

# Guide to the Science of Climate Change in the 21<sup>st</sup> Century

## Chapter 29 Selected Web Sites

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## 29.1 Educational

There are a large number of web sites that one could review to gain insight into the science of climate change. The really useful ones are offered by reputable educational institutions. Many are available free. Just search 'course on climate change' and you'll find quite a few. Many colleges and universities offer under-graduate, graduate, and adult education programs.

A few sites of interest are:

1. edX courses on climate change <https://www.edx.org/learn/climate-change>
2. Climate Change MOOCs <https://www.mooc-list.com/tags/climate-change>
3. UN CC: e-Learn <https://unccelearn.org/>
4. Class central <https://www.classcentral.com/subject/climate-change>
5. Carleton Climate Commons <https://carleton.ca/climatecommons/climate-change-courses/>
6. American Museum of Natural History <https://www.amnh.org/learn-teach/seminars-on-science/courses/climate-change>
7. Oxford Climate Emergency Programme [https://onlineprogrammes.sbs.ox.ac.uk/presentations/lp/oxford-climate-emergency-programme/?ef\\_id=c:497420060081\\_d:c\\_n:g\\_ti:kwd-347461175215\\_p:k:%2Bclimate%20%2Bchange%20%2Bcourse\\_m:b\\_a:116984347349&gclid=Cj0KCQiApsiBBhCKARIsAN8o\\_4gcCy-BIO4\\_A\\_FvTsQpNqrhae93OrPw1LKO1yBxBdAE8df89j0i4aArR1EALw\\_wcB&gclsrc=aw.ds](https://onlineprogrammes.sbs.ox.ac.uk/presentations/lp/oxford-climate-emergency-programme/?ef_id=c:497420060081_d:c_n:g_ti:kwd-347461175215_p:k:%2Bclimate%20%2Bchange%20%2Bcourse_m:b_a:116984347349&gclid=Cj0KCQiApsiBBhCKARIsAN8o_4gcCy-BIO4_A_FvTsQpNqrhae93OrPw1LKO1yBxBdAE8df89j0i4aArR1EALw_wcB&gclsrc=aw.ds)
8. World Health Organization <https://www.who.int/globalchange/training/en/>
9. Eco Canada – Royal Roads University <https://www.eco.ca/training/climate-change-certificate/>
10. Udemy <https://www.udemy.com/topic/climate-change/>
11. UN Environment Program Finance Initiative <https://www.unepfi.org/training/training/climate-change-training/online-course/>
12. U.S. Climate Resilience Toolkit <https://toolkit.climate.gov/training-courses>
13. UNESCO climate change education course for teachers <https://unesdoc.unesco.org/ark:/48223/pf0000219752>
14. Wikipedia [https://en.wikipedia.org/wiki/Climate\\_change\\_education](https://en.wikipedia.org/wiki/Climate_change_education)
15. Climate data Canada: Learning Zone <https://climatedata.ca/learn/>
16. World Meteorological Organization, Green Climate Fund, Swedish Meteorological and Hydrological Institute and World Climate Research Programme <https://climateinformation.org/>

Each course has a slightly different approach and emphasis. There are many more.

This Guide can serve as a supplement to the courses or vice versa.

It is very important to realize that scope of the science of climate change is very, very large. There are opportunities to study the subject in almost every discipline. There are many career opportunities.

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There are several so-called guides to climate change that are only a few pages long. These serve to inform the interested on what is meant by climate change. If your interest is piqued then close examination of one or more of the available courses, in conjunction with this guide, which is free, may be helpful.

A relatively new area of support is climate education in public schools, such as the Sustainability and education Policy Network, <https://sepn.ca/resources/report-building-climate-ready-schools-canada/>. UNESCO provides support for these initiatives through a variety of programs and resources, <https://aspnet.unesco.org/en-us/climate-education-education>.

## 29.2 Newsletters

These newsletters are intended to bring you into the world of discussion of the science of climate change. It still requires a little ‘poking around’ but the information and insights are often terrific. There are several others which you can find on your own. If you find a good one, let me know.

1. Carbon Brief. <https://www.carbonbrief.org/>
2. Climate Action. <https://www.climateaction.org/>
3. International Energy Agency. <https://www.iea.org/>
4. National Academy of Sciences, Engineering and Medicine. <https://www.nationalacademies.org/>
5. Bloomberg Green. <https://www.bloomberg.com/green>
6. Copernicus Newsletter. <https://www.copernicus.eu/en/sign-copernicus-newsletter>
7. World Resources Institute. <https://www.wri.org/>
8. Johannes Friedrich at World Resources Institute. <https://www.wri.org/profile/johannes-friedrich>
9. Climate Outreach. <https://climateoutreach.org/>
10. Climate Watch, World Resources Institute. <https://www.wri.org/our-work/project/climate-watch>
11. The Lancet. <https://www.thelancet.com/>
12. NASA Climate Change News. [https://climate.nasa.gov/news/?page=0&per\\_page=40&order=publish\\_date+desc%2C+created\\_at+desc&search=&category=19%2C98](https://climate.nasa.gov/news/?page=0&per_page=40&order=publish_date+desc%2C+created_at+desc&search=&category=19%2C98) and <https://climate.nasa.gov/>
13. Nature Briefing. <https://www.nature.com/articles/d41586-019-03551-y>
14. Philippa Nuttall Jones. <https://energymonitor.ai/author/philippanuttalljones>
15. Pembina Institute. <https://www.pembina.org/>
16. United Nations Convention to Combat Desertification and newsletter. <https://www.unccd.int/about-us/secretariat>
17. The Arctic Institute <https://www.thearcticinstitute.org/>

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### 29.3 International organizations

The two best-known international organizations are the Intergovernmental Panel on Climate Change, IPCC (<https://www.ipcc.ch/>) and the United Nations Framework Convention on Climate Change, UNFCCC (<https://unfccc.int/>). As will be noted in their web sites there is a significant effort to provide networking opportunities to anyone, not just scientists, interested in any aspect of the science of global warming and climate change and adaptation and mitigation. Many researchers from many disciplines participate in the development of the IPCC assessment reports and in the extensive support system required to produce the reports.

A few very important international organizations that network active individual scientists and organizations doing significant research into the various aspects of the science of global warming and climate change are the World Meteorological Association (<https://public.wmo.int/en>), the United Nations Environment Programme, UNEP, (<https://www.unep.org/>), the World Climate Research Program (<https://www.wcrp-climate.org/>) and Future Earth (<https://futureearth.org/>). The web site of each organization is worth exploring.

#### 29.3.1 World Meteorological Organization

The World Meteorological Organization is a specialized agency of the United Nations <https://public.wmo.int/en>. They state their mandate as follows; ‘As weather, climate and the water cycle know no national boundaries, international cooperation at a global scale is essential to implement an Earth system approach for the development of meteorology, climatology, operational hydrology and relate environmental services as well as to reap the benefits from application. WMO provides the framework for such international cooperation.’

WMO publishes a report in 2022 titled, United in Science 2022: A multi-organizational high-level compilation of the most recent science related to climate change, impacts and responses. United in Science reports are available for 2019, 2020 and 2021. “United in Science provides an overview of the most recent science related to climate change, impacts and responses from the World Meteorological Organization (WMO) and partner organizations. At a time when urgent action to address climate change is needed, the report provides unified scientific information to inform decision-makers and highlights some of the physical and socioeconomic impacts of the current and projected climate.” United in Science publications are available for download at [https://library.wmo.int/index.php?lvl=notice\\_display&id=22128#.Yzx5FXbMluV](https://library.wmo.int/index.php?lvl=notice_display&id=22128#.Yzx5FXbMluV).

As well the WMO publishes a report titled, Provisional State of the Global Climate each year. In 2021 there are reports titled State of the Global Climate, State of the Climate in Latin America and Caribbean, State of the Climate in Africa and State of the Climate in Europe.

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### 29.3.2 United Nations Environment Programme, UNEP

The United Nations Environment Programme, UNEP, <https://www.unep.org/> is the implementing arm of the United Nations Environment Assembly <https://www.unep.org/environmentassembly/about-united-nations-environment-assembly> which is described itself as follows; ‘The United Nations Environment Assembly is the world’s highest-level decision-making body on the environment. It addresses the critical environmental challenges facing the world today. Understanding these challenges and preserving and rehabilitating our environment is at the heart of the 2030 Agenda for Sustainable Development.

The Environment Assembly meets biennially to set priorities for global environmental policies and develop international environmental law. Through its resolutions and calls to action, the Assembly provides leadership and catalyses intergovernmental action on the environment. Decision-making requires broad participation, which is why the Assembly provides an opportunity for all peoples to help design solutions for our planet’s health.’

‘UNEP’s mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.’ ‘UNEP works on delivering transformational change for people and nature by drilling down on the root causes of the three planetary crises of climate change, nature and biodiversity loss, and pollution and waste.’

### 26.3.3 World Climate Research Program

The World Climate Research Programme (WCRP) <https://www.wcrp-climate.org/> leads the way in addressing frontier scientific questions related to the coupled climate system — questions that are too large and too complex to be tackled by a single nation, agency or scientific discipline. Through international science coordination and partnerships, WCRP contributes to advancing our understanding of the multi-scale dynamic interactions between natural and social systems that affect climate. WCRP engages productively through these partnerships to inform the development of policies and services and to promote science education. Most critically, WCRP-supported research provides the climate science that underpins the United Nations Framework Convention on Climate Change, including national commitments under the Paris Agreement of 2015, and contributes to the knowledge that supports the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, and multilateral environmental conventions.

In their own words, ‘The World Climate Research Program coordinates and facilitates international climate research to develop, share, and apply the climate knowledge that contributes to societal well-being. We seek to better understand the climate system. Our research aims to predict the near-term evolution of the climate system. We strive to better understand long-term responses to the climate system. We will build a bridge between climate

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science and society.’

#### 29.3.4 Future Earth

‘Future Earth <https://futureearth.org/> is a global network of researchers and innovators. The strength of Future Earth lies within the work of the community comprising 27 Global Research Networks (formerly referred to as 8 Knowledge Action Networks and 19 Global Research Projects), and National and Regional Networks (National Committees and Structures, Regional Committees and Offices), as well as the Early Career Network. These networks represent academics, policymakers, independent scholars, and students, all working across sectors and disciplines. They play a critical role in defining and advancing research and solutions in Earth system science and its component sub-systems and their nexus (land, ocean, food, energy, water, etc.), including human societies and health. The secretariat works to connect the networks and drives synthesis and engagement across the different networks, including communications products and links to policy communities at a global level.’ The Global Carbon Project <https://www.globalcarbonproject.org/index.htm> is a Global Research Project of Future Earth and is discussed in Chapter 15.

They elaborate in their 2021 Annual Report ([https://futureearth.org/wp-content/uploads/2022/09/future-earth\\_finalWEB.pdf](https://futureearth.org/wp-content/uploads/2022/09/future-earth_finalWEB.pdf)); ‘Future Earth continues to develop knowledge products for society, such as technical papers submitted to the Convention on Biological Diversity and the delivery of 10 New Insights in Climate Science to the United Nations Framework Convention on Climate Change (UNFCCC) at COP26 in Glasgow. The Earth Commission continued to advance on its assessment of tipping points in the Earth system to define safe and just Earth system boundaries to underpin science-based targets for businesses and cities. Sustainability in the Digital Age also launched a Digital Climate Projects Database focused on climate governance strategies. Each of these products translates the most recent scientific understanding into a user-oriented frame for greater relevance and uptake to communities at the forefront of change.’

#### 29.3.5 Global Carbon Project

The describe themselves as follows: The Global Carbon Project (GCP) <https://www.globalcarbonproject.org/> integrates knowledge of greenhouse gases for human activities and the Earth system. Our projects include global budgets for three dominant greenhouse gases — carbon dioxide, methane, and nitrous oxide — and complementary efforts in urban, regional, cumulative, and negative emissions.

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### 293.6 United Kingdom Met Office

The Met Office is the national meteorological service for the UK. <https://www.metoffice.gov.uk/>  
We provide critical weather services and world-leading climate science, helping you make better decisions to stay safe and thrive.

### 29.3.7 United Nations Office for Disaster Risk Reduction

They describe themselves as follows: UNDRR (formerly UNISDR) <https://www.undrr.org/> is the United Nations focal point for disaster risk reduction. UNDRR oversees the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, supporting countries in its implementation, monitoring and sharing what works in reducing existing risk and preventing the creation of new risk.

### 29.3.8 Urban Climate Change Research Network

The Urban Climate Change Research Network (UCCRN) <https://uccrn.ei.columbia.edu/> is a global consortium of over 1,200 individuals from over 150 cities dedicated to the analysis of climate change mitigation and adaptation from an urban perspective. UCCRN members are scholars and experts from universities and research organizations around the world. They span a broad range of expertise including climate scientists; urban heat island and air quality experts; climate change impact scientists; social scientists, including economists, political scientists, and sociologists; and urban designers and planners.

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