MNF344
AUTUMN 2017

Week 1: RADIATIVE FORCING

Natural radiative forcing

- Orbital insolation, volcanism and sunspots (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95713)
- Introduction to natural radiative forcing:
    - IPCC chapter 5.2 (https://ugc.futurelearn.com/uploads/files/ae/42/ae42921c-1d76-4baf-aa4c-0d57159819a6/WG1AR5_RadiativeForcing_Pre-IndustrialPerspective.pdf)
    - Note that Chapter 5 also gives an introduction to paleoclimate archives which will be the topic of week 2 (https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter05_FINAL.pdf)
- Review of solar and volcanic forcing:
    - IPCC chapter 8.4 (https://ugc.futurelearn.com/uploads/files/87/b8/87b8f511-562d-4467-83e5-1ea76dfbc06e/WG1AR5_RadiativeForcingLast250Years_Natural.pdf)
    - Note that chapter 8 also gives an introduction of anthropogenic as well as natural radiative forcing in general, parts of which will be covered this week (https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf)

Man-made radiative forcings

- The radiative forcing concept (https://ugc.futurelearn.com/uploads/files/cc/14/cc142412-7a39-458d-b501-72cd5a3dabc8/Forcing_text.pdf)
- Long lived greenhouse gases (https://ugc.futurelearn.com/uploads/files/97/16/97160631-242e-46a5-ae79-a12ce711434d/GHG.pdf)
- Man-made radiative forcing (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95721)
    - Anthropogenic forcings last 250 years (https://ugc.futurelearn.com/uploads/files/1e/a8/1ea83db8-6fe8-410d-8e1b-2e16d695314b/WG1AR5_RadiativeForcingLast250Years_Anthropogenic.pdf)
    - Overview of climate drivers (https://ugc.futurelearn.com/uploads/files/f4/72/f4724ff4-3353-44b2-85ad-7684d0f90a59/WG1AR5_ClimateDriversOverview.pdf)

Natural versus man-made radiative forcing

- What is the relative contribution of natural and made-made radiative forcing over the past few centuries? (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95726)

Week 2: CLIMATE FEEDBACKS AND HEAT TRANSPORT

Energy balance/heat transport

- The Gulf Stream and ocean heat transport (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95731)

- Atlantic Meridional Overturning Circulation:
    - IPCC chapter 3.6.3 (http://www.climatechange2013.org/images/report/WG1AR5_Chapter03_FINAL.pdf)
    - What is the gulf stream (https://www.mpimet.mpg.de/en/communication/climate-faq/what-is-the-gulf-stream/)

Climate Feedback

- Radiative feedbacks (https://ugc.futurelearn.com/uploads/files/30/83/30838bfc-3933-44fd-a4de-f53e33678b42/Feedbacks.pdf)
- Mathematical Expression of Climate feedbacks (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95738)
    - Overview of feedbacks and temperature sensitivity (https://ugc.futurelearn.com/uploads/files/95/df/95dfe3f5-c587-49b1-bfa8-3b22e733e335/WG1AR5_SensitivityFeedbacks_Overview.pdf)
    - More on climate feedbacks and temperature sensitivity (https://ugc.futurelearn.com/uploads/files/95/df/95dfe3f5-c587-49b1-bfa8-3b22e733e335/WG1AR5_SensitivityFeedbacks_Overview.pdf)

Week 3: PAST CHANGES IN CLIMATE AND OCEAN HEAT UPTAKE

Ocean heat Uptake

- Ocean heat uptake (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95749)
    - Changes in ocean heat uptake (https://ugc.futurelearn.com/uploads/files/b7/14/b7146101-d054-4357-bc3e-8c36d2942285/WG1AR5_OceanHeatContent.pdf)
- A simple climate model with ocean heat uptake (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95751)

Records of past changes in climate

- Past changes in climate (https://www.futurelearn.com/courses/causes-of-climate-change/2/steps/95754)
- IPCC chapter 5 (https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter05_FINAL.pdf)

Week 4:

Work related to semester thesis