NOTE FOR NATIONAL DEFENCE:
Security Concerns over Climatic and Environmental Implications in the North Pacific

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Summary

- The purpose of this report is to highlight the important environmental implications of climate change, incentivizing security concerns along the North Pacific borders to the Arctic Circle.

CONTEXT AND BACKGROUND:

The North Pacific's sea surface temperature (SST) and sea level pressure (SLP) indicate climatic variability for which models, namely, the Pacific Decadal Oscillation (PDO) and the North Pacific Gyre Oscillation (NPGO) reveal "a uniform warming of the entire North Pacific basin" with a positive correlation in climate anomalies.[1][2] In conjunction with other models such as the atmosphere-ocean general circulation models (GCMs), simulations estimate multifaceted conundrums implicating greater anthropogenic impacts and climatic variability, in the next 30 to 50 years, than the anticipated greenhouse gas emissions by the IPCC.[3][4] These climate-induced implications affect the biodiversity of the region, ultimately altering the ecosystem, and resulting in the weakening and regional transfer of activities. Climate anomalies in the North Pacific are unprecedented and multifarious, giving rise to important security concerns for Canada mainly between the Russian Far East to the Arctic Circle. Thus, with unprecedent climate variabilities in the North Pacific, there is a need to assess environmental implications in the latter regions, rather than a sole focus on the Arctic Circle, given the probabilistic incentives for land seizure by neighboring states.

THE ISSUE

An increasing number of states rely on simulated scenarios and reports by bodies such as the IPCC for domestic and economic policymaking, and government preparedness strategies to alleviate the effects of climate-induced anomalies.[5] The issue rests on the focus of the Canadian government on the Arctic Circle

[1] Jason C. Furtado, Emanuele Di Lorenzo, Niklas Schneider, Nicholas A. Bond, "North Pacific Decadal Variability and Climate Change in the IPCC AR4 Models", *Journal of Climate* 24 (2011): 3050. doi: 10.1175/2010JCLI3584.1.

[2] Micheal A. Litzvow et al. "The Changing Physical and Ecological Meanings of North Pacific Ocean Climate Indices", *Proceeding of the National Academy of Science* 117, no. 14 (2020): 7666. https://www.pnas.org/cgi/doi/10.1073/pnas.1921266117

[3] J.E Overland, M. Wang, "Future Climate of the North Pacific Ocean", *EOS Transactions American Geophysical Union* 88, no. 16 (2007): 178-79.

[4] Anticipated climate variability between 1.53-2°C warmer. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/4/2020/07/03_Technical-Summary-TS_V2.pdf

[5] See Layla-Maria Slim's essay on: Challenging the Conventional Wisdom of The Relation Between the Environment and War: The Importance of Domestic Policy in the Age of Climate Change, and in the Assessment of Volcanic Eruptions and the Birth of Revolutions (2020).

rather than the North Pacific regions from Irkutsk, to Kamchatka, Alaska, and Ellesmere Island. Each region houses different, numerous, and unprecedent climate-related implications that may develop into security concerns. Given the different climatic effects, regions may either pave a uniform border similar in temperatures or create new roads affecting border settlement. For instance, in Irkutsk, the air temperature and precipitation fluctuations deviated from anticipated climate predictions on soil fertility due to warmer temperature changes. The increase in temperature and precipitation over the last century, between 1890-1990, resulted in greater precipitations occurring during colder winters, while warmer winters resulted in drier summers accompanied by colder soil impacting the agricultural sector.[6] Climate anomalies, such as these, question the future environment type of the regions along the Arctic Circle to the North Pacific, climate oscillation tendencies and ecosystem services. Hence, with a 60% decrease in ecosystem services over the last 50 years, the uncertainty of environments, whether global warming in the North Pacific engenders deserts or arable lands, posits security concerns along the anticipated borders to the Arctic Circle.[7]

CLIMATIC IMPLICATIONS

Climatic projections estimate a rise of 3◦C by the end of the 21st century affecting atmospheric and oceanic thermal environments, producing drastic changes in sensitive coastal ecosystems in the North Pacific.[8] These thermal changes in atmospheric and oceanic realms increase the occurrence of natural disasters such as wildfire, droughts, floods, windstorms, blizzards, tornados, heatwaves, etc. Moreover, natural disturbances increase the incubation and propagation of diseases such as waterborne and vector-borne diseases, namely cholera and malaria, and pathogen growth on water surfaces affecting ecosystem functions and services.[9] The Russian Far East is particularly vulnerable given its diverse environments, home to Arctic ice deserts in the far North and subtropic forests in the South, experiencing extreme weather conditions and natural phenomena from permafrost, tsunamis, earthquakes, and floods.[10] An important implication lies in the Russian regions from the North Pacific to the Arctic hydrates. The Arctic hydrates, if destabilized by 1%, results in an atmospheric doubling of methane and further degradation of underwater permafrost reserves.[11] These variations affect Arctic water runoff and water-levels, affecting land to sea ratio, deriving from Siberian Rivers into the Arctic under global warming, meaning that, as V. Bogatov et al. states, Siberian river "runoff affects global climatic processes".[12]

The latter engender major biodiversity concerns such as ecosystem services and habitat loss by stimulating species redistribution and migration towards "optimal thermal environments", thereby affecting economic activities reliant on the exploitation of species.[13][14] The fishing industry in the North Pacific expects a general decrease of fish species such as tuna, skipjack, yellowfin and bigeye by 2 to 5% per decade due to the species thermal sensitivity and the declining richness of zooplankton in the water.[15] These

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[6] T. Zhang, Roger G. Barry, D. Gilichinsky, S.S. Bykhovets, V.A Sorokovitkov, and Jinping Ye., "An Amplified Signal of Climate Change in Soil Temperatures During the Last Century at Irkutsk, Russia", *Climate Change* 49 (2001): 70.

[7] Harold Mooney & al., "Biodiversity, Climate Change and Ecosystem Services", *Environmental Sustainability* 1 (2009): 46. Doi 10.1016/j.cosust.2009.07.006

[8] Jason C. Furtado, Emanuele Di Lorenzo, Niklas Schneider, Nicholas A. Bond, "North Pacific Decadal Variability and Climate Change in the IPCC AR4 Models", *Journal of Climate* 24 (2011): 3064. doi: 10.1175/2010JCLI3584.

[9] Layla-Maria Slim, "Challenging the Conventional Wisdom of Developing Countries on Climate Change: The Importance of Environmental Regulations in Assessing Climate Change Deceleration in China", Anthology of Strategic Studies 5 (2020): 12-14. ISSN: 2562-4849

[10] Bogatov, V. V., P. Ya Baklanov, S. A. Lozovskaya, and M. B. Shtets, "Climate Change and Health in the Russian Far East", *Вестник Дальневосточного отделения Российской академии наук* 1 (215) (2021): 6.

[11] Ibid, 4.

[12] Ibid.

[13] Phoebe A. Woodworth-Jefcoats, Jeffrey J. Polovina, and Jeffrey C. Drazen, "Climate Change is projected to reduce carrying capacity and redistribute species richness in the North Pacific pelagic marine ecosystems", *Global Change Biology* 23 (2017): 1000. doi: 10.1111/gcb.13471

[14] Steven J. Bograd & al., "Developing a Social-Ecological-Environmental System Framework to Address Climate Change Impacts in the North Pacific", *Frontiers in Marine Science* 6, no.333 (2019): 7. doi: 10.3389/fmars.2019.00333.

[15] Ibid.

species migrate further North dependently from zooplankton migratory movements, altering the location of economic zones, whilst declining in number. Climate models show that the North Pacific bioregion hold a great vulnerability score in anthropogenic activities on a global scale.[16] A major concern lies within the decreasing yield of valuable North Pacific fish and the expected fish migration in high-latitude regions from southern regions by 30 to 70% by 2055, engendering food security and territorial concerns for economic activities.[17]

Climate change simulates an effect on infrastructure development with the emerging need for land and water strategies, demographics changes for both human and non-human species, and anthropogenic activities. The IPCC's predictions anticipate infrastructure development in conjunction with a change in land use within newly ice-free regions, altering agricultural production and food demand, while reassessing land-degradation and desertification in tropical regions.[18] The unprecedent climate oscillations in the North Pacific are expected to yield an increase in floods in regions with greater winter precipitations such as in Irkutsk, requiring infrastructure development.[19] In 1998, China, the North Pacific weather oscillations led to a 30-to-60-day period of floods, requiring infrastructure development and risk management strategies.[20] Climatic implications function similarly to an ecosystem with the *modus operandi* that a single alteration with the system results in a shift affecting all human and non-human branches, ranging from natural implications to socio-political and economic disturbances.

SECURITY CONCERNS

Climatic implications include anthropogenic movements in economic activities and demographics changes leading to increase simulations on climate migrants deriving from China to Russia.[21] Demographic changes reflect a shift in life expectancy with a uniform decrease in public health and a rise in climate-migrants in regions affected, particularly in the Russian Far East.[22] Colder winters in the Russian North Pacific resulted in a drastic increase of respiratory and chronic diseases from 48.8%, during warmer weathers, to 145.6%.[23] Demographic changes due to environmental-health related conundrums weaken North Pacific regions and pose security concerns in terms of responding to threat from neighboring countries. Incentives for 'land grabbing' deriving from North Pacific adjacent regions, such as China, will grow on the assumption a uniform warming of northern regions and their agricultural prospects as sustainable economic incubators.[24] Security concerns for the Russian Far East rest on their post-Soviet financial-agricultural vulnerability within domestic policy, resulting in an outflow of capital from foreign investors thereby weaking domestic farming whilst increasing foreign acquisition of land.[25] The latter vulnerability facilitates Russia's top foreign investors, the Chinese, to land-grab North Pacific regions. In the Russian Far East, Chinese and South Korean investors have begun purchasing land for agricultural means. With Chinese farmers producing, consuming, and exporting over two-thirds of crop yields in the Russian Far East, accompanied by poorly populated Russian rural regions, Russia becomes vulnerable to

[16] Alana Grech & al., "A Comparison of threats, vulnerabilities and management approaches in global seagrass bioregions", *Environmental Research Letters* 7 (2012): 5.

[17] William W.L. Cheung & al., "Large-Scale Redistribution of Maximum Fisheries Catch Potential in the Global Ocean under Climate Change", *Global Change Biology* 16 (2010): 24. doi: 10.1111/j.1365-2486.2009.01995.x

[18] P.R. Shukla, J. Skea, R. Slade, R. van Diemen, E. Haughey, J. Malley, M. Pathak, J. Portugal Pereira (eds.), "Technical Summary", in: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems,* 2019.

[19] Dina Khrennikova, and Olga Tanas, "Climate Change Threatens Russia with Billions in Annual Costs", *Bloomberg Green*, April 14, 2021 https://www.bloomberg.com/news/articles/2021-04-14/climate-change-may-be-costing-russia-billions-every-year

[20] Congwen & al., "The 30-60-day intra-seasonal oscillation over the western North Pacific Ocean and its impacts on summer flooding in China during 1998", *Geophysical Research Letters* 30, no. 18 (2003): 2. doi:10.1029/2003GL017817.

[21] N. Horie, "The Positionality of Russia's Far East Border Regions", *Problems of Economic Transition* 59, no.10 (2017): 759. https://doi.org/10.1080/10611991.2017.1416835

[22] Bogatov, V. V., P. Ya Baklanov, S. A. Lozovskaya, and M. B. Shtets, "Climate Change and Health in the Russian Far East", *Вестник Дальневосточного отделения Российской академии наук* 1 (215) (2021): 6.

[23] Ibid.

[24] Oane Visser & Max Spoor, "Land Grabbing in Post-Soviet Eurasia: The World's Largest Agricultural Land Reserve at Stake", *The Journal of Peasant Studies* 38, no.2 (2011): 308. https://doi.org/10.1080/03066150.2011.559010

[25] Ibid.

foreign exploitation.[26] The IPCC's concerns over food security further threatens the North Pacific given the increase competition over land acquisition and accumulation from foreign powers such as the Gulf State's recent purchase of land, and involvement in Northern and Central Eurasia.[27] Therefore, with publicized simulations over newly ice-free regions, mainly along the North Pacific borders to the Arctic Circle, land grabbing and accumulation from foreign investors mushrooms security concerns from adjacent regions such as China.

Further concerns focus on the Arctic Circle and China's declaration of being "near the Arctic" threatening Russia's Far East regions and the North Pacific by slowing acquiring land towards the Arctic.[28] The latter poses security concerns for Canada given its status as one of the five Arctic countries and given an estimate of 100 billion dollars in investment for resource extraction in the Arctic.[2930] Moreover, Northern islands and territories such as Baffinland Island are mostly owned by mining companies; the Baffinland Iron Mine and its co-owners own 100% of the Baffinland Mary River, posing security concerns for the Canadian federal government sovereignty in the North.

SOLUTION

Redirect focus and resources to the regions between the North Pacific to the Arctic Circle by ensuring Canada's Arctic border's safety, while increasing local government policymaking capabilities, government preparedness strategies and reducing company seizure of land.

REFERENCES:

Anticipated climate variability between 1.53-2°C warmer. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/4/2020/07/03_Technical-Summary-TS_V2.pdf

Bograd Steven J. et al. "Developing a Social-Ecological-Environmental System Framework to Address Climate Change Impacts in the North Pacific". *Frontiers in Marine Science* 6, no.333 (2019): 1-11. doi: 10.3389/fmars.2019.00333.

Bogatov, V. V., P. Ya Baklanov, S. A. Lozovskaya, and M. B. Shtets. "Climate Change and Health in the Russian Far East." *Вестник Дальневосточного отделения Российской академии наук* 1 (215) (2021): 5-21.

Congwen & al. "The 30-60-day intra-seasonal oscillation over the western North Pacific Ocean and its impacts on summer flooding in China during 1998". *Geophysical Research Letters* 30, no. 18 (2003): 1-5. doi:10.1029/2003GL017817.

Furtado, Jason C., Di Lorenzo, Emanuele., Schneider, Niklas., Bond, Nicholas A. "North Pacific Decadal Variability and Climate Change in the IPCC AR4 Models". *Journal of Climate* 24 (2011): 3049-3067. doi: 10.1175/2010JCLI3584.

Gjedssø, Rasmus., Galluci, Vincent. "The return of China, post-Cold War Russia, and the Arctic: Changes on land and at sea". *Marine Policy* 72 (2016): 240-245.

Grech, Alana & al."A Comparison of threats, vulnerabilities and management approaches in global seagrass bioregions". *Environmental Research Letters* 7 (2012): 1-8.

Horie, N. "The Positionality of Russia's Far East Border Regions".*Problems of Economic Transition* 59, no.10 (2017): 753-767. https://doi.org/10.1080/10611991.2017.1416835

[26] N. Horie, "The Positionality of Russia's Far East Border Regions", *Problems of Economic Transition* 59, no.10 (2017): 760. https://doi.org/10.1080/10611991.2017.1416835

[27] Oane Visser & Max Spoor, "Land Grabbing in Post-Soviet Eurasia: The World's Largest Agricultural Land Reserve at Stake", *The Journal of Peasant Studies* 38, no.2 (2011): 306. https://doi.org/10.1080/03066150.2011.559010

[28] Rasmus Gjedssø & Vincent Galluci, "The return of China, post-Cold War Russia, and the Arctic: Changes on land and at sea", *Marine Policy* 72 (2016): 240.

[29] Linyan Huang, Frédéric Lasserre, and Olga Alexeeva, "Is China's Interest for the Arctic Driven by Arctic ShipPing Potential?", *Asian Geographer* 32, no.1 (2015): 59. https://doi.org/10.1080/10225706.2014.928785

[30] Lloyd's, *Artic Opening: Opportunity and Risk in High North*, Chatham House, 2012.

Huang, Linyan., Lasserre, Frédéric., Alexeeva, Olga. “Is China’s Interest for the Arctic Driven by Arctic Shipping Potential?”. *Asian Geographer* 32, no.1 (2015): 59-71. https://doi.org/10.1080/10225706.2014.928785

Khrennikova, Dina.,Tanas, Olga. “Climate Change Threatens Russia with Billions in Annual Costs”. *Bloomberg Green*, April 14, 2021 https://www.bloomberg.com/news/articles/2021-04-14/climate-change-may-be-costing-russia-billions-every-year

Litzvow, Micheal A. et al. “The Changing Physical and Ecological Meanings of North Pacific Ocean Climate Indices”. *Proceeding of the National Academy of Science* 117, no. 14 (2020): 7665-7671. https://www.pnas.org/cgi/doi/10.1073/pnas.1921266117

Lloyd’s. *Artic Opening: Opportunity and Risk in High North*. Chatham House, 2012.

Mooney, Harold & al. “Biodiversity, Climate Change and Ecosystem Services”. *Environmental Sustainability* 1 (2009): 46-54. Doi 10.1016/j.cosust.2009.07.006

Overland, J.E., Wang, M. “Future Climate of the North Pacific Ocean”. *EOS Transactions American Geophysical Union* 88, no. 16 (2007): 178-182.

Shukla, P.R., Skea, J., Slade, R., van Diemen, R., Haughey, E., Malley, J., Pathak, M., Portugal Pereira, J. “Technical Summary”. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems,* 2019.

Slim, Layla-Maria. “Challenging the Conventional Wisdom of Developing Countries on Climate Change: The Importance of Environmental Regulations in Assessing Climate Change Deceleration in China”. Anthology of Strategic Studies 5 (2020): 1-36. ISSN: 2562-4849

Visser, Oane., Spoor, Max. “Land Grabbing in Post-Soviet Eurasia: The World’s Largest Agricultural Land Reserve at Stake”. *The Journal of Peasant Studies* 38, no.2 (2011): 299-323. https://doi.org/10.1080/03066150.2011.559010

W.L., William., Cheung & al., “Large-Scale Redistribution of Maximum Fisheries Catch Potential in the Global Ocean under Climate Change”. *Global Change Biology* 16 (2010): 24-35. doi: 10.1111/j.1365-2486.2009.01995.x

Woodworth-Jefcoats, Phoebe A., Polovina, Jeffrey J., Drazen, Jeffrey C. “Climate Change is projected to reduce carrying capacity and redistribute species richness in the North Pacific pelagic marine ecosystems”. *Global Change Biology* 23 (2017): 1000-1008. doi: 10.1111/gcb.13471

Zhang, T., Barry, Roger G., Gilichinsky, D., Bykhovets, S.S., Sorokovitkov, V.A., Ye, Jinping. “An Amplified Signal of Climate Change in Soil Temperatures During the Last Century at Irkutsk, Russia”. *Climate Change* 49 (2001): 41-76.