions are wrong

Bastasch, 15 – senior reporter with The Daily Caller News Foundation, a D.C.-based news organization specializing in policy reporting and investigative journalism (Michael, 4/29. “‘Irreversible’ Arctic Ice Loss Seems To Be Reversing Itself.” http://dailycaller.com/2015/04/29/irreversible-arctic-ice-loss-seems-to-be-reversing-itself/#ixzz4LO47rQRG)

For years, scientists have been warning the Arctic was in a “death spiral” and could soon be ice-free during the summertime and shrink to unprecedented levels due to man-made global warming. Such ice loss could be “irreversible,” some scientists claimed.

But new research from the Scripps Institution of Oceanography says that predictions of a permanently ice-free Arctic are based on “oversimplified” theories. Scripps researchers, who were co-funded by the Navy, found that the Arctic sea ice may be “substantially more stable than has been suggested in previous idealized modeling studies.”

“We found that two key physical processes, which were often overlooked in previous process models, were actually essential for accurately describing whether sea ice loss is reversible,” Scripps climate scientist Ian Eisenman, co-author of a new study refuting claims the Arctic is in a “death spiral,” said in a statement.

“Our results show that the basis for a sea ice tipping point doesn’t hold up when these additional processes are considered,” echoed Till Wagner, also a Scripps scientist. “In other words, no tipping point is likely to devour what’s left of the Arctic summer sea ice. So if global warming does soon melt all the Arctic sea ice, at least we can expect to get it back if we somehow manage to cool the planet back down again.”

“If the associated parameters are set to values that correspond to the current climate, the ice retreat is reversible and there is no instability when the climate is warmed,” according to Eisenman and Wagner’s study.

Eisenman and Wagner’s study comes after the Arctic hit its lowest maximum sea ice extent on record during February. This was followed by the Arctic having its lowest ice extent for March on record, according to the National Snow and Ice Data Center. Indeed, Arctic sea ice has been declining at a rate of 2.6 percent per decade since 1979.

Scientists and climate pundits have already predicted this year’s Arctic summer sea ice extent will be the lowest on record, following poor winter extent. This has only bolstered claims that the Arctic could soon be ice free.

“Summertime Arctic sea ice is not long for this world,” lamented Joe Romm, a climate scientist and editor for the liberal blog ThinkProgress. “Because of Arctic amplification, the Arctic warms twice as fast (or more) than the Earth as a whole does.”

Romm goes on to cite a February study claiming that Arctic ice is losing its thickness and becoming more susceptible to warmer weather — meaning it’s melting a lot faster. The study, published in the journal The Cryosphere found that “annual mean ice thickness has decreased from 3.59 meters [11.8 feet] in 1975 to 1.25 m [4.1 feet] in 2012, a 65% reduction.”

“The ice is thinning dramatically,” climatologist Ron Lindsay, the study’s lead author, was quoted saying.

It wasn’t long ago that David Barber, Canada’s Research Chair in Arctic System Science at the University of Manitoba, warned there was almost no multi-year ice left in the Northern Hemisphere.

“We are almost out of multiyear sea ice in the northern hemisphere,” he told Canada’s Parliament in 2009. “I’ve never seen anything like this in my 30 years of working in the high Arctic … it was very dramatic.”

Arctic sea ice extent that year was at its third-lowest extent on record, behind 2007 and 2008, and experts were saying there would be no polar ice during the summer by 2030 for the first time in one million years.

“I would argue that, from a practical perspective, we almost have a seasonally ice-free Arctic now, because multiyear sea ice is the barrier to the use and development of the Arctic,” Barber said.

But such predictions have fallen flat, as the Arctic has seen a resurgence of multi-year ice since 2009.

NSIDC and European satellite data show that multi-year sea ice made a big comeback in 2013 and 2014 — increasing from 2.25 to 3.17 million square kilometers during that time and making up 43 percent of the north pole’s ice pack.

In fact, Arctic sea ice extent as a whole seems to be stabilizing despite this year’s record low maximum in February. NSIDC data shows Arctic sea ice extent is currently within the normal range based on the 1981 to 2010 average extent.

“Global sea ice is at a record high, another key indicator that something is working in the opposite direction of what was predicted,” Dr. Benny Peiser, director of the Global Warming Policy Forum, told the U.K. Express in January.

“Most people think the poles are melting… they’re not,” he said. “This is a huge inconvenience that reality is now catching up with climate alarmists, who were predicting that the poles would be melting fairly soon.”

#### Warming in the Arctic is self-correcting—increases snowfall which slows ice cap melting

Hsu, 16 – University at Buffalo (Charlotte, 5/24. “Paleo Study: Global Warming May Boost Arctic Snowfall And Slow Greenland Ice Sheet Decline.” http://www.reportingclimatescience.com/2016/05/24/arctic-snowfall/)

The history of Greenland’s snowfall is chronicled in an unlikely place: the remains of aquatic plants that died long ago, collecting at the bottom of lakes in horizontal layers that document the passing years.

Using this ancient record, scientists are attempting to reconstruct how Arctic precipitation fluctuated over the past several millennia, potentially influencing the size of the Greenland Ice Sheet as the Earth warmed and cooled.

An early study in this field finds that snowfall at one key location in western Greenland may have intensified from 6,000 to 4,000 years ago, a period when the planet’s Northern Hemisphere was warmer than it is today.

Global Warming Could Arctic Snowfall

While more research needs to be done to draw conclusions about ancient precipitation patterns across Greenland, the new results are consistent with the hypothesis that global warming could drive increasing Arctic snowfall — a trend that would slow the shrinkage of the Greenland Ice Sheet and, ultimately, affect the pace at which sea levels rise.

“As the Arctic gets warmer, there is a vigorous scientific debate about how stable the Greenland Ice Sheet will be. How quickly will it lose mass?” says lead researcher Elizabeth Thomas, PhD, an assistant professor of geology in the University at Buffalo College of Arts and Sciences who completed much of the study as a postdoctoral fellow at the University of Massachusetts Amherst.

“Climate models and observations suggest that as temperatures rise, snowfall over Greenland could increase as sea ice melts and larger areas of the ocean are exposed for evaporation. This would slow the decline of the ice sheet, because snow would add to its mass,” Thomas says. “Our findings are consistent with this hypothesis. We see evidence that the ratio of snow to rain was unusually high from 6,000 to 4,000 years ago, which is what you would expect to see if sea ice loss causes snowfall to increase in the region.”