

Syllabus
Earth's Climate: Past, Present and Future and Reasons for concern
subject to further revision – dated 7/13/2015 version 1

Fall Term - OLLI West
Tuesday 9:30-11:30 am at OLLI west campus; Jefferson Unitarian
14350 W 32nd Ave, Golden, CO 80401
September 15– November 3, 2015

WITH TENTATIVE ICE CORELAB FIELD TRIP 11/5 SUBJECT TO Class consensus

Facilitator: Paul Belanger; pebelanger@glassdesignresources.com; cell 303-249-7966
If you are unable to attend the first session, please notify the facilitator by email.

Course description: go to <http://denverclimatestudygroup.com/> and click on OLLI tab to find the following <http://denverclimatestudygroup.com/wp-content/uploads/2014/07/Belanger-OLLI-fall-2015-Class-description-update-20150713.pdf>

Readings:

All readings will be handouts distributed weekly by e-mail or hard copies handed out in class for those without Internet access; please advise me of the latter. The readings will include excerpts from books, articles, and web site links.

Prerequisite reading: read or be familiar with concepts presented in the following book: *What We Know About Climate Change* by Kerry Emanuel, 2nd Edition 2012, 120 pages — An outline of the basic science of global warming and how current consensus has emerged. Also familiarize yourself with <http://www.skepticalscience.com/> and <http://www.realclimate.org/>

Weekly Topics:

Updates to the syllabus below will be updated and expanded with resources, links and suggested reading before, during and after various classes at:
http://denverclimatestudygroup.com/?page_id=24

Class Type: Illustrated Lectures, some video and discussion; in lieu of 3rd class there will be a field trip to National Ice Core Lab located at USGS in Lakewood; <http://icecores.org/> at 9 a.m. Tuesday September 30th. I will have room for a total of 35 persons for the Ice Core Lab field trip and will solicit for other-than-class members on a first come, first served basis. See if your spouse or significant other wishes to come.

1. Tuesday September 15th, 9:30-11:30 a.m.: Introduction
 - Key principles of climate change
 - The difference between weather and climate
 - Climate system: feedbacks, cycles and self-regulation (climate, not government)
 - What determines Earth's climate

2. Tuesday September 22nd, 9:30-11:30 a.m.:
 - Earth's deep past before the Cambrian (600 MaBP): hot and cold
 - Earth's past: Cambrian onward: mostly hot-house Earth; 100s parts per million (ppm)
 - Climate trend in the Cenozoic – the last 65 million years; proxy data from 3600ppm to <200 ppm.

- More recent past: 180-280 part per million; how do we know – empirical data. Preview of next week's field trip
- Today: 400 ppm and growing 2-3ppm/year

REVISED FROM HERE ONWARD:

3. Tuesday September 29th, 9:00-11:30-noon:
 - **THIS WAS SUPPOSED TO BE A FOLLOW UP TO THE ICE CORE LAB FIELD TRIP (RESCHEDULED, TENTATIVELY FOR THURSDAY NOVEMBER 5TH, SEE BELOW – INSTEAD:**
 - Antarctic ice cores
 - Arctic Ice cores
 - What the data tells us
 - Signs of climate change/how has it changed: ocean acidification, Arctic warming
 - Global carbon emissions of Carbon dioxide (CO₂) and Methane (CH₄)
4. Tuesday October 6th, 9:30-11:30 a.m.:
 - Future projections and feedbacks:
 - Models
 - Rates of change: analogs and various comparisons to the past
 - IPCC Fifth Assessment report (AR5): <http://www.ipcc.ch/report/ar5/>
 - The Pope's encyclical: google it or go here http://denverclimatestudygroup.com/wp-content/uploads/2014/10/2015.05.24-papa-francesco_20150524_enciclica-laudato-si.pdf

THE NEXT 3 WEEKS ARE TENTATIVE TOPICS/ORGANIZATION – LIKELY TO BE MODIFIED

5. Tuesday October 13th, 9:30-11:30 a.m.:
 - **Denial 101x:**
 - here's a link to a newly available self-paced version of the course I took in April and May: <https://www.edx.org/course/making-sense-climate-science-denial-uqx-denial101x-0>
6. **Tuesday October 20st, 9:30-11:30 a.m. – NO CLASS**
7. Tuesday, October 27th, 9:30-11:30 a.m.:
 - **Solutions:**
 - Climate Intervention Proposals:
 - Solar Radiation Management (SRM)
 - and Carbon Dioxide Removal (CDR)
 - Economics:
 - economics of doing nothing vs. the economics of mitigation: Lomborg, Stern, Nordhaus
 - game changers: existing technologies/promise, but at what cost? (One might be surprised).
 - Biochar vs. BECCS solutions
8. Tuesday November 3th, 9:30-11:30 a.m.: **conclusion**

- It's not about climate change as much as sustainability
- Energy
- Urban heat islands
- Food security
- Population growth; potential refugee issue of climate change
- Welcome to the Anthropocene and looking ahead
- Your carbon footprint
- Wrap-up

ICE CORELAB FIELD TRIP 11/5 SUBJECT TO Class consensus

9. Thursday November 5th (**tentative**), 9:00-11:30-noon: (important: bring government issued ID), hat, coat, gloves for – 40 degrees F. and adequate time to be checked in at the gate – details to follow in class.
 - it will include some lecturing by Ice Core Lab personnel:
 - Antarctic ice cores
 - Arctic Ice cores
 - What the data tells us

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Some links I'd like you to investigate:

- <http://www.nybooks.com/articles/archives/2015/jun/04/new-solution-climate-club/> and
- <http://carbon-price.com/wp-content/uploads/2015-01-04-Nordhaus-ClimateClubAEA-v2-slides.pdf> (30 slides, Jan, 2015)
- <http://citizensclimatelobby.org/>

and others that I'll be updating on class web page

Books/Materials:

- 1) To be read before class — *What We Know About Climate Change* by Kerry Emanuel, 2nd Edition 2012, 120 pages — An outline of the basic science of global warming and how current consensus has emerged.
- 2) Optional reading *Don't Even Think About It: Why Our Brains are Wired to Ignore Climate Change* by George Marshall 2014, 272 pages. Both available from Amazon, Barnes & Noble, Tattered Cover in book, e-book, or audible forms.
- 3) Slides, links, and additional resources posted on the OLLI class link at <http://www.denverclimatestudygroup.com/> and on the OLLI Portfolio website.
- 4) Handouts

Class Type: Illustrated Lectures/Discussion; in lieu of 3rd class there will be a field trip to National Ice Core Lab located at USGS in Lakewood; <http://icecores.org/> set for 9 a.m. Tuesday September 29th.

Materials Fee: None