Environmental Issues in East Asia

EA30e Spring 2021

April 16, 2021

Contents

Preface

0.1 Guiding Principles

Environmental issues in East Asia are not unique or particularly more prevasive than other parts of the world. However, the issues are born from particular histories that may contrast with other parts of the world and other parts of the world may be able to learn from.

In this project, the students in EA030e (Spring 2021) have written a textbook that highlights examples of environmental processes. Each student contributed to one theme, composed of two examples that highlight environmental issues of East Asia.

0.1.1 Context and Positionality

As students in a college course located in Southern California, we approach the project with...

Our goal is not to call out environmental issues in East Asia, but to point to linkages of how a range of globalized economy contribute to these environmental problems.

In the end, it would be useful for us to acknowledge we have some capacity to address these how these global linkages could be modified to reduce these environmental issues.

We are not experts, but learning... if there are errors please let us know... We recommend that suggestions be submitted via a github pull request.

0.1.2 Goals

Processes across horizontal boundaries define many environmental patterns that frame human interactions with the environment. How do humans impact processes that cross these boundaries and how do humans influence these ecosystem interface?

0.1.3 Rationale

We hope to learn more about the how environmental issues are expressed in different parts of the world and to what extent can we learn from this work.

0.1.4 Activity

Each group will be composed of two students, that will become experts and teach their classmates on the topic.

0.2 East Asia and the World

0.3 Acknowledgments

Everyone in the world!

LaTeX Guide

Why Learn LaTeX?

In the past, I used LaTeXto make publication quality text. In fact, many prefer writing in LaTeXbecause they can focus on the text and avoid worrying about formatting. However, it is NOT WYSIWYG ("what you see is what you get") word processor. In reality, the processing or compiling is a separate step.

Nevertheless, the quality of the output and ability to integrate with R (or Python) allows us to have an exceptional tool to make reproducible documents.

How to Learn LaTeX?

There are several ways to learn LaTeX. I suggest you find a decent tutorial to get the basics. For example, here are some suggestions:

- Learning LaTeXin 30 minutes

If you are like me and can't remember commands very well, then here's a cheet sheet that might be helpful.

R Chunks

To create effective graphics, each chapter will have a rchunk that creates a graphic for the chapter. To review and learn R, here are some resources:

- Marc's Video Description
- RMarkdown for Scientists (super helpful!)
- R Studio Tutorial
- R Studio's Cheatsheet
- R Markdown Cookbook – Robust Source

Noting Your Contribution

Because this is an ongoing project, you should record your contribution to each chapter – but also let go of these contributions at some point; Others might revise and their authorship might take some precedence, so you should both invest in the product but also be willing to detach from the final outcome as others contribute. This will feel uncomfortable at times, but please note from the beginning this is a social process and as such subject to negotiation. Please be generous to the authors that laid the foundation and be respectful of those that follow.

0.4 Setting Up Book Project–Type Setting w/ LaTeX

0.4.1 Latex Book Class

Currently, the text is written using the standard book class.

0.4.2 Structuring the Text with Nested Hierarchies

Contributors divide their contributions into sections and subsections. This format allows a consistent approach to structuring the text and forcing themes to be organized in blocks that can be used to organize the overall text. We use section, subsection, and subsubsection to break up the topic into bite sizes.

To accomplish this, contributors use the `\section{Section}` command for major sections, and the `\subsection{Subsection}` command for subsections, and a similar approach for subsubsections.

NOTE: for each nested level, it MUST be followed by the lowest level in the section before a paragraph is started – in contrast to what is shown above!

NOTE: We may dispense with subsubsections in the future to provide a less blocky structure, but for now they remain useful.

0.4.3 Font Changes

We can use various methods to alter the typeset: *Emphasize*, **Bold**, *Italics*, and *Slanted*. We can also typeset Roman, Sans Serif, Small Caps, and `Typewriter` texts. Look online to see the commands to accomplish these changes.

You can also apply the special, mathematics only commands $\mathbb{BLACKBOARD}$, $\mathbb{BOLD}$, $\mathcal{CALLIGRAPHIC}$, and $\mathfrak{fraktur}$. Note that blackboard bold and calligraphic are correct only when applied to uppercase letters A through Z.

You can apply the size tags – Format menu, Font size submenu – tiny, scriptsize, footnotesize, small, normalsize, large, Large, LARGE, huge and Huge.

You can use the `\begin{quote} etc. \end{quote}` environment for typesetting short quotations. Select the text then click on Insert, Quotations, Short Quotations:

> The buck stops here. *Harry Truman*
>
> Ask not what your country can do for you; ask what you can do for your country. *John F Kennedy*
>
> I am not a crook. *Richard Nixon*
>
> I did not have sexual relations with that woman, Miss Lewinsky. *Bill Clinton*

The Quotation environment is used for quotations of more than one paragraph. Following is the beginning of description of LaTeXfrom *Wikipedia*:

> LaTeX (/ltx/ LAH-tekh or /letx/ LAY-tekh, often stylized as LaTeX) is a software system for document preparation. When writing, the writer uses plain text as opposed to the formatted text found in "What You See Is What You Get" word processors like Microsoft Word, LibreOffice Writer and Apple Pages. The writer uses markup tagging conventions to define the general structure of a document (such as article, book, and letter), to stylise text throughout a document (such as bold and italics), and to add

citations and cross-references. A TEXdistribution such as TEXLive or MiKTEXis used to produce an output file (such as PDF or DVI) suitable for printing or digital distribution.

LaTeX is widely used in academia for the communication and publication of scientific documents in many fields, including mathematics, statistics, computer science, engineering, physics, economics, linguistics, quantitative psychology, philosophy, and political science. It also has a prominent role in the preparation and publication of books and articles that contain complex multilingual materials, such as Sanskrit and Greek. LATEXuses the TeX typesetting program for formatting its output, and is itself written in the TeX macro language."

Use the Verbatim environment if you want LATEX to preserve spacing, perhaps when including a fragment from a program such as:

```
#read csv data  // read data into R
my.dataframe <- read.csv(file.choose())   // read data from a popup window.

str(my.dataframe) // display data structure
```

(After selecting the text click on Insert, Code Environments, Code.)

0.4.4 Mathematics and Specialized Characters

Warning: Special Characters

When you use percent and ampersand symbols, hash tags, and other non-standard ASCII characters, LATEXwill be very uncooperative. LATEX doesn't like a range of characters or they reserved for special behavior. So, do yourself a favor and make sure you understand that these are used for special typesetting functions. To use them you have to "escape" and use commands to get them to do what you might usually expect!

The following symbols $, %, #, &, è, ñ, " and " do not reflect the key stroke you might expect.

For example, the & is used for tabs in a table environment. % is used to make comments, thus stuff behind a % is ignored. There are lots of others, but these come up the most. If you want to show use the ampersand or one of these characters, put a backslash in front of the dollar sybmol, e.g. \$. See Table 1.

If you want to a superscript (raised to 3nd power), we can create text in math mode, with $ to start and end the text in math mode, e.g. m^3 is written in LATEXas m^3. A subscript uses an underscore, x$_1$ creates x_1. If you need more than one character as a subscript or superscript then enclose the content in curly brakets, e.g. x^{2c} (x^{2c}) and t_{step} (t$_{step}$).

Table 1: Table of Symbols in LATEX

Symbol	LATEXcode	Symbol	LATEXcode
&	\&	$	\$
"	``	"	''
mg L^{-1}	mg~L^{-1}		

0.4.5 Creating equations

One of the most powerful parts of LaTeXis how it can be used to write complex equations, with all those symbols and Greek letters! This can be done inline $y = mx + b + \epsilon$ for fairly simple equations, or set apart for more complex equations:

$$\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2} \tag{1}$$

Theorems, etc

Theorem 1 *(The Currant minimax principle.) Let T be completely continuous selfadjoint operator in a Hilbert space H. Let n be an arbitrary integer and let $u_1, \ldots, u_{n-1}$ be an arbitrary system of $n-1$ linearly independent elements of H. Denote*

$$\max_{\substack{v \in H, v \neq 0 \\ (v,u_1)=0,\ldots,(v,u_n)=0}} \frac{(Tv, v)}{(v, v)} = m(u_1, \ldots, u_{n-1}) \tag{2}$$

Then the n-th eigenvalue of T is equal to the minimum of these maxima, when minimizing over all linearly independent systems $u_1, \ldots u_{n-1}$ in H,

$$\mu_n = \min_{u_1,\ldots,u_{n-1} \in H} m(u_1, \ldots, u_{n-1}) \tag{3}$$

The above equations are automatically numbered as equation (2) and (3).

0.4.6 Lists Environments: Making bulletted, numbered, description lists

We use special commands to create an itemized list.

You can create numbered, bulleted, and description lists (Use the Itemization or Enumeration buttons, or click on the Insert menu then chose an item from the Enumeration submenu):

1. List item 1
2. List item 2
   (a) A list item under a list item.
   (b) Just another list item under a list item.
      i. Third level list item under a list item.
         A. Fourth and final level of list items allowed.

- Bullet item 1
- Bullet item 2
  - Second level bullet item.
    - Third level bullet item.
      - Fourth (and final) level bullet item.

Description List Each description list item has a term followed by the description of that term.

Bunyip Mythical beast of Australian Aboriginal legends.

Figure 1: My plot's caption is here!

0.4.7 Theorem-Like Environments

The following theorem-like environments (in alphabetical order) are available in this style.

Example 2 *This is an example*

Exercise 3 *This is an exercise*

Theorem 4 *This is a theorem*

0.4.8 Peer Review Commenting

You can put your comments in square brackets and in color for things that need help. [This section is confusing, I am not sure what commenting means.]

0.4.9 Adding Figures, etc

Using Rnw Files

To generate R figures, we use R chunks in and Rnw file, where the text is integreated. When we compile into a PDF, the program converts the files into TeX files and then combineds them into a single pdf.

For each chapter, we create a "child" document and Marc will help you create that text when you begin.

Creating a floating figure

This is my floating figure (Figure 1).

Using R to Create Effective Figures

R Markdown can be a very powerful tool to integrate R code, figures and text. Making high quality figures that are both clear and aestically pleasing will be something that we need to think about it.

- Axis Labels – Labelled with clarity
- Axis Text – Size, Orientation
- Captions (usually better than titles)
- References connecting labels to references
- ADA accessible (e.g. color impairment mitigation)

For example, here's code to generate a pretty good figure:

In the case of Figure 2, we can a create a figure that has all of the characteristics listed above, except perhaps ADA. Creating a "alt text" for the figure is something we might want to consider – For now a decent caption about what the reader is seing is super helpful.

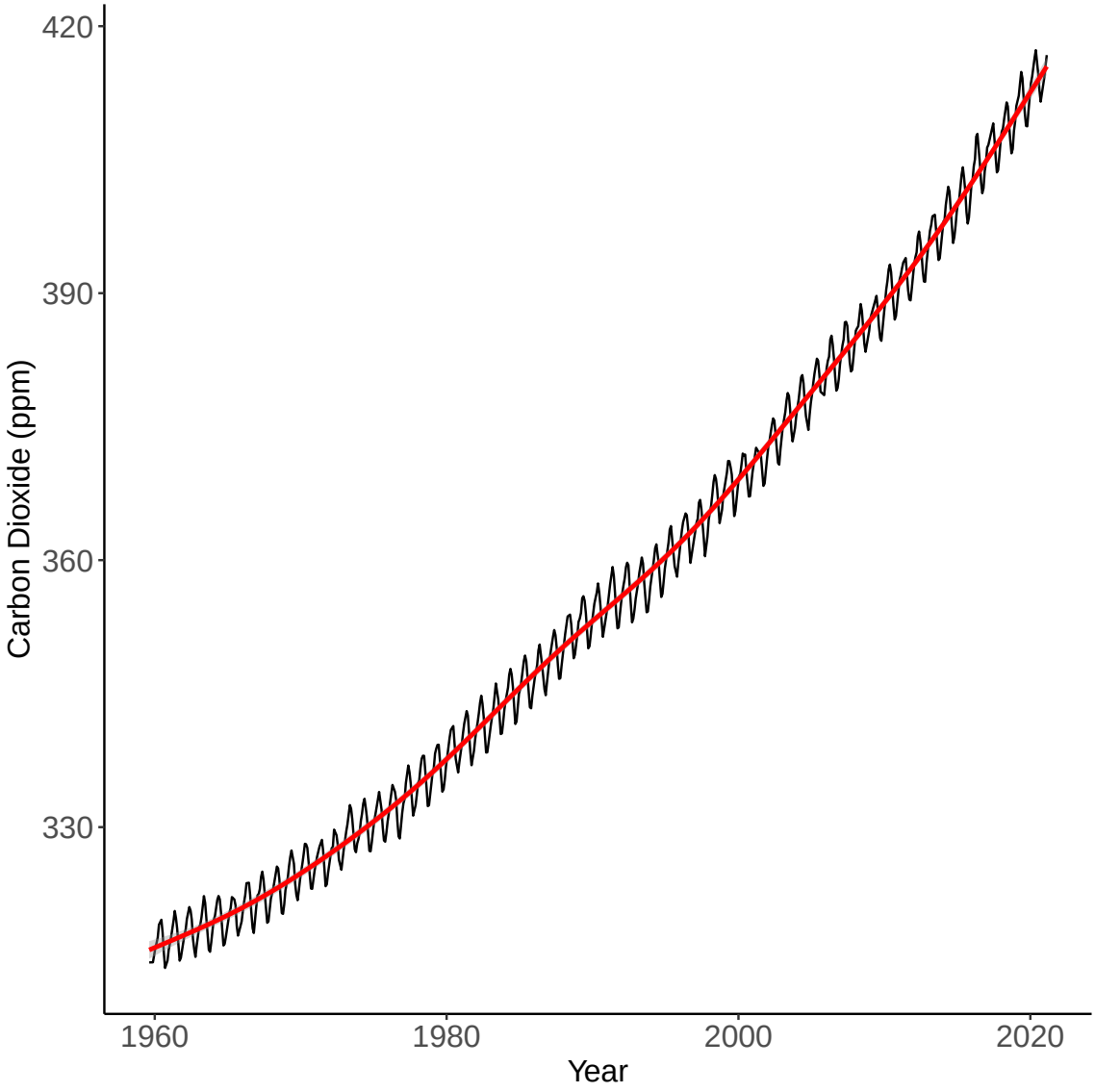

Figure 2: Carbon Dioxide Concentrations (Mauna Loa, HI). Data demonstrate the CO2 concentrations are increases, but that a seasonal impact is embedded in the long-term trend. Source: Scripps/NOAA.

0.4.10 Using Boxes

0.4.11 minibox X

Some text

0.4.12 Cross-References, Citations, and Glossaries

Cross-References

We can cross-reference sections (e.g. Section 3 or figures (Figure **??**) using several methods. I suggest you look at the this Rmd file to see how I did it in these examples.

You can also create links to URLs or hyperlinks, e.g. `http://texblog.org`. However, if these addresses change, then the link will break, so I suggest you only link to internal references.

Bibliography generation

There will be two steps to cite our sources. First, we need to add the reference to a database, or bib file. This is titled 'References.bib' and is located in the main folder in our respository. When you add information to the bib file, be sure to paste in the reference using a bibTeX format.

Second, we'll need to place in-line citations, using `\citep{knitr}`, which produces [Xie, 2021], by using a key, which is knitr in this case.

For example, you might write, "This document was produced in RStudio using the knitr package ([Xie, 2021]). Also try `\citet{LosHuertos2017OverviewR}` to create use the author name as the subject: Los Huertos [2018] wrote an guide to help students learn R.

Note: You will see these citations automatically put in alphabetic order in the Bibliography at the end of the PDF.

Creating glossary words

Definition 5 *This is a definition and the word is use in an glossary, e.g.* **peat**. **Peat** *is when you want to capitalize the defined word without having to re-define a capitalized version, the only downside of case sensitivity in LaTeX.*

Template Chapter Title

Marc Los Huertos

[1]

0.5 Section Heading

0.5.1 Subsection Headings

Some text here...The hierarchy structure is described in the Author Guide, Section 0.4 – NOTE: This is a section cross reference.

if you cut and paste, be sure to make sure you don't include formatted characters outside the ASCII values. See Author Guide, Section 0.4.4. NOTE: This is a subsection cross reference.

Optional Subsubsection Headings

some text here.... and a subsubsection cross reference (See Section 0.5.1).

0.6 Goals of this template

This template will NOT teach you how to use LaTeX! To accomplish that, we'll rely on some great online resources that you can find on in Chapter 0.3.

Instead this section of the document is designed to demonstrate how our textbook will look, feel, and ultimately how we contribute to the project.

This document also compiles all of our projects into a single PDF, where each chapter is composed of a input tex file.

0.7 Here's figure

0.7.1 R Created Figures

First we create an R chunk and add some code. In this case, I created a floating figure which can be referenced (Figure 3)!

[1] Statement of Contributions– For example, "The chapter was first drafted by Marc Los Huertos (2021). The author recieved valuable feedback from X, and Y and Z to improve the chapter. Slater revised the chapter in 2022 with suggestions from Cater." Note: I am still working on the formatting for this to improve it.

```
plot(pressure)
```

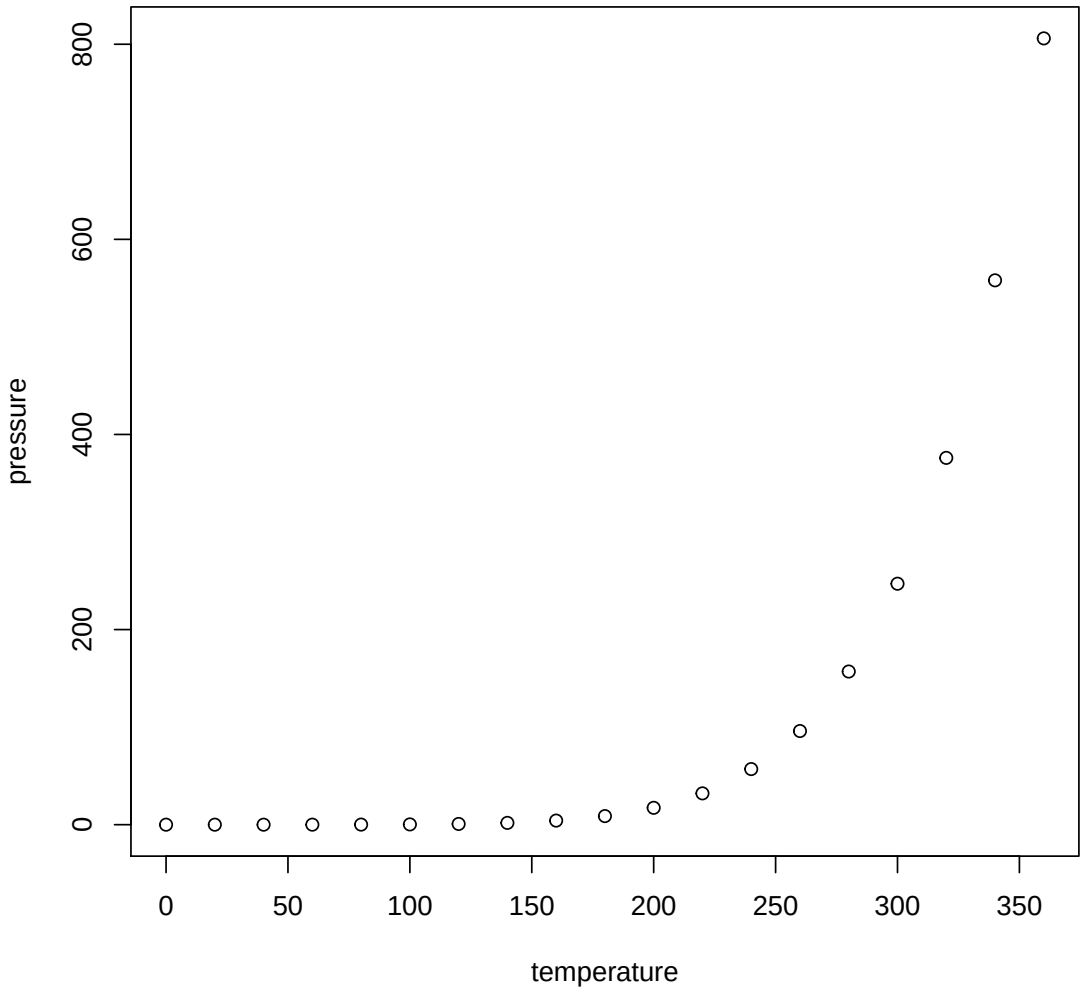

Figure 3: Figure Caption...we should turn "echo=False" in the R chunk options, but I left it true for now. (source: ??)

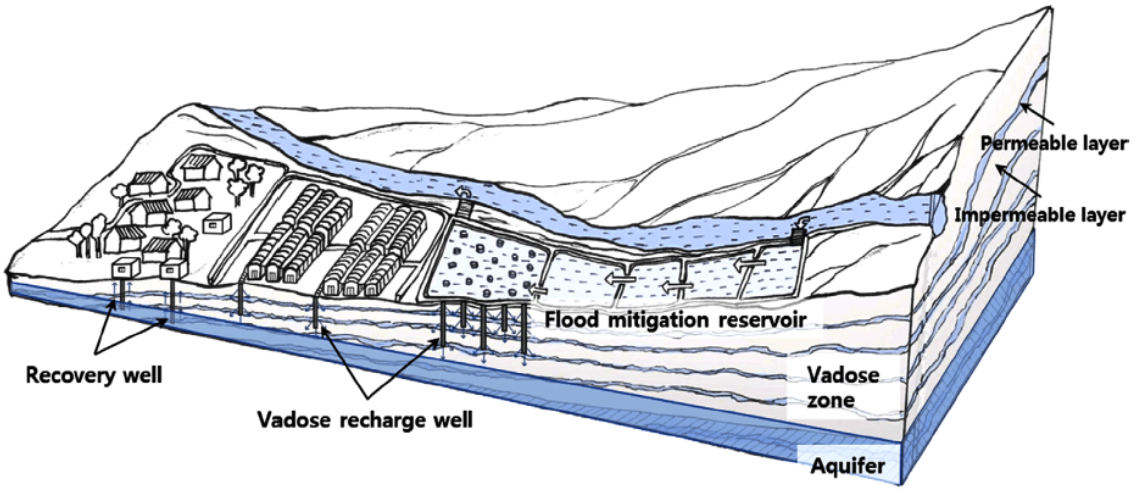

Figure 4: Vadose zone is neato (Source: Lee et al. [2017]).

0.7.2 Floating Figures from External Sources

All figures and images that are imported should be put into the "images" sudirectory to keep stuff organized. Even better to create a subdirectory with your images, but we can naviagate as we go.

Figure 4 is a good example of inserting an image from an external source.

In this case, I had to specify the width so it would fit on the page! See the Rnw file for the code. Notice, I was also abel to "reference" the figure in the text.

0.8 Adding Citations

See the Guide, as well, but my video is probably the most helpful.

Generally, there are many environmental trends in Asia [Imura et al., 2005].

Imura et al. [2005] describes the how urbanization has affected the hydrology of East Asia.

Plastic

Nora

→
chekcing on this today, 4-020-2021 pull request test 1.2
changes at 3 pm, 4-1-21
changes at 3:20 pm, 4-1-21
changes at 3:29 pm 4-1-21
changes at 3:33 pm

0.9 What the Polar Vortex and why do we care?

test commit and pull request

0.9.1 What Factors Drive Land Use Change?

Chapter 1

The Earth System

Marc Los Huertos

1.1 The Sun's Energy and the Earth's Temperature

The temperture of the Earth's surface is the result of a balance – the energy entering the atmosphere and the leaving the atmosphere. Most of this energy is in the form of light or electromagnetic radiation (Figure 1.1).

Light enters the atmosphere, where some is absorbed and some is reflected. Light interacts in different ways with land, oceans, and vegetation, which is beyond the scope of our project. The "quality" of light changes through these processes.

1.1.1 The Spectrum of Light Entering and Exiting the Earth's Surface

As the sun's electromagnetic radiation interacts with the Earth's Atmosphere, certain wavelengths are absorbed and filtered out (Figure 1.2).

1.1.2 The Atmosphere and Greenhouse Effect

1.2 Carbon Biogeochemistry

1.2.1 Long and Short Time Scales

The carbon cycle processes occur at wide range of temporal scales from hundreds of millions of years to seasons of the year. These have been referred to as long and short carbon cycles. However, for our purposes, I will call them "geologic carbon" and "biosphere carbon" processes.

1.2.2 Rock Cycle and Geologic Carbon

The carbon cycle describes changes in the fluxes and reservoirs of carbon in the Earth system. On very long time-scales, millions of years, the primary reservoirs of carbon are the atmosphere, ocean, and rocks (limestone). Carbon moves between these reservoirs through volcanic outgassing, silicate weathering, and limestone sedimentation. The carbon cycle is linked to Earth's energy balance through atmospheric carbon in the form of CO_2 , a greenhouse gas.

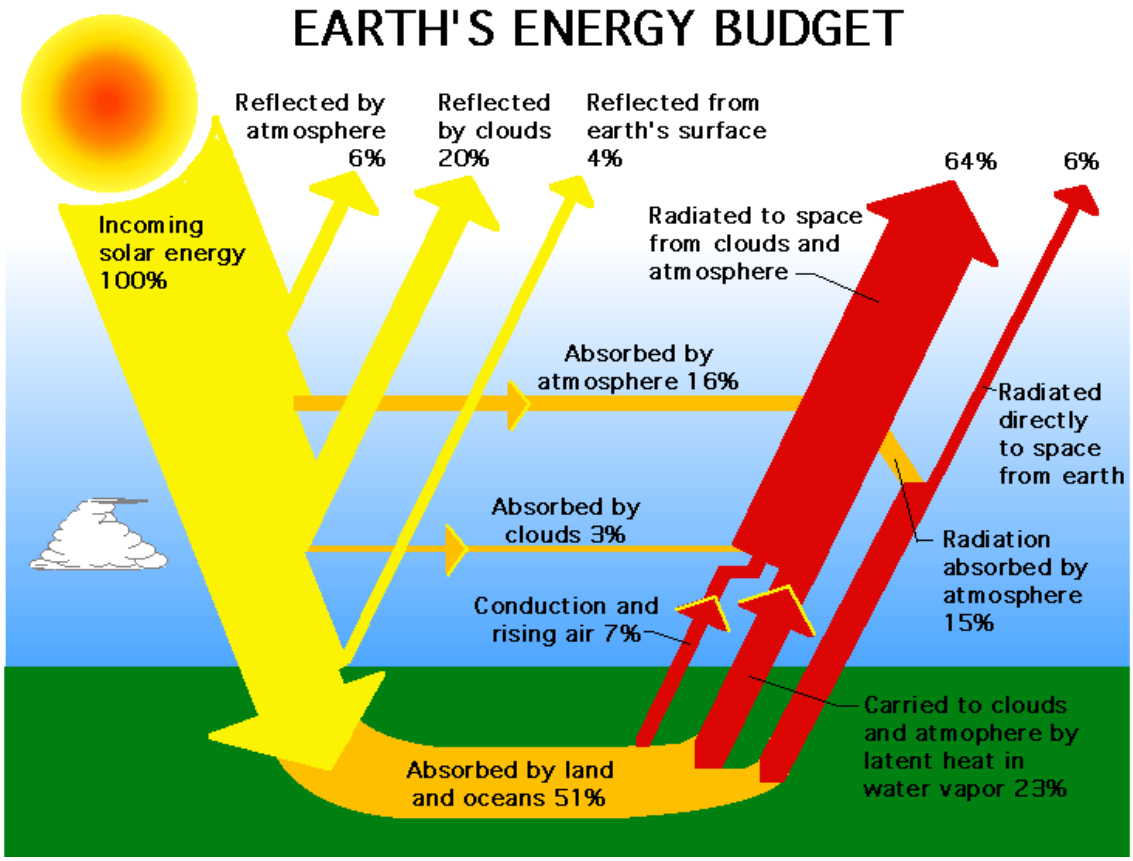

Figure 1.1: caption

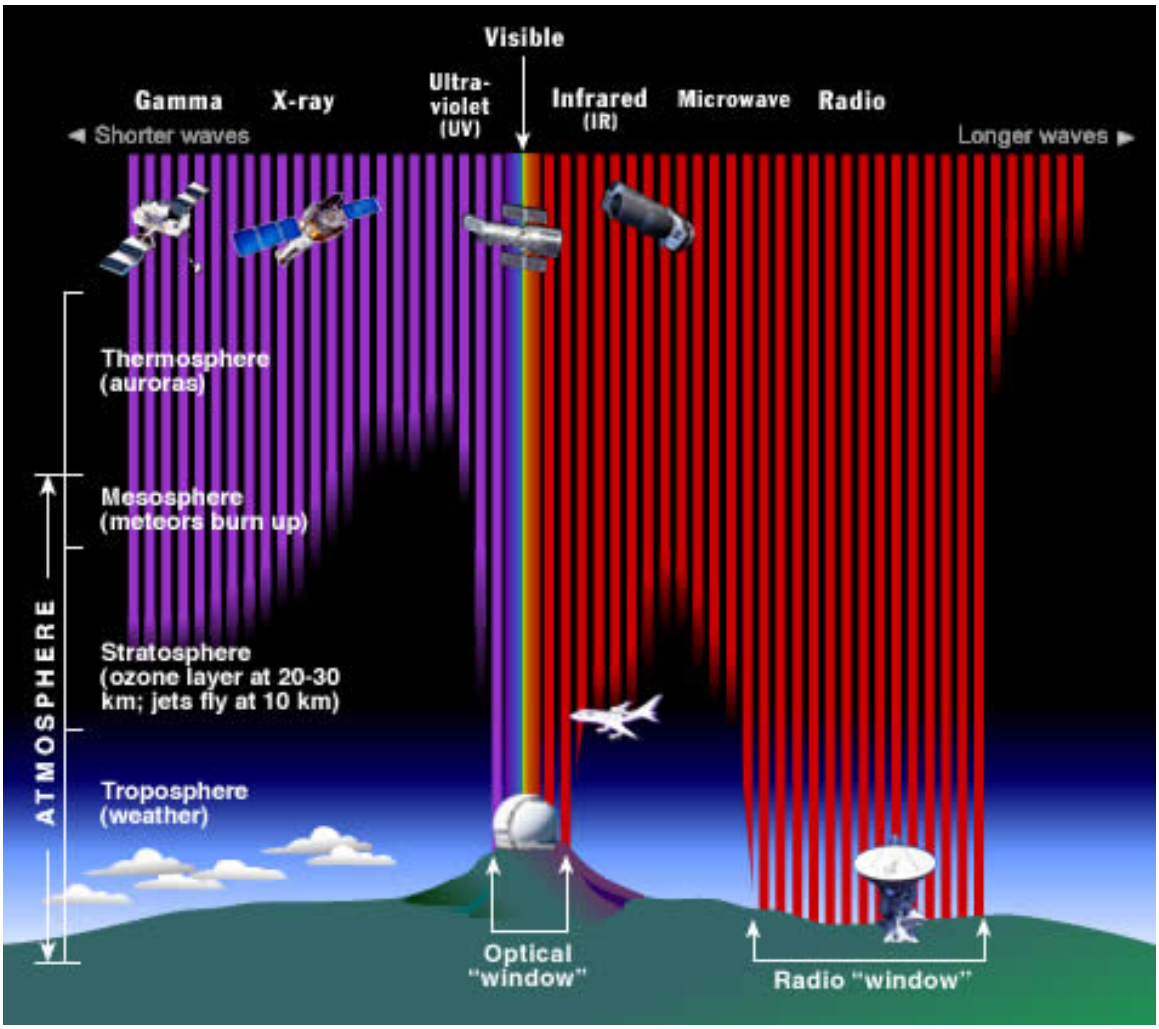

Figure 1.2: Various wavelengths of solar electromagnetic radiation penetrate Earth's atmosphere to various depths. Fortunately for us, all of the high energy X-rays and most UV is filtered out long before it reaches the ground. Much of the infrared radiation is also absorbed by our atmosphere far above our heads. Most radio waves do make it to the ground, along with a narrow 'window' of IR, UV, and visible light frequencies. Source: STCI/JHU/NASA.

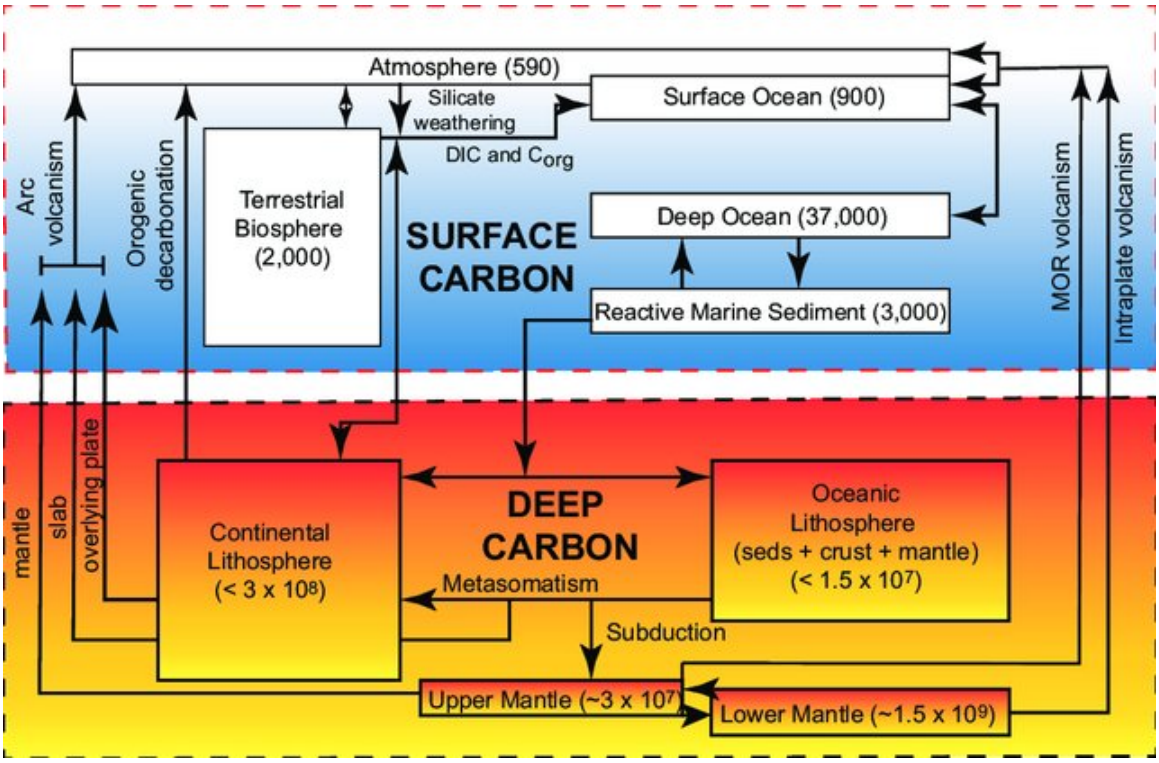

Figure 1.3: Carbon reservoirs and cycles in the Earth. The figure shows short-and long-term cycles; biosphere and geologic carbon reservoirs and fluxes, and the relative sizes and residence times (y axis) of respective carbon. Numbers in brackets refer to the total mass of carbon in a given reservoir, in Pg C (1Pg C = 10^{15} g carbon). All reservoirs are pre-industrial. Abbreviations: C org = organic carbon; DIC = dissolved inorganic carbon; MOR = mid ocean ridge; seds = sedimentary rocks. Adapted from Lee et al. (2019 And references therein).

Mountains and Erosion

1.3

Subduction Burial and Carbon Recycling

Figure **??**

1.2.3 Photosynthesis, Respiration, and Biosphere Carbon

Soil Respiration and the Soil Profile

Carbon in soils is respired – but different pools might have different rates of respiration. Sometimes these pools are distinquished as an active soil organic carbon pool and slow soil organic carbon pool. Although the reference of "slow" causes confusion with long-term, geologic carbon, but soil organic carbon remains a component of what we are refering to as biosphere carbon.

The surface of the soil tends to have more SOC and microbes that can use that carbon for respiration. Lower down in the soil profile, we tend to see lower amounts of SOC and lower microbial

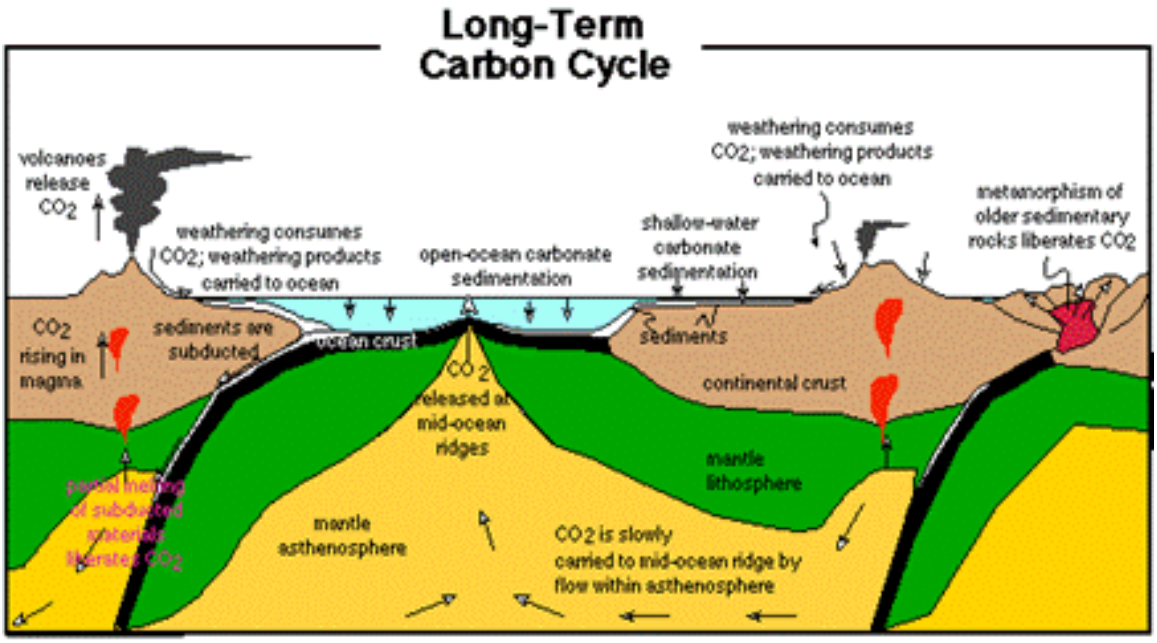

Figure 1.4: Schematic of the long-term carbon cycle (from Bice, 2001)

biomass (Figure **??**. In addition, soils in the lower part of the profile tend to have more aggregation that protects SOC from microbial attack, thus a key area that soil carbon can seqeustor carbon.

In addition to these microbial biomass and aggregate patterns, the microbes aree more senstive to temperature changes near the surface as measured by Q10 – the rate of biochemical processes with a 10 degree C increase in temperature. Thus, soil processes, such as respiration, is likely to increase more near the surface with global warming that the lower part of the soil profile.

1.3 Fossil Fuels and Carbon Dioxide Trends

As part if the industrial revolution, our energy sources have put more CO_2 from the biosphere (soils and forests) and geologic carbon (coal, petroleum).

1.3.1 The Signal of Geologic and Biosphere Carbon in Atmosphere

The combined contribution from geologic and biosphere carbon in the atmosphere is clearly documented from numerous sources. First, look at data collected at the Mauna Loa where CO_2 measurements have been taken continuously since the late 1950s.

Figure 1.6

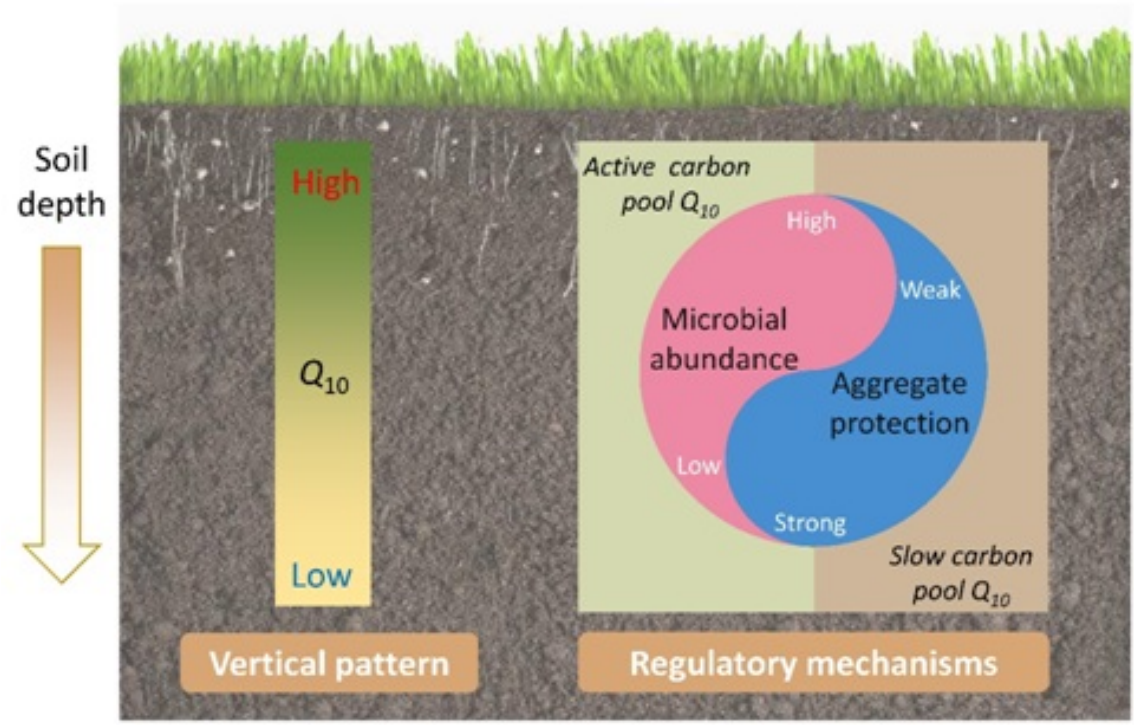

Figure 1.5: Regulatory Mechanisms of the Temperature Sensitivity of Soil Organic Matter Decomposition in Alpine Grasslands (Source: Qin et al. [2019], Institute of Botany [2021]).

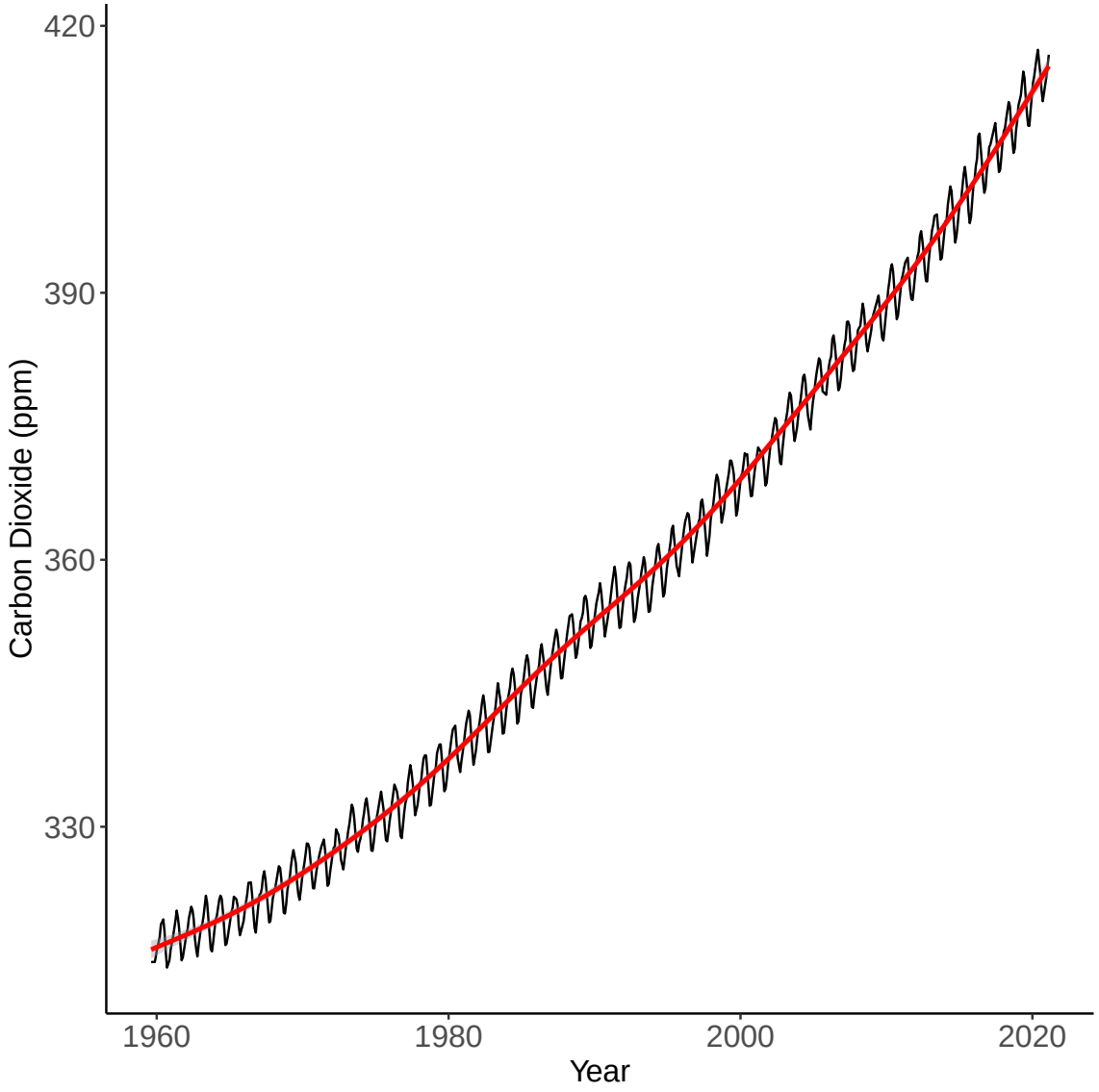

Figure 1.6: Carbon Dioxide Measure on Mauna Loa, HI

Chapter 2

Monsoons and East Asia Climates

2.1 Temperature Gradients and Latitude

Chapter 3

Critical Zone

Marc Los Huertos

[1]

3.1 What is the Critical Zone

The crticical zone refers the the portion of the Earth's skin where the zone where rock meets life. The Critical Zone supports all terrestrial life.

The critical zone includes the following:

- A permeable layer from the tops of the trees to the bottom of the groundwater;
- An environment where rock, soil, water, air, and living organisms interact and shape the Earth's surface;
- Water and atmospheric gases move through the porous Critical Zone, and living systems thrive in its surface and subsurface environments, shaped over time by biota, geology, and climate.

All this activity transforms rock and biomass into the central component of the Critical Zone - soil; it also creates one of the most heterogenous and complex regions on Earth.

Its complex interactions regulate the natural habitat and determine the availability of life-sustaining resources, such as food production and water quality.

These are but two of the many benefits or services provided by the Critical Zone. Such 'Critical-Zone Services' expand upon the benefits provided by ecosystems to also include the coupled hydrologic, geochemical, and geomorphic processes that underpin those ecosystems.

3.1.1 What are the environmental implications of the Critical Zone?

The critical zone as a concept and as a material space pushes us to think of the porousity of the Earth's surface — the gas and fluid flows through rocks, soils, and plants. We can begin to appreciate the complexity of the transport and fate of chemical pollutants as they enter the soil and become part of the vadose zone and perhaps the ground water table – moving with water and diffusing through the water, simultaneously.

[1] The chapter was first drafted by Marc Los Huertos (2021). The author recieved valuable feedback from X, and Y and Z to improve the chapter.

Figure 3.1: The Critical Zone is an interdisciplinary field of research exploring the interactions among the land surface, vegetation, and water bodies, and extends through the pedosphere, unsaturated vadose zone, and saturated groundwater zone. Critical Zone science is the integration of Earth surface processes (such as landscape evolution, weathering, hydrology, geochemistry, and ecology) at multiple spatial and temporal scales and across anthropogenic gradients. These processes impact mass and energy exchange necessary for biomass productivity, chemical cycling, and water storage.

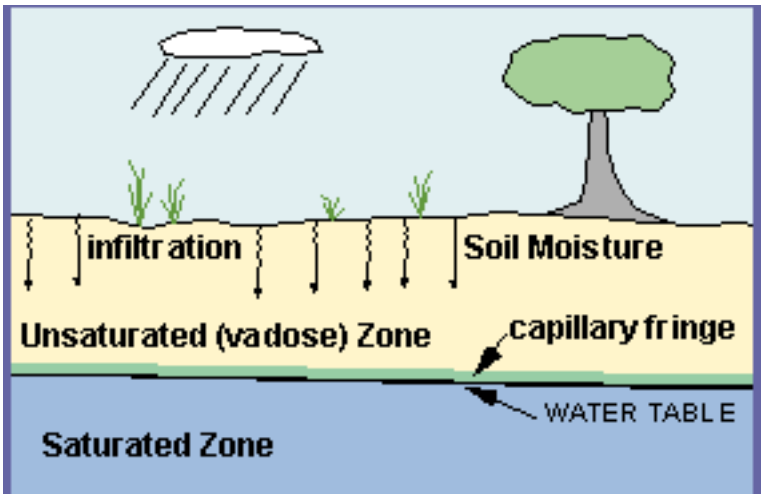

Figure 3.2: Diagram of Ground Water.

3.2 Hydrologic Aspects

3.2.1 Subsurface Hydrology

As water percolates into the soil or flows in the pour space below the surface waters it becomes part of the ground water. The study of this water might be called subsurface hydrology or ground water hydrology or hydrogeology.

There are two main areas of subsurface waters: saturated zone and unsaturated zone (Figure 3.2).

The saturated zone is the region where all the spaces between the particles are filled by water. The surface of the saturated zone is the water table.

The unsaturated zone is also called the vadose zone has some percentage of the pour spaces have air. The vadose zone also includes an area called the capillary fringe. Because of the surface tension of water, water is found in between particles above the water table and this zone is referred to as the capillary fringe.

3.2.2 Saturated Zone

Aquifers and Aquitards

Confined and Unconfined Aquifers

Ground Water Flow

TAKE A LOOK at some flow net sketches that will help clarify the relationships between aquifer matrix, and groundwater movement.

In general, water flow is driven by potential energy, e.g. where water flows down hill, driven by gravity. If water flows from point A to point B, the the potential energy for the flow is the height of the water at point A minus the height at point B, which can be symbolized as dl. The head potential is the heigh difference divided by the distance between the two points.

DARCY'S LAW

$$Q = KIA \tag{3.1}$$

In 1856, Henry Darcy studied the movement of water through porous material. He determined an equation that described groundwater flow. The following description tell how Darcy determined his equation:

A horizontal pipe filled with sand is used to demonstrate Darcy's experiment. Water is applied under pressure through end A, flows through the pipe, and discharges at end B. Water pressure is measured using piezometer tubes (thin vertical pipes installed at each end of the horizontal pipe). The difference in hydraulic head (between points A and B) is dh (change in height). Divide this by the flow length (i.e. the distance between the two tubes), dl, and you get the hydraulic gradient (I).

The velocity of groundwater is based on hydraulic conductivity (K), as well as the hydraulic head (I). Therefore, the equation determined by Darcy to describe the basic relationship between subsurface materials and the movement of water through them is Q = KIA where Q is the volumetric flow rate (or discharge) and A is the area that the groundwater is flowing through. This relationship is known as Darcys law.

DISCHARGE

AREA OF FLOW

Now, rearrange the equation to Q/A = KI, which is known as the flux (v), which is an apparent velocity. Actual groundwater velocity is lower than that determined by Darcy, and is called Darcy Flux (vx)

FLUX

DARCY FLUX

Darcy's law is used extensively in groundwater studies. It can help answer important questions such as what direction an aquifer pollution plume is moving in, and how fast it is traveling

3.2.3 The Vadose Zone

The vadose zone is the

Jeji is a volcanic island is located some XX km south of the Korean Penisula. Water runs off the steep slopes quickly and water supplies are limited on the island. To adddress this...Lee et al. [2017].

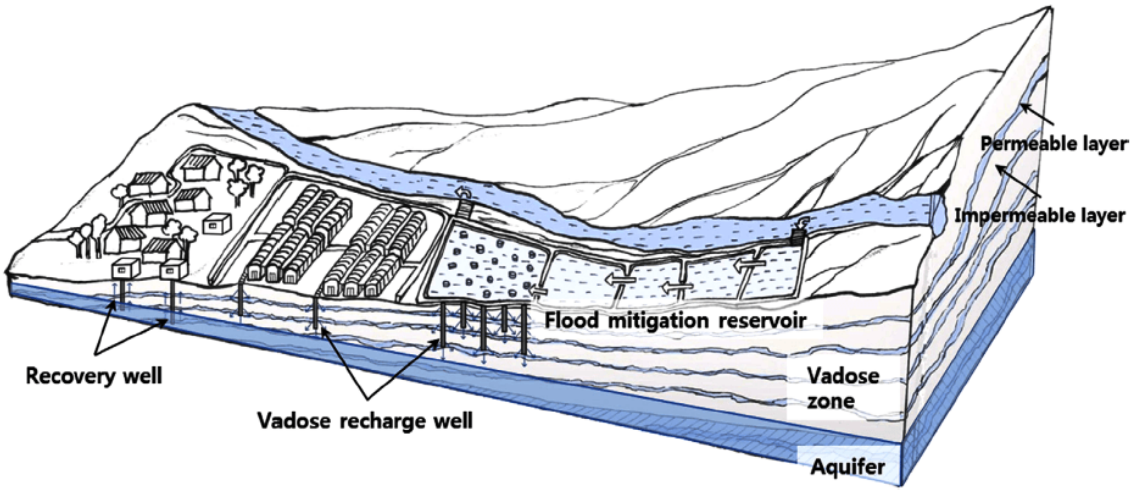

Figure 3.3: ... (Source: [Lee et al., 2017]).

Chapter 4

Land Use in East Asia

chapterauthorSamantha Beaton
What is Land Use Change?
What Factors Drive Land Use Change?
How Land Use Change is Measured and Quantified
Integration of sociology
with data science: spatial data compiled from aerial photos, Landsat satellite images, topographic maps, GPS data, etc.
Requires classification and division of land-space types
Ecological Effects of Land Use Change on Soil, Air, and Water

4.1 Impacts on Soil

Deforestation and soil degradation
lack of stability (erosion) and loss of carbon sequestration potential
Forests
coupled with monoculture agriculture
Example Case Study: representative of monoculture agriculture-rice paddies in SE Asia (potentially...)
Impacts on Local Watersheds
hydrology
infiltration/pollution, groundwater recharge, flow of river basins, runoff
Higher risk of flooding and droughts

4.2 Conclusion & Prospect of Sustainable Urbanization/Land Use Change

Chapter 5

Invasive Species

Soliel

[1]

5.1 Section Heading

[1]Statement of Contributions– For example, "The chapter was first drafted by Marc Los Huertos (2021). The author recieved valuable feedback from X, and Y and Z to improve the chapter. Slater revised the chapter in 2022 with suggestions from Cater." Note: I am still working on the formatting for this to improve it.

Chapter 6

Nuclear Power and Nuclear Waste

6.1 Current and Future Energy Needs

Chapter 7

Air Pollution & Social Justice in Hong Kong

Neenah Vittum

7.1 Science of Air Pollution

7.1.1 Overview of the layers of the atmosphere/atmospheric gases

What part of the atmosphere does air pollution affect?
- What is air pollution?
- Overview of different types of air pollution

7.2 Major Sources Use as geographical overview

7.2.1 General common sources of air pollution all over the world

7.2.2 East Asian countries/communities and their prominent air pollution sources

Shipping
- Traffic Emissions
- Commercial and otherwise
- Coal
- Urban Development
- Manufacturing
- Other
- The transboundary issue and its implications in regulation and politics
- Impacts
- Human health
- Environmental Health
- Greenhouse gas emissions and global warming
- Both

Visibility
Environmental Justice
Case Study: Hong Kong
The Intersection of Air Pollution and Other Environmental Issues
Many environmental issues are interconnected
Air pollution and deforestation
Air pollution and urbanization/industrialization
Other Issues (To Explore)
Goals/Other Ideas/Questions
Ground information in geography and relevant examples
Incorporate stories and person accounts
slow violence environmental justice issues
Maybe activist or someone who has suffered the issues firsthand
Draw people into the empathy
Use stories and descriptions to describe places
What is the best way to section the chapter?

Chapter 8

Flood Pulse System in East Asia

Kristin Gabriel

8.1 Introduction

What is the flood pulse system?
- Seasonality
- Ecosystem Services
- Fish stocks
- Flooded forests
- How the flood pulse system influences the Tonle Sap Ecosystem
- Timing of Flood Pulse
- Magnitude of Flood Pulse
- Duration of Flood Pulse
- Influence of flood pulse system on people and their livelihoods
- Fisheries
- Immigration and emigration
- Human Impacts on the flood pulse system
- Climate change
- Dam development
- Case Study: Cambodia and the Tonle Sap

Chapter 9

Hydroelectric Dams in East Asia

9.1 Introduction

Basic facts about dams in East Asia
Statistics on how many, size, scale, location etc.
Function of the Dam
How it generates electricity/how much
Different types of dams (multi/single use etc.)
Immediate ecological impacts
Positive:
Flood control, electricity generation, improved water quality
Negative:
Decreased water quality, flooding, sedimentation, habitat loss, deforestation, salinization etc...
*note: the ecological impacts may be too many to go completely in depth into so perhaps a paragraph or subsection of each as opposed to a 7 page explanation of each
Anthropological impacts
Supposedly positive (I.e. employment etc...)
Negative: displacement, loss of cultural sites, diseases
Displacement
Policy/government action/regulation (policies that exist or propose solutions)

9.2 Conclusion

Chapter 10

Climate Change and Food Security in Myanmar

10.1 Climate Change, Climate Change Response in Myanmar

General history of rice production and food demand in Myanmar.
Impact on credit policy on rice
Impact of infrastructure development on rice production
Study of the constraints of rice production in Myanmar
The effect of a command economy on food production in Myanmar
Overall review on demand for food in Myanmar
Possible implementation of SRI (systemic rice intensification) in order to increase rice yields in Myanmar
Transition from talking about rice production
sea-level rise
subsidence
coastal erosion
coastal flooding
Impact of climate change on rice production in Southeast Asia
Monsoon Season effect on Ayeyarwady River Badin
Sea Level Rise
Sea level rise effect on global markets/rice production
Subsidence
Subsidence in Yangon, Myanmar
interview segments/personal experiences of rice farmers
Roles of the Burmese government

10.2 Conclusion

Reminders/Areas of Focus

Chapter 11

Disasters, Typhoons and Phillipines

Ian Horsburgh

11.1 What are Typhoons?

Chapter 12

Climate Infrastructure in Vietnam

12.1 Introductory

How climate change will impact Vietnam
- Flooding (especially coastal urban areas)
- Sea Level Rise
- Land Erosion
- Health outcomes

Current Adaptation Plans
- Strengthen existing barriers and infrastructure
- Adapt cities expecting sea level rise
- Withdraw from the coastlines in areas that are well below sea level

What's Needed for the Future
- Stronger healthcare system
- Support for farmers and agricultural workers
- Support for rural population near Mekong and Red river deltas

12.2 Conclusion

Implications for other places in the region

Chapter 13

Waste Management for a Circular Economy

13.1 Life-Cycle

13.1.1 Collection

13.1.2 Transport

Treatment
- Disposal
- Sectors:
- Industrial
- Household
- Biological
- Types of Waste:
- Solid:
- Liquid
- Gaseous waste

13.2 Biomimicry

13.2.1 Circularity

Examples in Nature
- Education:
- Teach people to be mindful and live sustainably
- Social PsychologyProblems and New Approaches:
- Sustainability
- Incineration & Dumping
- Recycle & Reuse
- Resource Recovery

Chapter 14

Plastic and Packaging in Japan

14.1 Introductiona and Goals?

Plan: Use Japan's unique plastic packaging as a lens to view plastic waste management. I can bring in benefits of their plastic use, like cultural significance of beautiful wrapping and food safety, and then discuss plastic pollution as a larger issue in East Asia, bringing in examples of blame placing, and of course discussing potential solutions on both international and local scales.

14.2 Plastic Pollution and Waste Management in East Asia

14.2.1 Statistics/comparisons

graphs and images will help with perspective

14.2.2 History of plastic waste issues in East Asia

Are specific companies/industries responsible responsible

what kinds of plastic waste are there (sector break down)?

Where in the world did the ubiquitous usage of single use plastics come from?

General blame placing/biases/rhetorical

examples of discourse around plastic waste in East Asia. Why does any of this matter(needs its own section)?

Plastic waste trade?

https://link.springer.com/article/10.1007%2Fs10163-004-0115-0

https://www.sciencedirect.com/science/article/abs/pii/S0956053X20305602

Blame placing through both rhetoric and scientific studies

(this source is a very data based study that concluded that the vast majority of plastic pollution comes from a few sources in Asia/Africa... I want to explore what they might not have taken into account when collecting data)

https://science.sciencemag.org/content/347/6223/768

https://pubs.acs.org/doi/10.1021/acs.est.7b02368

https://www.dw.com/en/whose-fault-is-plastic-waste-in-the-ocean/a-49745660 (found the two above studies through this article)

Japan Specific (I need to break these into hierarchies of significance), some sections, the first few will be more data based, the second half will be more rooted in sociological primary sources.

Waste management issue overview

Sector Break Down/ responsible parties in Japan

Impacts of plastic pollution on different groups within Japan

Cultural significance of wrapping

Food safety

Gov action/recycling/current efforts

Activism

Potential solutions moving forward rooted in current activist efforts/respect to culture

https://www.pnas.org/content/117/33/19844.short

https://www.jstor.org/stable/432317?seq=1

https://onlinelibrary.wiley.com/doi/abs/10.1002/1099-1522(200003/04)13:2%3C45::AID-PTS496%3E3.0.CO;2-%23

Part I

Backmatter

The back matter often includes one or more of an index, an afterword, acknowledgments, a bibliography, a colophon, or any other similar item. In the back matter, chapters do not produce a chapter number, but they are entered in the table of contents. If you are not using anything in the back matter, you can delete the back matter TeX field and everything that follows it.

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