GLOBAL SUMMER PROGRAMME 2023

COR2205 CLIMATE, HISTORY, SOCIETY

- Instructor Name: Dr. Fiona WILLIAMSON
- Title: Associate Professor in Environmental History
- School: College of Integrative Studies
- Email: fwilliamson@smu.edu.sg
- Office: Room 16, Level 4, School of Law

A. COURSE DESCRIPTION

This module aims to introduce students to topics within the emerging field of climate history. After an overview of the field, it focuses on two trajectories. First the complex relationship between society and climate. Whilst we are well aware today how humans have shaped our climate, the story of how climate has shaped us is less well understood. Climate has played a role in socio-political changes including the rise and fall of civilisations, to the shaping of socio-cultural traditions and customs. Second, it looks at the development of the science of climate and meteorology. It explores climate science as a global phenomenon, influenced by scientific ideas and movements that circulated across borders and empires, but also as a response to local circumstances, especially extremes of weather. It also considers some of the broader challenges being faced because of climate change today and the role of the historian in current climate change debate. It has a particular focus on Asia and the exchange of knowledge about climate and weather between East and West.

Working with a combination of online and pre-recorded materials and face-to-face discussions, this course invites students to:

1. Broaden their understanding of interactions between climate, society and culture historically;
2. Critically analyse the our modern-day challenges in light of historical precedent;
3. Consider the long history of climate change ideas in scientific and popular thought;
4. Gain a greater appreciation of the interaction between history and the sciences.

B. LEARNING OBJECTIVES

By the end of this course, students will be able to:

- Have a firm grasp of the basic concepts and theories that inform the broad field of the history of the climate;
- Be confident with using primary sources for the study of historical issues;
- Be able to provide insights into climate related issues as they have developed over time, and the processes and politics that shaped the same;
- Be more aware of the long history of environmental thought;
- Be more aware of the role of climate in shaping human culture, in addition to the impact of man on the climate;
- Have developed skills in critical objective analysis and interpretation.

C. PRE-REQUISITES / REQUIREMENTS / MUTUALLY EXCLUSIVE COURSES (IF ANY)

This course does not require any pre-requisite.

D. ASSESSMENT METHODS / GRADING DETAILS

Mid-term assignment	20%
Class Participation	20%
Group Presentation	20%
Final Exam	40%
Total	100%

1. The course is assessed on the standard SMU grading scheme.
2. The grading for this course is divided into 60% from Continual Assessment, and 40% from an exam conducted in class at the end of the course.
3. The 60% Continual Assessment is apportioned in the following manner: -
   - Mid-term assignment (20%) – A mid-term assignment will be conducted during Lesson 9. It will focus on themes discussed in class during Lessons' 1-6 and is framed as a written response to a short scholarly article extract that you will be given in class to read on the day. No prior revision is required BUT it will be very helpful if you have read all the weekly readings up to and including Lesson 6.

   - Class Participation (20%) – You are encouraged to prepare for and, actively participate in, the discussions and activities that take place in class.

   - Group Presentation (20%) – Students will lead class discussion every week with a group presentation on that week's assigned readings. The presentation should take the form of a 30 min talk with 15 mins for questions (total 45 mins). The soft copy of this presentation is to be submitted under assignments on E-learn within one week of your assigned presentation slot. Guidelines for the presentation can be found under content on E-learn.

4. Exam (40%) – Details to be released.

No questions verbatim from past year papers or published **test banks will be used for the graded** continuous **assessments and examinations in this course.**

E. ACADEMIC INTEGRITY

All written assignments are to be submitted in double-spaced typing along with a total word count and a written anti-plagiarism declaration (for example "By submitting this assignment, I confirm that it conforms to the guidelines on plagiarism in SMU"). There is a policy of zero tolerance for late submission (except in exceptional circumstances and in agreement with your instructor) and for non-submission of assignments.

Please note that only copyright holders are entitled to reproduce their work, publish their work, perform their work in public, communicate their work to the public and make an adaption of their work. Hence, making course materials (owned by the faculty) available for sale or posting such works on websites for gain, is strictly prohibited. Disciplinary action will be taken against those found infringing copyright.

F. ACCESSIBILITY

SMU strives to make learning experiences accessible for all. If students anticipate or experience physical or academic barriers due to disability, please let the instructor know immediately. Students are also welcomed to contact the university's disability services team if they have questions or concerns about academic provisions: included@smu.edu.sg. Please be aware that the accessible tables in the seminar room should remain available for students who require them.

G. INSTRUCTIONAL METHODS AND EXPECTATIONS

This course will be blended learning. Lectures will be online and pre-recorded (1 hour) and can be watched in your own time. Face-to-face discussions and activities will be held for 2 hours every week on Tuesday, Wednesdays and Thursdays unless otherwise stated. These classes will include student-led presentations.

Your attendance, preparation and active participation at these lectures/discussions will contribute significantly towards your class participation marks.

H. CLASSROOM POLICIES

As required per Singapore Management University

I. IMPORTANT ASSIGNMENT DATES

1. Midterm Assignment: Lesson 9
2. Group Presentation: To be advised
3. Final Exam: Lesson 12

J. CONSULTATIONS

Office: Room 16, Level 4, School of Law
Tel: 0418

K. RECOMMENDED TEXT / READING LIST / CASE STUDIES LIST

N.B.: Compulsory reading is listed for each week, a broader bibliography is also available below.

LESSON PLAN	
LESSONS	TOPICS *(availability of materials / videos may change)*
LESSON 1 Tuesday 27 June	**Part 1: Introducing Climate in History** <u>Session 1: Introduction to the field</u> In this introductory session, we will explore the different ways in which climate has been addressed by historians and some of the latest research and research trends in the field. We will also consider the tools and sources available for the study of the climate within the field. Questions to consider: What is the difference between the history of the climate and historical climatology? Why is an inter-disciplinary approach so important to the study of the climate of the past? What is the significance of climate history today? Learning Objectives: •To understand how this module will work in practice and give you the space to ask questions •To explore the different types of climate history and the sources used for their study Essential Class Reading: •Carey, M., Climate and history: A critical review of historical climatology and climate change historiography', WIRES Climate Change 3:3 (2012): 233-249 •Chakrabarty, Dipesh, 'The Climate of History: Four Theses', Critical Inquiry 35:2 (2009): 197-222.
LESSON 2 Wednesday 28 June	<u>Session 2: Presentation preparation time</u> ***NB*** *There is no assigned reading or class for thus session, as you are expected to use this time to prepare for the presentations starting from tomorrow!*
LESSON 3 Thursday 29 June	<u>Session 3: How Climate Changes</u> In this week, we will explore how global climate has changed over the past 1000 years, highlighting particular cold or warm periods and their impacts on society, social change and big events in history. Questions to consider: To what extent has the history of climate changes been western centric? Should climate always be considered as a factor in our exploration of past social change? Learning Objectives: •To understand the natural and unnatural climatic phases of our earth •To understand how these shifts have affected societies •To explore whether this understanding might help us to determine our future Essential Class Reading: •Wolfgang Behringer, 'Global Cooling: The Little Ice Age' in Wolfgang Behringer, *A Cultural History of Climate* (Polity Press, 2010), pp. 85-120. •Raphael Neukom et al., 'No evidence for globally coherent warm and cold periods over the preindustrial Common Era', *Nature,* 571 (July, 2019): 550-54.

LESSON 4 Tuesday 4 July	Part 2: The History of Climate Science <u>Session 4: The Development of meteorology 1840s-1940s</u> In this week we will look at how meteorology developed from a niche and poorly understood subject to a science in its own right. In so doing, we consider the catalysts, turning points and problems along the way, as well as the enduring intersections between weather science and popular/traditional methods of explaining the weather. We will also focus on how the science developed here and in Hong Kong. Questions to consider: What, in your opinion, were key moments in the history of meteorology? What is the difference between climate science and meteorology, if any? In what ways did 'science' learn from 'weather watching'? Learning Objectives: •To see what went before climate science as we understand it today •To explore how meteorology linked to other fields, such as health •To gain an understanding of how meteorology was linked to imperial interests Essential Class Reading: •Harper, K. C., *Weather by the Numbers: The Genesis of Modern Meteorology* (Cambridge, MA: MIT Press, 2008), Ch. 2. •Mahony, M., 'For an empire of "all types of climate": meteorology as an imperial science' *Journal of Historical Geography*, 51 (2016): 29–39.
LESSON 5 Wednesday 5 July	<u>Session 5: The emergence of climate change science</u> In many ways, the 1930s-1950s could be considered a watershed in climate science. The Second World War, the demands of commercial agriculture and the burgeoning aviation industry all played a significant role in pushing the boundaries of meteorology further. At the same time, ideas about man's impact on the natural world were also evolving. In this class we will look in more depth at the factors, discoveries and ideas that contributed to a more recognisably 'modern' science. Questions to consider: What are the major developments in how climate and climate changes were understood from the 19th to the 20th century? Learning Objectives: •To explore how meteorology became 'modern' science •To understand the background to some of the big 20th century climate controversies Essential Class Reading: •Fleming, J. R., Historical Perspectives on Climate Change (Oxford: Oxford University Press, 2005), Ch. 6 •Joshua P. Howe, 'Scientists, Environmentalists, and the Global Atmosphere' in Joshua P. Howe, Behind the Curve: Science and the Politics of Global Warming (University of Washington Press, 2014), pp. 44-66.

LESSON 6 Thursday 6 July	**FIELD TRIP: Singapore Sustainability Gallery @ Marina Barrage**
LESSON 7 Tuesday 11 July	**Session 7: Urban Climate and the Discovery of the Urban Heat Island effect** In this session, we will explore the unique climate(s) of the city and the 'discovery' of one of the critical problems facing city dwellers in the 21st century: the Urban Heat Island effect (UHI). You will also be encouraged to explore the concept of 'micro-climates' for yourself on an exploration outside. For this, you will need to have downloaded the Gamelead app (details to be provided. Any questions about the app, speak to our TA). Questions to Consider: How might the idea of urban 'micro-climates' be useful to urban planners and, how was this concept employed historically? How did our forebears manage city heat? Would any of their ideas be relevant or useful today? Learning Objectives: •To understand more about the history of UHI science •To see how urban heat will be a future problem •To think about past and present, can we usefully learn from the past? Essential Class Reading: •Vladimir Jankovic and Michael Hebbert, 'Hidden Climate Change – Urban Meteorology and the Scales of Real Weather', Climatic Change 113 (2012): 23-33. •Chang, Jiat-Hwee, 'Thermal Comfort and Climatic Design in the Tropics: An Historical Critique', The Journal of Architecture 21, no. 8 (2016): 1171-202
LESSON 8 Wednesday 12 July	**Part 3: Climate and Culture** **Session 8-9 Future Imaginaries: Seeing the Future from the Past – mid-course assignment**
LESSON 9 Thursday 13 July	***NB** There is no assigned reading or class for these sessions, nor the normal student presentations.*

LESSON 10 Tuesday 18 July	<u>Session 10: Floods in society: case studies from our past</u> Singapore and Malaysia are largely free of any of the most extreme weather and natural disasters that this region suffers from, with the exception of floods. Today, Singapore rarely suffers any major flooding events that destroy lives and livelihoods, but this was not always the case. This week we will look at some of the worst flooding events in Singapore (and Malaysia's) history and explore the connections between some of these floods and socio-political history. Questions to consider: How have attitudes towards flooding have changed over time? To what extent should floods be explored as political events historically? Learning Objectives: •To understand how Singapore has managed floods past and present •To determine effectiveness in flood management and its connection with time and place •To understand how nature-induced disasters can become inscribed into social memory Essential Class Reading: •Georgina H. Endfield and Lucy Veale, eds., Cultural Histories, Memories and Extreme Weather: A Historical Geography Perspective (London and New York: Routledge, 2017), Ch. 1. •Chris Courtney, Governing Disasters: A Comparative Analysis of the 1931, 1954 and 1998 Middle-Yangzi Floods in Hubei', J.-M.F. Blanchard, K.-C. Lin (eds.), Governance, Domestic Change, and Social Policy in China (2017), Ch. 4.
LESSON 11 Wednesday 19 July	<u>Session 11: Class prep time</u> ***NB*** *There is no assigned reading or class for this week, nor the normal student presentations.*
LESSON 12 Thursday 20 July	FINAL EXAM

RECOMMENDED READINGS

Below are some readings that students might find useful for this class, beyond those that are specified under the lecture topics. This is not meant to be an exhaustive list, but rather an indication of the breadth of topics that this course touches on.

Adamson, George, et al., 'Re-thinking the present: The role of a historical focus in climate change adaptation research', G*lobal Environmental Change* 48 (2018): 195-205.

Adamson, G. C. D., & Nash, D. J., 'Long-term variability in the date of monsoon onset over western India', *Climate Dynamics*, 40-11–12 (2013): 2589–2603.

Adamson, G. C. D., "The languor of the hot weather": Everyday perspectives on weather and climate in colonial Bombay, 1819-1828', *Journal of Historical Geography*, 38:2 (2012): 143–154.

Adamson, P., 'Clement Lindley Wragge and the naming of weather disturbances, *Weather*, 58:9 (2003): 357–359.

Allan, R., et al., 'Towards integrated historical climate research: The example of atmospheric circulation reconstructions over the Earth', *WIREs Climate Change,* 7:2 (2016): 164–174.

Alessandro, A and Morgan, R., 'Making and Unmaking Bodies: Embodying Knowledge and Place in Environmental History', *International Review of Environmental History* 4:1 (2018: 55-67.

Anderson, B., 'Affective Atmospheres', *Emotion, Space and Society* 2:2 (2009): 77-81.

Anderson, David, et al., *Climate Change and Cultural Dynamics: A Global Perspective on Mid-Holocene Transitions* (London: Elsevier, 2007)

Anderson, D. G., Maasch, K. A., Sandweiss, D. H., *Climate Change and Cultural Dynamics: A Global Perspective on Mid-Holocene Transitions* (Burlington, MA: Academic Press; 2007).

Anderson, K., *Predicting the Weather: Victorians and the Science of Meteorology* (Chicago: Chicago University Press, 2005).

Anduaga, A., 'Spanish Jesuits in the Philippines: Geophysical Research and Synergies between Science, Education and Trade, 1865–1898', *Annals of Science*, 71:4 (2014): 497–521.

Arnold, D., *The problem of nature: Environment, culture and European expansion* (Oxford: Wiley, 1996).

D. Aubin, C. Bigg, & H. O. Sibum, eds., *The heavens on Earth: Observatories and astronomy in nineteenth century science and culture* (Duke University Press, 2010)

Bankoff, G., 'Aeolian empires: The influence of winds and currents on European maritime expansion in the days of sail', *Environment and History,* 23:2 (2017): 163–196.

Beattie, J., Emily O'Gorman and Matthew Henry, eds, *Climate, Science, and Colonisation: Histories from Australia and New Zealand* (New York: Palgrave Macmillan, 2014).

Behringer, Wolfgang, *A Cultural History of Climate* (Cambridge: Polity Press, 2005)

Behringer, Wolfgang, 'Climatic Change and Witch-hunting. The Impact of the Little-Ice Age on Mentalities', *Climatic Change* 43 (1999): 335-351.

Bickers, R., 'Throwing Light on Natural Laws': Meteorology on the China Coast, 1869-1912', in R. Bickers and I. Jackson, eds., *Treaty Ports in Modern China: Law, Land and Power* (London and New York, 2016)

Boia, Lucian, *The Weather in the Imagination* (London: Reaktion, 2005).
Bolin, Bert, *A history of the science and politics of climate change: the role of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007)

Bonneuil, C., & Fressoz, J., *The shock of the Anthropocene* (London: Verso, 2015)

Brádzil, Rudolf et al., 'Historical Climatology in Europe- the State of the Art', *Climatic Change* 70 (2005): 363-430.

Brenner, Neil, and Christian Schmid, 'The 'Urban Age' in Question', *International Journal of Urban and Regional Research*, 38 (2014): 731-55.

Bristow, Tom, and Thomas H. Ford, eds, *A Cultural History of Climate Change* (London: Routledge, 2016).

Brönnimann, Stefan, & Jeannine Wintzer, 'Society and History Imprint Climate Data', *Nature,* 554 (2018): 423.

Burton, J., 'Robert FitzRoy and the early history of the meteorological office', *The British Journal for the History of Science*, 19:2 (1986): 147–176
Cao S., Li Y., Yang B., "Mt. Tambora, Climatic Changes, and China's Decline in the Nineteenth Century." *Journal of World History*, 23:3 (2012): 587-607.

Carey, Mark, Climate and history: A critical review of historical climatology and climate change historiography', *WIRES Climate Change 3:3* (2012): 233-249

Carey, M., Inventing Caribbean climates: how science, medicine, and tourism changed tropical weather from deadly to healthy, *Osiris 26* (2011): 129–141

Carter, C. R., *Magnetic fever: Global imperialism and empiricism in the nineteenth century* (Philadelphia: American Philosophical Society, 2009)

Cawood, J., 'The magnetic crusade: Science and politics in early Victorian Britain', *ISIS* 70:4 (1979): 492–518.

Chakrabarty, Dipesh, 'The Climate of History: Four Theses', Critical Inquiry 35:2 (2009): 197-222.

Chang, Jiat-Hwee and Tim Winter, 'Thermal Modernity and Architecture,' *The Journal of Architecture* 20 (2015): 92-121.

Chang, J. H., & King, A. D., 'Towards a genealogy of tropical architecture: Historical fragments of power-knowledge, built environment and climate in the British colonial territories', *Singapore Journal of Tropical Geography*, 32:3 (2011): 283–300.

Chow, W.T.L. and M. Roth, "Temporal dynamics of the urban heat island of Singapore', *International Journal of Climatology*, 26:15 (2006): 2243-2260.

Crumley, Carole L., *Historical Ecology: Cultural Knowledge and Changing Landscapes* (Seattle: School for Advanced Research Press, 1994).

Culver, L., 'Seeing climate through culture' *Environmental History,* 19:2 (2014): 311–318.

Cushman, G.T., 'The imperial politics of hurricane prediction: from Calcutta and Havana to Manila and Galveston, 1839-1900', in M. Lawrence, E. Bsumek, & D. Kinkela, eds. *Nation-States and the Global Environment (*Oxford: Oxford University Press, 2013), pp. 137–162.

Cushman, G. T., 'Humboldtian science, creole meteorology, and the discovery of human-caused climate change in South America', *Osiris,* 26:1 (2011): 16–44.

Cushman, G.T., 'Enclave Vision: Foreign networks in Peru and the internationalization of El Niño research during the 1920s', *Proceedings of the International Commission on History of Meteorology*, 1 (2004): 65–74.

Cushman, G.T., 'The Struggle over Airways in the Americas, 1919-1945: Atmospheric science, aviation technology, and neocolonialism', in J. R. Fleming, V. Janković, & D. R. Coen, eds. *Intimate Universality: Local and Global Themes in the History of Weather and Climate.* Sagamore Beach, MA: Science History Publications, 2006): 175–222.

Daston, L., & M. Stolleis, eds., *Natural law and law of nature in early modern Europe: Jurispudence, theology, moral and natural philosophy* (Aldershot: Ashgate, 2008).

DeMenocal, P., B., Cultural responses to climate change during the late Holocene, *Science* 292 (2001): 667–673.

Davis, Mike, *Late Victorian Holocausts: El Niño, Famines and the Making of the Third World* (London: Verso, 2001).

Douglas, K., *"Under such sunny skies": Understanding weather in colonial Australia, 1860-1901* (Melbourne: Australian Bureau of Meteorology, 2007).

Elvin, Mark, 'Who Was Responsible for the Weather? Moral Meteorology in Late Imperial China', *Osiris* 13 (1998): 213-37

Emeis, S & C. Ludecke, eds, *From Beaufort to Bjerknes and beyond: Critical perspectives on observing, analyzing, and predicting weather and climate* (Augsburg: Rauner, 2005)

Endfield, G. H. & L. Veale, *Cultural Histories, Memories and Extreme Weather: A Historical Geography Perspective* (Routledge: London and New York, 2018).

Endfield, G.H. & Nash, D.J., 'Drought, desiccation and discourse: missionary correspondence and nineteenth-century climate change in central southern Africa', *The Geographical Journal*, 168:1 (2002): 33–47.

Fagan, B., *The Great Warming: Climate Change and the Rise and Fall of Civilizations* (New York: Bloomsbury Press; 2008).

Fan K., "Climatic change and dynastic cycles in Chinese history: a review essay," *Climatic Change*, 101 (2010): 565–573.

Fang X. Q., Xiao L. B., Wei Z. D., "Social impacts of the climatic shift around the turn of the 19th century on the North China Plain." *Science China: Earth Sciences*, 56 (2013): 1044–1058,

Fenby, C., "Seven Lean Years, Seven Fat Years": Climate Theory in Australia, 1820–1830, *History of Meteorology* 7 (2015): 25–38.

Fleming, J. R., *Fixing the Sky: The Checkered History of Weather and Climate Control* (New York: Columbia University Press; 2010)

Fleming, J. R., Jankovic, V., Coen, D. R., eds. *Intimate Universality: Local and Global Themes in the History of Weather and Climate* (Sagamore Beach: Science History Publications, 2006)

Fleming, J. R., *Historical Perspectives on Climate Change* (Oxford: Oxford University Press, 2005).

Foxhall, K., 'Interpreting the Tropical Atlantic Climate: Diaries from the Mid-Nineteenth-Century Australian Voyage', *Weather, Climate, and Society* 2 (2010): 91–102.

Freese, Barbara, *Coal: A Human History* (Basic Books, 2016)

Garden, Don. *Droughts, Floods and Cyclones: El Ninos That Shaped Our Colonial Past* (Melbourne: Australian Scholarly Publishing, 2009).

Ghosh, Amitav, *The Great Derangement: Climate Change and the Unthinkable* (Chicago: University of Chicago Press, 2016).

Glacken, Clarence, *Traces on the Rhodian shore: nature and culture in Western thought from ancient times to the end of the eighteenth century* (Berkeley: University of California Press, 1967)

Glassberg, David, 'Place, Memory, and Climate Change', *The Public Historian* 36 (2014): 17-30

Glantz, M. H., *Currents of Change: Impacts of El Niño and La Niña on Climate and Society* (New York: Cambridge, 2001)

Grove, R., 'Revolutionary weather: the climatic and economic crisis of 1788-1795 and the discovery of El Niño' in Costanza, R., Graumlich, L. J., Steffen, W., eds. *Sustainability or Collapse? An Integrated History and Future of People on Earth* (Cambridge, MA: MIT Press; 2007), 151–168

Grove, R. H., 'The East India Company, the Raj and the El Niño: The Critical Role Played by Colonial Scientists in Establishing the Mechanisms of Global Climate Teleconnections 1770-1930', in R. H. Grove, V. Damodaran, & S. Sangwan, eds. *Nature & The Orient*. Oxford: Oxford University Press, 1998): 301–323

Grove, Richard, *Ecology, Climate and Empire: Colonialism and Global Environmental History, 1400-1940* (Cambridge: White Horse Press, 1997).

Grove, R., *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge: Cambridge University Press, 1995)

Golinski, J., *British Weather and the Climate of Enlightenment* (Chicago: Chicago University Press, 2007).

Golinski, Jan. "The Weather in Eighteenth-Century Britain." In *Weather, Climate, Culture*, edited by Sarah Strauss and Ben Orlove. Oxford, New York: Berg, 2003.

Graham, O. L., 'Uses and Misuses of History: Roles in Policy Making', *The Public Historian* 5:2 (1983): 5-19.

Green, D., Raygorodetsky, G., 'Indigenous knowledge of a changing climate', *Climatic Change* 100 (2010): 239–242.

Hamblyn, R., *The Invention of Clouds: How an Amateur Meteorologist forged the Language of the Skies* (New York, 2001)

Harper, K. C., *Weather by the Numbers: The Genesis of Modern Meteorology* (Cambridge, MA: MIT Press, 2008). (focus on American services)

Harrison, M., *Climates and Constitutions: Health, Race, Environment and British Imperialism in India 1600-1850* (Oxford, 1997).

Harrison, M., 'The Tender Frame of Man': disease, climate, and racial difference in India and the West Indies, 1760-1860', *Bull Hist Med* 70 (1996): 68–93
Headrick, D. R., 'Climate Change: Debate and Reality', *International Review of Environmental History* 5:1 (2019): 43-60.

Henry, M., 'Assembling meteorology: Balloons, leaking gas, and colonial relations in the making of new atmospheres', *Journal of the Royal Society of New Zealand*, 47:2 (2017): 162–168.

Henry, M., "Inspired divination": mapping the boundaries of meteorological credibility in New Zealand, 1920–1939' *Journal of Historical Geography*, 50 (2015): 66–75.

Heymann, M., 'The evolution of climate ideas and knowledge', *WIREs Climate Change* 1:4 (2010): 581–597.

Hirsh, R., 'Historians of Technology in the Real World: Reflections on the Pursuit of Policy-Oriented History', *Technology and Culture*, 52:1 (2011): 6–20

Ho, P. Y., *Weathering the Storm: Hong Kong Observatory and Social Development* (Hong Kong, 2003).

Holland, P., Wood, V. & Dixon, P., 'Learning About the Weather in Early Colonial New Zealand', *Weather and Climate* 29 (2009): pp.3–23.

Howe, J. P., 'History and climate: a roadmap to humanistic scholarship on climate change', *Climatic Change* 105 (2011): 357–363.

Howkins, A., 'Melting empires? Climate change and politics in Antarctica since the international geophysical year', *Osiris*, 26 (2011): 180–197.

Howkins, A., 'Political meteorology: Weather, climate, and the contest for Antarctic sovereignty, 1939–1959', *History of Meteorology*, 4 (2008): 27–40.

Huang, C. C., Su H., 'Climate change and Zhou relocations in early Chinese history. *Journal of Historical Geography* 35 (2009): 297–310.

Huesemann, M., Huesemann, J., *TechNO-fix: Why Technology Won't Save us or the Environment* (New Society Publishers, Gabriola Island BC, Canada, 2011).

Hulme, M., *Weathered: cultures of climate* (London: Sage, 2017)

Hulme, Mike, *Climates and Cultures* (Sage, 2015).

Hulme, M., 2015. Climate and its Changes: A Cultural Appraisal. *Geo. Geography and Environment*, 2:1(2015): 1-11.

Hulme, M., 'Reducing the Future to Climate: A story of climate determinism and reductionism', *Osiris*, 26 (2011): 245-66.

Hulme, M., *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity* (Cambridge: Cambridge University Press, 2009).

Hughes, J. D., 'Climate change: a history of environmental knowledge', *Capital Nature Social 21* (2010): 75–80.

Haug, G. H., Climate and the collapse of Maya civilization *Science 299* (2003): 1731–1735.

Ingold, T., 'Footprints through the weather world: Walking, breathing, knowing', *Journal of the Royal Anthropological Institute*, 16:1 (2010): 121–139.

Jankovic, V., *Reading the Skies: A Cultural History of the English Weather, 1650-1820* (Chicago: Chicago University Press, 2000).

Kennedy, D., 'The perils of the midday sun: climatic anxieties in the colonial tropics', in MacKenzie, J. M., ed. *Imperialism and the Natural World* (Manchester: Manchester University Press, 1990), 118–140

Kenny, J., 'Climate, race, and imperial authority: The symbolic landscape of the British Hill station in India', *Annals of the Association of American Geographers,* 85:4 (1995): 694–714.

Kenworthy, J.M., *Albert Walter, O.B.E (1877-1972) Meteorologist in the Colonial Service Part I: His early life and work in Mauritius* (Royal Meteorological Society, 2013).

Kenworthy, J.M., *Albert Walter, O.B.E (1877-1972): Meteorologist in the colonial service, Part II* (Royal Meteorological Society, 2014).

Kenworthy, J.M. & Walker, J.M. eds., *Colonial Observatories and Observations: Meteorology and Geophysics*. Dept. of Geography, Durham, Occasional Publications No. 31 (1997)
Klinenberg, Eric, *Heat wave: a social autopsy of disaster in Chicago* (Chicago: University of Chicago Press, 2002).

Kneale, J., & Randalls, S., 'Invisible atmospheric Knowledges in British insurance companies, 1830–1914', *History of Meteorology*, 6, (2014): 35–52.

Lamb, H., *Climate, History and the Modern World* (London: Routledge, 1982).

Langston, Nancy, 'Paradise Lost: Climate Change, Boreal Forests, and Environmental History', *Environmental History*, 14:4 (2009): 641–50.

Le Roy Ladurie, E., *Times of Feast, Times of Famine: A History of Climate since the year 1000* (Garden City: Doubleday, 1971).

Lee H.F., Zhang D.D., "A tale of two population crises in recent Chinese history," *Climatic Change*, 116 (2013): 285–308.

Lee, K. N., *Compass and Gyroscope: Integrating Science and Politics for the Environment* (Island Press: Washington, 1993).

Leggewie, Claus and Mauelshagen, Franz, *Climate Change and Cultural Transition in Europe* (Leiden: Brill, 2018)

Levere, T. H. & W. R. Shea, eds., *Nature, experiment, and the sciences* (Amsterdam: Springer Netherlands, 1990).

Levy, David L. and André Spicer, "Contested Imaginaries and the Cultural Political Economy of Climate Change," *Organization* 20:5 (2013): 659-678.

Lewis, Jayne Elizabeth, *Air's Appearance: Literary Atmosphere in British Fiction, 1660-1794* (Chicago: University of Chicago Press, 2012).

Lightman, Bernard and Michael S. Reidy, eds, *The Age of Scientific Naturalism: Tyndall and his Contemporaries* (University of Pittsburgh Press, 2016).

Liverman, D. M., 'Conventions of climate change: constructions of danger and the dispossession of the atmosphere', *Journal Historical Geography* 35 (2009): 279–296.

Livingstone, D., N., 'The moral discourse of climate: historical considerations on race, place and virtue', *J Hist Geog 17* (1991):413–434

Livingston, K.T. & Home, R.W., 'Science and technology in the story of Australian Federation: the case of meteorology, 1876-1908', *Historical Records of Australian Science*, 10:2 (1994):109–127.

Locher, F., & Fressoz, J., 'Modernity's frail climate: A climate history of environmental reflexivity', *Critical Inquiry,* 38:3 (2012): 579–598.

Locher, F., 'The observatory, the land-based ship and the crusades: earth sciences in European context, 1830-50' *British Journal for the History of Science*, 40:147 (2007): 491–504.

Lorrey, A.M. & Chappell, P.R., 'The "Dirty Weather" diaries of Reverend Richard Davis: insights about early Colonial-era meteorology and climate variability for Northern New Zealand, 1839–1851' *Climate of the Past Discussions,* 11:4 (2015): 3799–3851.

MacKeown, P.K., *Early China coast meteorology: the role of Hong Kong* (Hong Kong University Press, 2010)

Mahony, M., and Endfield, G., 'Climate and Colonialism'. *WIRES: Climate Change* 9:2 (2018).

Mahony, M., & Caglioti, A.M., 'Relocating meteorology', *History of Meteorology,* 8 (2017), 1–14.

Mahony, M., 'For an empire of "all types of climate": meteorology as an imperial science' *Journal of Historical Geography*, 51 (2016): 29–39.

Markley, R., and Wood, G. D., eds, 'Climate and Crisis', *Journal for Early Modern Cultural Studies* 8:2 (2008).

McCormick, M., 'History's Changing Climate: Climate Science, Genomics, and the Emerging Consilient Approach to Interdisciplinary History', *J Interdiscip Hist* 42:2 (2011): 251–273

McIntosh, R. J., Tainter, J. A., McIntosh, S. K., *The Way the Wind Blows: Climate, History, and Human Action* (New York: Columbia University Press, 2000), 1–42.

McKittrick, Meredith, 'Talking about the Weather: Settler Vernaculars and Climate Anxieties in Early Twentieth-Century South Africa', Environmental History 23:1 (2018): 3-27.

McMichael, A. J. with Woodward A., & Muir C., *Climate Change and the Health of Nations* (Oxford: Oxford University Press, 2017)

McNeill, J. R., Can History Help Us with Global Warming?', in Campbell K. M., ed. *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change* (Washington, DC: Brookings Institution Press, 20089: 26–48.

McNeill, J. R., 'Observations on the Nature and Culture of Environmental History', *History and Theory*, 42 (2003):5-43

Manley, Gordon, 'The Revival of Climatic Determinism', *Geographical Review,* 48:1 (1958), pp. 98-105

Meinert, Carmen, *Nature, Environment and Culture in East Asia: The Challenge of Climate Change* (Leiden: Brill, 2013)

Menley, T., 'The Present Obfuscation': Cowper's task and the time of climate change', *PMLA* 127:3 (2012): 477-492.

Merchant, C., *Science and Nature: Past, Present and Future* (London: Routledge, 2018)

Mikami, T. et al., 'A History of Climate Change in Japan: A Reconstruction of Meteorological Trends from Documentary Evidence', in *Environment and Society in the Japanese Islands, From Prehistory to the Present* (Corvallis: Oregon State University Press, 2015): 197-212.

Miller, Rosen, A., *Civilizing Climate: Social Responses to Climate Change in the Ancient Near East* (Lanham: Altamira Press; 2007).

Moo, Jonathan. "Climate Change and the Apocalyptic Imagination: Science, Faith, and Ecological Responsibility," *Zygon* 50:4 (2015): 937-948.

Moore, P., *The Weather Experiment: The Pioneers who Sought to see the Future* (London, 2015)

Moser, S. C., and Dilling, L., eds., *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change* (Cambridge: Cambridge University Press, 2007).

Narain, S., and Agarwal, A., *Global Warming in an Unequal World: A Case of Environmental Colonialism* (New Delhi: Centre for Science and Environment, 1991).

Naylor, S., 'Weather instruments all at sea: meteorology and the Royal Navy in the nineteenth century' in MacDonald, F. and Withers, C. W. J., eds, *Geography, Technology and Instruments of Exploration.* Routledge: Farnham, 2015): 77-96.

Naylor, S., 'Log books and the law of storms: Maritime meteorology and the British admiralty in the nineteenth century', *Isis,* 106:4 (2015): 771–797.

Nebeker, F., *Calculating the Weather: Meteorology in the 20th Century* (San Diego, 1995)

Needham J., *Science and civilization in China*. Vol. 3. Mathematics and the sciences of the heavens and the earth (Cambridge: Cambridge University Press, 1959).

O'Brien, C., 'Deliberate Confusions', *History of Meteorology*, 6 (2014): 17–34.

O'Gorman, E., Beattie, J. & Henry, M., 'Histories of climate, science, and colonization in Australia and New Zealand, 1800-1945', *Wiley Interdisciplinary Reviews: Climate Change*, 7:6 (2016): 893–909.

Oreskes, Naomi and Erik Conway, *The Collapse of Western Civilization: A View from the Future* (New York: Columbia University Press, 2014).

Osborne, M. A., 'Acclimatizing the world: A history of the paradigmatic colonial science', *Osiris,* 15 (2000): 135–151.

Palmer, William G., 'Environment in Utopia: History, Climate, and Time in Renaissance Environment Thought', *Environmental Review* 8 (1984): 162-78.

Pan J., "The invention of thermometer and hygrometer and the history of their introduction into China, Japan, and Korea," *Ziran Kexue Shi Yanjiu (Studies in the History of Natural Sciences)*, 12 (1993): 249-256 (in Chinese).

Pietruska, J.L., 'Hurricanes, Crops, and Capital: the Meteorological Infrastructure of American Empire in the West Indies. *The Journal of the Gilded Age and Progressive Era*, 15:4 (2016): 418–445.

Poole, S., *Unspeak: How Words Become Weapons* (New York: Grove Press, 2006).

Postman, N., *Technopoly: The Surrender of Culture to Technology* (Knopf: New York, 1992).

Pui-yin Ho, *Weathering the Storm: Hong Kong Observatory and Social Development* (Hong Kong University Press, 2003)

Pyenson, L., *Civilizing Mission: Exact Sciences and Overseas French Expansion, 1830-1940* (Baltimore and London, 1993).

Ruddiman, W. F., *Plows, Plagues, and Petroleum: How Humans Took Control of Climate* (Princeton: Princeton University Press; 2005.)

Sandweiss, D. H., Quilter J. *El Nino, Catastrophism, and Culture Change in Ancient America* (Washington: Dumbarton Oaks, 2008)

Shi W., Liu Q., Li Z., "Introduction of Western Meteorological Science & Technology and Modernization of Chinese Meteorological Service," *Yuejiang Academic Journal*, 2 (2016): 21-29 (in Chinese).

Sikka, D. R., 'The role of the India Meteorological Department' in U. Das Gupta, ed. *Science and Modern India: An Institutional History, c. 1784-1947 (*New Delhi: Pearson Longman, 2011): 381–426.

Snider, Alvin Martin, 'Hard Frost, 1684', *Journal for Early Modern Cultural Studies* 8 (2008): 8-32

Strauss, S., Orlove B., eds. *Weather, Climate, Culture* (New York: Berg; 2003)

Taylor, G.I., 'Walker, Gilbert, Thomas, 1868-1958', *Biographical Memoirs of Fellows of the Royal Society*, 8 (1962): 166–174.

Randall, David. "The Apocalyptic Imagination: Climate Nonfiction and the Dream of Marxist Utopia." *Academic Questions* 29:4 (2016): 454-463.

Robin, L., 'Histories for Changing Times: Entering the Anthropocene? *Australian Historical Studies* 44:3 (2013): 329-340.

Ross, A., *Strange Weather: Culture, Science and Technology in the Age of Limits* (London: Verso, 1991).

Schneider-Mayerson, Matthew. "Some Islands Will Rise: Singapore in the Anthropocene." Resilience: A Journal of the Environmental Humanities 4:2 (2017): 166-184.

Sherratt, Tim, et al., *A Change in the Weather: Climate and Culture in Australia* (Canberra: National Museum of Australia Press, 2005).

Turchin, P., *Historical Dynamics, Why States Rise and Fall* (Princeton University Press, 2003).

Udías, A., *Searching the Heavens and the Earth: The History of Jesuit Observatories* (Dordrecht/Boston/London, 2003)

Udías, A., ''Jesuits' contribution to meteorology', *Bulletin of the American Meteorological Society,* 77:10 (1996): 2307–2315.

Urry J., *Climate Change and Society* (Malden, MA: Polity Press; 2011)

Warren, J. F., '*Scientific Superman: Father Jose Algue, Jesuit meteorology, and the Philippines under American Rule, 1897-1924'*, in A. W. McCoy and F. A. Scarano, eds, *Colonial Crucible: Empire in the Making of the Modern American State* (Wisconsin, 2009), pp. 508-519

Whitmarsh, L., 'What's in a Name? Commonalities and Differences in Public Understanding of 'climate change' and 'global warming', *Public Understanding of Science* 18 (2009): 401-420.

Williamson, F., and C. Wilkinson, 'Asian Extremes: Experience and Exchange in the Development of Meteorological Knowledge c. 1840-1930', *History of Meteorology* Vol. 8, Special Issue: "Relocating Meteorology" (2017).

Williamson, F., 'Weathering the empire: meteorological research in the early British straits settlements. *The British Journal for the History of Science*, 48:3 (2015): 475–492

Wood, G., D., A., 'The volcano lover: climate, colonialism, and the slave trade in raffle's history of Java (1817)', *J Early Modern Cultural Stud 8* (2008), 33–55.

Xiao Ling Bo et al., Climatic Impacts on the Rise and Decline of 'Mulan Qiuxian' and 'Chengde Bishu' in North China, 1683-1820, *Journal of Historical Geography* 39 (2013): 19-28

Zaiki, M., & Tsukahara, T., 'Meteorology on the Southern Frontier of Japan's Empire: Ogasawara Kazuo at Taihoku Imperial University', *East Asian Science, Technology and Society*, 1:2 (2007): 183–203.

Zhang D.D., Jim C., Lin C., et al., "Climate change, social unrest and dynastic transition in ancient China." *Chinese Science Bulletin*, 50 (2005): 137-144

Zheng J., Xiao L., Fang X., et al., "How climate change impacted the collapse of the Ming dynasty." *Climatic Change*, 127 (2014): 169-182.

Zilberstein, Anja, *A Temperate Empire: Making Climate Change in Early America* (New York: Oxford University Press, 2016.)

Zuidervaart, H. J. and van Gent, R. H., ''A Bare Outpost of Learned European Culture on the Edge of the Jungles of Java': Johan Maurits Mohr (1716-1775) and the Emergence of Instrumental and Institutional Science in Dutch Colonial Indonesia', *Isis: An International Review devoted to the History of Science and its Cultural Influences*, 95 (2004): 1-33

Online Resources:

An Online Bibliography from the Historical Climatology Network. A bit awkward to use because their tags are not very good but there is a lot of material:
https://www.zotero.org/groups/22111/historical_climatology_network_bibliographical_project/items?

https://www.historicalclimatology.com/blog