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# Slowly Warming to Climate Change

## INTRODUCTION

Patrick Michaels, a former professor at the University of Virginia, has built a second career at the libertarian Cato Institute issuing data-laden reports against mainstream climate change science.<sup>1</sup> In his latest book, *Lukewarming: The New Climate Science that Changes Everything*, Michaels joins Paul Knappenberger, the assistant director for the Cato Institute’s Center for the Study of Science, to introduce new arguments updating Michaels’ long-held thesis that man-made warming is a reality but that “[t]he atmosphere isn’t warming nearly as fast as is predicted in the forecasts . . . .”<sup>2</sup> Forecasts of substantial warming are a problem, Michaels believes, because they “serve as the basis for some of the most onerous environmental regulations ever proposed (and adopted).”<sup>3</sup> In Michaels’s view, reducing fossil fuel emissions to control the amount of carbon dioxide in the atmosphere not only involves introducing suspect regulations, but may in fact be impossible.<sup>4</sup> “We simply don’t know,” Michaels asserts, “how to power or develop a modern economy either without emitting vast quantities of carbon dioxide and/or proliferating nuclear fusion worldwide. . . .”<sup>5</sup>

This review first summarizes the structure and content of Michaels’s argument in *Lukewarming*. It then considers the significance of Michaels’s ideas in relation to the climate policy of the current presidential administration. The review concludes with a comment on *Lukewarming*’s place in the progression of American attitudes towards climate change.

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1. See generally Patrick J. Michaels: Director, Center for the Study of Science, CATO INST., <https://www.cato.org/people/patrick-michaels> (last visited May 21, 2017) (listing Michaels’s biography and current works).

2. PATRICK J. MICHAELS & PAUL C. KNAPPENBERGER, *LUKEWARMING: THE NEW CLIMATE SCIENCE THAT CHANGES EVERYTHING* 9, 249 (2016).

3. *Id.* at 9.

4. *Id.* at 11.

5. *Id.*

I. THE STRUCTURE AND ARGUMENT OF *LUKEWARMING*A. *Eschatology and Climatology*

Michaels warns the reader at the outset that the format of *Lukewarming* is “different from most popular science and policy texts.”<sup>6</sup> Rather than laying his arguments in longer chapters, Michaels breaks his ideas up into short “essays.”<sup>7</sup> The form is meant as homage to Kurt Vonnegut’s *Cat’s Cradle*, which Michaels describes as “a wonderfully funny book about how government and science bring about the end of the world.”<sup>8</sup>

Michaels’s tone is polemical, and his targets include proponents of action on climate change within the U.S. government, especially former President Obama, as well as the leading Intergovernmental Panel on Climate Change (IPCC). While Obama’s policies are the butt of numerous sarcastic asides and stand-alone essays,<sup>9</sup> the structure of *Lukewarming* displays a greater preoccupation with the work of the IPCC. Michaels dedicates roughly half of the essays to arguing that the IPCC issues inflated global warming forecasts, and another half to showing that a small increase in global temperatures will leave various other climate phenomena, such as the frequency of extreme weather, unaffected.

The arc of Michaels’s argument tracks that of the IPCC’s Climate Change 2014 Synthesis Report, a document which both summarizes the state of climate research and advocates measures to slow global warming.<sup>10</sup> The report is broken into four sections: (1) observed climate changes and their causes, (2) risks from projected future climate change, (3) the different climate outcomes to which alternative policies may lead, and (4) measures for mitigating and adapting to climate change.<sup>11</sup> In *Lukewarming*, Michaels selects models that follow some of the same indicators as those monitored by the IPCC, but finds that they produce lower estimated warming effects than the IPCC models.<sup>12</sup> Michaels argues that, assuming no change in today’s emissions rates, active measures to combat climate change are unnecessary. So, in effect, Michaels’s essays are arranged to concede the findings of section (1) of the IPCC report, to dispute the conclusions of section (2), and to obviate discussion of the issues raised in sections (3) and (4).

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6. *Id.* at xiv.

7. *Id.*

8. *Id.*

9. *See, e.g., id.* at 14, 119–21.

10. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT 28–29, 36 (2015), [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR\\_AR5\\_FINAL\\_full\\_wcover.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf).

11. *Id.* at 2.

12. MICHAELS & KNAPPENBERGER, *supra* note 2, at 85–89.

*B. Equilibrium Sensitivity: The Centerpiece*

Michaels's treatment of "equilibrium sensitivity," a measurement of the globe's response to a doubling of carbon dioxide in the atmosphere relative to pre-industrial levels,<sup>13</sup> constitutes the most important link in the logic of *Lukewarming*.

The IPCC predicted in its 2013 report that global mean surface temperatures would increase by 3.2°C in response to a doubling in carbon dioxide concentrations.<sup>14</sup> Michaels believes, however, that the IPCC's models overlook cooling factors that counteract the buildup of atmospheric carbon dioxide, and so predict more warming than will really occur.<sup>15</sup> Michaels instead adopts a single model, initially published in a blog post, in which two scientists incorporated these cooling factors to yield an estimated increase of 1.2°C.<sup>16</sup> Michaels further believes that half of this predicted increase (or 0.6°C) has already occurred and can be observed in a climb in mean global temperatures between the Industrial Revolution and the present.<sup>17</sup> The model Michaels relies on assumes that carbon dioxide concentrations, continuing at their present rate, will reach twice pre-modern levels by the year 2065.<sup>18</sup> This allows Michaels to predict that man-made carbon dioxide emissions will cause an additional increase of 0.6°C in mean global surface temperatures over the next five decades.<sup>19</sup>

*C. Science Funding and Bias*

After settling on an estimate for equilibrium sensitivity, Michaels bolsters his argument by casting doubt on the funding structure of contemporary scientific research.<sup>20</sup> He argues U.S. scientists are prone to exaggerating both observations of, and predictions for, climate change when grants from government agencies are on the line.<sup>21</sup> "Can anyone seriously believe," he asks, "that a young researcher will get . . . funding by approaching federal agencies with a proposal that global warming's future magnitude and effects have been dramatically overforecast?"<sup>22</sup>

13. *Id.*

14. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 817 (2013), [http://www.climatechange2013.org/images/report/WG1AR5\\_ALL\\_FINAL.pdf](http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf).

15. MICHAELS & KNAPPENBERGER, *supra* note 2, at 79–84. Michaels's arguments on bias in the IPCC models have been questioned. See Joseph Majkut, *Is There a Divergence Between Climate Models and Temperature Data?*, NISKANEN CTR.: CLIMATE UNPLUGGED (Dec. 1, 2015), <https://niskanencenter.org/blog/is-there-a-divergence-between-climate-models-and-temperature-data/>.

16. MICHAELS & KNAPPENBERGER, *supra* note 2, at 87–88.

17. *Id.*

18. *Id.*

19. *Id.*

20. *Id.* at 99–102.

21. *Id.* at 102–04.

22. *Id.* at 104.

Michaels evidently has first-hand knowledge of the trials facing government workers who doubt climate change's severity. While employed as the State Climatologist for Virginia in 2006, Michaels's views prompted then-Governor Tim Kaine to ask Michaels to stop using the title when discussing climate issues outside of Virginia.<sup>23</sup> Michaels left the position the next year for the Cato Institute.<sup>24</sup>

#### *D. Other Dangers in the Lukewarm World of Michaels*

In the second half of *Lukewarming*, Michaels discusses various consequences he views as likely to follow (or not to follow) from the warming estimate he has adopted. In these essays, Michaels points out that researchers have found no robust connection between warming and increases in catastrophic flooding from rain<sup>25</sup> or in the patterns of extreme storm formation.<sup>26</sup> He also cites a recent study dismissing the likelihood that climate change will melt the Greenland ice sheet and thus cause a massive increase in sea levels in the foreseeable future.<sup>27</sup> Michaels points out that the study showed that the Greenland ice sheet remained in place through sustained warm periods in the earth's past.<sup>28</sup> To the extent that sea levels in those periods were inexplicably elevated, the poorly-modeled Antarctic ice sheet must have made a major contribution, so Michaels advises the reader to "[m]ake certain you file that in your 'the science is settled' file."<sup>29</sup>

Michaels also notes that an increase in damage from storm events has been observed in recent decades, but that it is the result of "more people and property in harm's way,"<sup>30</sup> rather than an increase in the frequency or severity of bad weather.

## II. ANALYSIS

### *A. Transitioning to Trump*

The election of President Donald Trump has lent sudden gravity to Michaels's work. Although Trump publicly attributed the "concept of global warming" to a Chinese plot to hobble U.S. manufacturing,<sup>31</sup> he told the *New*

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23. Juliet Eilperin & David A. Fahrenthold, *Climatologist Draws Heat from Critics*, WASH. POST (Sept. 17, 2006), <http://www.washingtonpost.com/wp-dyn/content/article/2006/09/16/AR2006091600644.html>.

24. *Va. Climatologist Steps Down*, E&E NEWS: GREENWIRE (Sept. 27, 2007), <https://www.eenews.net/greenwire/stories/57682>.

25. MICHAELS & KNAPPENBERGER, *supra* note 2, at 179–81.

26. *Id.* at 171–73.

27. *Id.* at 204–05.

28. *Id.*

29. *Id.*

30. *Id.* at 186.

31. Donald J. Trump (@realDonaldTrump), TWITTER (Nov. 6, 2012, 11:15 AM), <https://twitter.com/realdonaldtrump/status/265895292191248385?lang=en>.

*York Times* in an interview after his election that he believes “there is some connectivity” between human activity and climate change.<sup>32</sup> In the same interview, Trump linked the reality of warming to the needs of American businesses, stating that the importance of the problem “depends on how much it’s going to cost our companies.”<sup>33</sup> Though the details of Trump’s stance on climate change remain unclear, his general view coincides with the two main points of Michaels’s thesis: some human-generated climate change is occurring, but deregulation is a more pressing issue.<sup>34</sup>

Trump has appointed officials who publicly profess his views on climate change. EPA Administrator Scott Pruitt, Secretary of State Rex Tillerson, and Secretary of the Interior Ryan Zinke have all gone on record acknowledging that a global warming trend exists and that it has some connection to human activity.<sup>35</sup> Maintaining the administration’s line on climate change, however, requires officials to stay silent on the details. Pruitt, for example, at his confirmation hearing acknowledged that the “climate is changing and human activity contributes to that in some manner,” but upon repeated direct questioning from Senator Bernie Sanders refused to quantify the extent of human contribution.<sup>36</sup>

### B. A Revolutionary Position?

Since Trump and the officials in his administration have staked out a position on climate change near to that of Michaels, *Lukewarming* deserves close attention as a fuller articulation of America’s new climate change policy than its proponents in government have yet made. Advocates of robust action on climate change have especial reason to read *Lukewarming*, since the book displays the serious tensions contained in Michaels’s reasoning and, by extension, that of the Trump Administration.

Michaels acknowledges from the outset of the book that global warming is occurring, but argues that its consequences do not warrant alarm.<sup>37</sup> To support this thesis, Michaels identifies numerous secondary climate phenomena that

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32. *Donald Trump’s New York Times Interview: Full Transcript*, N.Y. TIMES (Nov. 23, 2016), [https://www.nytimes.com/2016/11/23/us/politics/trump-new-york-times-interview-transcript.html?\\_r=1](https://www.nytimes.com/2016/11/23/us/politics/trump-new-york-times-interview-transcript.html?_r=1).

33. *Id.*

34. MICHAELS & KNAPPENBERGER, *supra* note 2, at 9.

35. See *EPA Administrator Confirmation Hearing, Part I*, C-SPAN (Jan. 18, 2017), <https://www.c-span.org/video/?421719-1/epa-nominee-scott-pruitt-testifies-confirmation-hearing> (documenting Scott Pruitt’s confirmation hearing, including comments on climate change); Eric Wolff & Esther Whieldon, *Interior Pick Zinke on Climate Change: ‘I Don’t Believe It’s a Hoax’*, POLITICO (Jan. 17, 2017, 6:36 PM), <http://www.politico.com/story/2017/01/ryan-zinke-interior-climate-change-233703> (reporting on Ryan Zinke’s views on climate change); Justin Worland, *Rex Tillerson Says He Believes in Climate Change – but That May Not Mean Much*, TIME (Jan. 11, 2017), <http://time.com/4631614/rex-tillerson-climate-change-paris-agreement/> (describing Rex Tillerson’s thoughts on climate change).

36. *EPA Administrator Confirmation Hearing, Part I*, *supra* note 35.

37. MICHAELS & KNAPPENBERGER, *supra* note 2, at xi.

will not change if the globe warms 0.6°C in the coming five decades.<sup>38</sup> But while the examples Michaels uses to illustrate his view seem both exhaustive and conclusive, the phenomena he selects have *not* actually been identified by the IPCC as likely climate change threats.<sup>39</sup>

Michaels frames his discussion of flooding, for example, by posing a rhetorical question: if warm air holds more moisture than cold air, and the air is getting warmer globally, “then a globally warmed atmosphere should increase flooding rains. It’s obvious, isn’t it?”<sup>40</sup> But Michaels is putting words in the mouth of his imagined interlocutor. The IPCC has in fact drawn the same conclusion as Michaels, writing that “[t]here is low confidence that [man-made] climate change has affected the frequency and magnitude of fluvial floods on a global scale.”<sup>41</sup>

Michaels sets up straw men to buttress his argument several more times in *Lukewarming*. His essay arguing against a connection between observed warming and the frequency of extreme storms also mirrors the finding of the IPCC, which has “low confidence that long-term changes in tropical cyclone activity are robust.”<sup>42</sup> Likewise, Michaels’s insistence that Greenland and Antarctic ice sheet dynamics are incompletely modeled also echoes the IPCC’s own findings.<sup>43</sup> Finally, Michaels’s refusal to attribute increased damages from storms to an uptick in extreme weather events reflects nearly verbatim the IPCC’s conclusion that “[i]ncreasing exposure of people and economic assets” to extreme weather has been the major cause of the increased damage.<sup>44</sup>

### C. Real Costs of Global Warming

While Michaels focuses the reader’s attention on areas where global warming will generate few costs, he glides over areas where significant expense will arise even if his predictions are borne out, much less if his models are off and the IPCC’s forecasts for more extreme outcomes prove true.<sup>45</sup> Michaels’s treatment of water storage in the American West provides an example of his approach.

The California state government estimates that one-third of California’s annual water supply is stored as snowpack in the Sierra Nevada.<sup>46</sup> As average winter temperatures in the Sierra Nevada increase, winter snows will

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38. *See id.* at 176–77, 179–81, 186.

39. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 10, at 8–16.

40. MICHAELS & KNAPPENBERGER, *supra* note 2, at 179.

41. *See* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 10, at 53 (emphasis omitted).

42. *Id.* (emphasis omitted).

43. *See id.* at 42, 48.

44. *Id.* at 53.

45. *See id.* at 57.

46. OFFICE OF THE STATE CLIMATOLOGIST, HYDROCLIMATE REPORT: WATER YEAR 2015, 12 (2016), [http://www.water.ca.gov/climatechange/docs/2016/a3037\\_Hydroclimate\\_report\\_v11.pdf](http://www.water.ca.gov/climatechange/docs/2016/a3037_Hydroclimate_report_v11.pdf).

increasingly turn to rain that drains away before the dry season.<sup>47</sup> Scientists at the University of California, Los Angeles have estimated that, under a scenario where mean global warming stabilizes at a level within 2°C of pre-industrial levels (Michaels's scenario), snowpack volume will fall by 47 percent.<sup>48</sup> Under the warmer scenarios that the IPCC considers possible if no action is taken, snowpack volume will fall by at least 60 percent.<sup>49</sup> Under any of the scenarios, "it is likely to become more difficult to store and manage municipal, agricultural, and ecological water needs . . . ."<sup>50</sup>

Michaels, in addressing the problem of water storage in the western United States, predicts simply that "[droughts] will occur in the future, with or without human-induced climate change."<sup>51</sup> But in framing climate change policy as a choice with no consequences, Michaels passes over a significant local reality for California; if fossil fuel emissions can be reduced, California's snowpack problem can be mitigated.

As the example of California's snowpack shows, warming temperatures will create significant costs to society. Yet Michaels, while deriding regulation of carbon emissions,<sup>52</sup> remains silent about the real costs of climate change to entities who are not in the fossil fuel business.

#### D. Other Forces at Work

The *New York Review of Books* reported, in a series of articles in late 2016, that the oil company ExxonMobil has engaged in a decades-long campaign aimed at disrupting the public reception of climate change, which the company's own researchers linked to fossil fuel emissions by the late 1970s.<sup>53</sup> ExxonMobil borrowed its strategy from tobacco companies that had hoped to avoid liability for damages caused by cigarette smoking.<sup>54</sup> In some cases, ExxonMobil hired the same scientists and lobbyists who worked for the tobacco industry to dispute findings on the harmful effects of tobacco smoke.<sup>55</sup> Indeed, Michaels was listed in 1998 as a member of the European Science and Environment Forum, an organization that found bias in the "epidemiological

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47. *See id.* at 14–15.

48. Neil Berg & Alex Hall, *Anthropogenic Warming Impacts on California Snowpack During Drought*, 44 *GEOPHYSICAL RES. LETTERS* 2511, 2514 (2017), <http://onlinelibrary.wiley.com/doi/10.1002/2016GL072104/epdf>; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 10, at 10.

49. Berg & Hall, *supra* note 48, at 2515; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *supra* note 10, at 10.

50. Berg & Hall, *supra* note 48, at 2517.

51. MICHAELS & KNAPPENBERGER, *supra* note 2, at 115.

52. *See id.* at 221.

53. David Kaiser & Lee Wasserman, *The Rockefeller Family Fund vs. Exxon*, N.Y. REVIEW OF BOOKS (Dec. 8, 2016), <http://www.nybooks.com/articles/2016/12/08/the-rockefeller-family-fund-vs-exxon/>.

54. *Id.*

55. *Id.*

studies used to support regulatory action [on tobacco] in the U.S.,"<sup>56</sup> just as Michaels now finds bias in climate change studies.<sup>57</sup>

Although funding for Michaels's current employer, the Cato Institute, comes from a variety of sources,<sup>58</sup> Michaels has enjoyed personalized support from fossil fuel companies over his career. He has stated that, as of 2010, he derived 40 percent of his funding from the petroleum industry.<sup>59</sup> While still a professor at the University of Virginia, he also received substantial funding to produce commentary on other researchers' work from a utility company concerned by the predominance of "alarmist" voices on climate change.<sup>60</sup> Michaels's insistence that funding sources can bias research results raises troubling implications if applied to his own work.

#### CONCLUSION

The early actions of the Trump Administration suggest that it plans to implement a climate change policy in line with the fossil fuel-friendly ideas expounded by Michaels; within days of Trump's inauguration, all mention of climate change was removed from the White House website,<sup>61</sup> and Trump green-lighted the construction of oil pipelines suspended by Obama.<sup>62</sup>

And yet, as sharply as the Trump Administration's position differs from that of the Obama Administration, the ascendance of Michaels's view at the White House may also represent a step in the gradual process of social compromise over the question of climate change. Professor Dan Kahan at Yale Law School, who studies cultural resistance to the concept of climate change, has argued that "[w]hat guides individual risk perception . . . is not the truth of [climate change] beliefs but rather their congruence with individuals' cultural commitments."<sup>63</sup> By repudiating the view of global warming as a Chinese

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56. ROBERT NILSSON, ENVIRONMENTAL TOBACCO SMOKE REVISITED: THE RELIABILITY OF THE EVIDENCE FOR RISK OF LUNG CANCER AND CARDIOVASCULAR DISEASE 2, 30 (Mar. 1998), <https://www.industrydocumentslibrary.ucsf.edu/docs/#id=rsmx0078>.

57. MICHAELS & KNAPPENBERGER, *supra* note 2, at 100–06.

58. Laurie Bennett, *The Kochs Aren't the Only Funders of Cato*, FORBES (Mar. 13, 2012, 12:56 PM), <http://www.forbes.com/sites/lauriebennett/2012/03/13/the-kochs-arent-the-only-funders-of-cato/#34df41b86003>.

59. *Transcripts: Fareed Zakaria GPS, Money Troubles: How to Kick-Start the Economy; Wild Weather Evidence of Global Warming?*, CNN (Aug. 15, 2010), <http://transcripts.cnn.com/TRANSCRIPTS/1008/15/fzgps.01.html>.

60. Associated Press, *Utilities Pay Scientist Ally on Warming*, N.Y. TIMES (July 28, 2006), <http://www.nytimes.com/2006/07/28/science/28climate.html>.

61. Coral Davenport, *With Trump in Charge, Climate Change References Purged from Website*, N.Y. TIMES (Jan. 20, 2017), <https://www.nytimes.com/2017/01/20/us/politics/trump-white-house-website.html>.

62. Athena Jones et al., *Trump Advances Controversial Oil Pipelines with Executive Action*, CNN (Jan. 24, 2017, 5:57 PM), <http://www.cnn.com/2017/01/24/politics/trump-keystone-xl-dakota-access-pipelines-executive-actions/>.

63. Dan M. Kahan et al., *The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks*, 2 NATURE CLIMATE CHANGE 732, 734 (2012) (emphasis omitted), <http://www.nature.com/nclimate/journal/v2/n10/pdf/nclimate1547.pdf>.

hoax, Trump may have made acknowledging global warming less taboo for his supporters. For example, attendees at a March 2017 town hall held by Senator Sanders in a coal mining community in West Virginia, a state where Trump won 68 percent of the vote,<sup>64</sup> applauded when Sanders mentioned his beliefs on climate change.<sup>65</sup> Perhaps this hints at a shift in the stance of Trump supporters, only 22 percent of whom attributed climate change to human activity in a survey shortly before the election.<sup>66</sup>

As political and cultural opposition to the concept of man-made climate change is in flux, the position adopted in *Lukewarming* may represent the next point where the “cultural commitments” of former climate change doubters can coalesce.<sup>67</sup> Michaels’s book and his views therefore merit attention.

*John Hannon*

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64. 2016 West Virginia Presidential Election Results, POLITICO (Dec. 13, 2016, 1:57 PM), <http://www.politico.com/2016-election/results/map/president/west-virginia/>.

65. MSNBC, *WV Resident: ‘You’re Born into This Generational Poverty’*, YOUTUBE, (Mar. 13, 2017), [https://www.youtube.com/watch?v=S\\_ujv0emOul](https://www.youtube.com/watch?v=S_ujv0emOul).

66. Brian Kennedy, *Clinton, Trump Supporters Worlds Apart on Views of Climate Change and Its Scientists*, PEW RES. CTR. (Oct. 10, 2016), <http://www.pewresearch.org/fact-tank/2016/10/10/clinton-trump-supporters-worlds-apart-on-views-of-climate-change-and-its-scientists/>.

67. Kahan et al., *supra* note 63, at 734.

**We welcome responses to this Book Review. If you are interested in submitting a response for our online journal, *Ecology Law Currents*, please contact [cse.elq@law.berkeley.edu](mailto:cse.elq@law.berkeley.edu). Responses to articles may be viewed at our website, <http://www.ecologylawquarterly.org>.**

