MODIS Lab
Biology 3380, Advanced Ecology

May Myklebust, Instructor
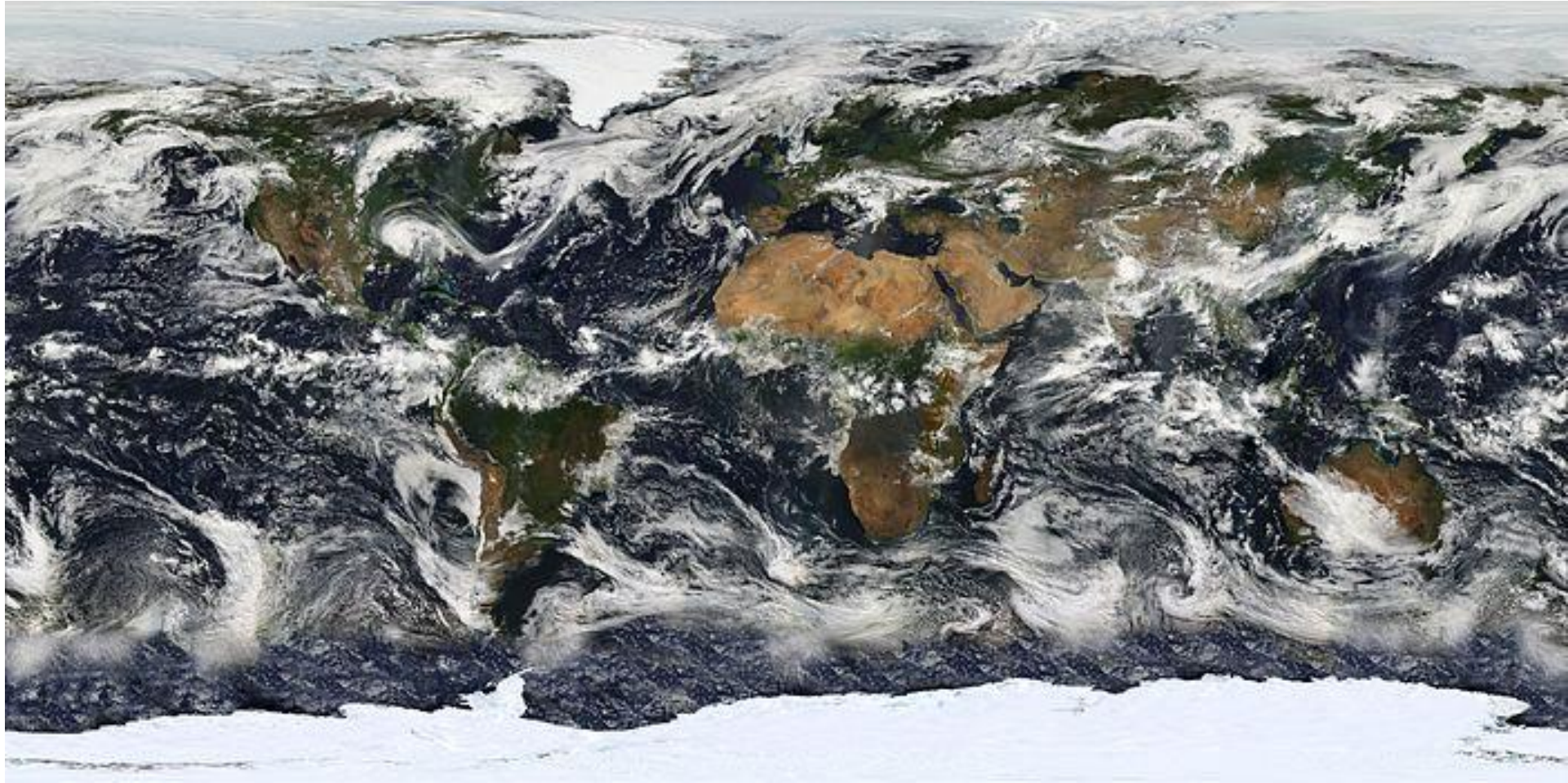Biology 3380, Advanced Ecology
Biology Department
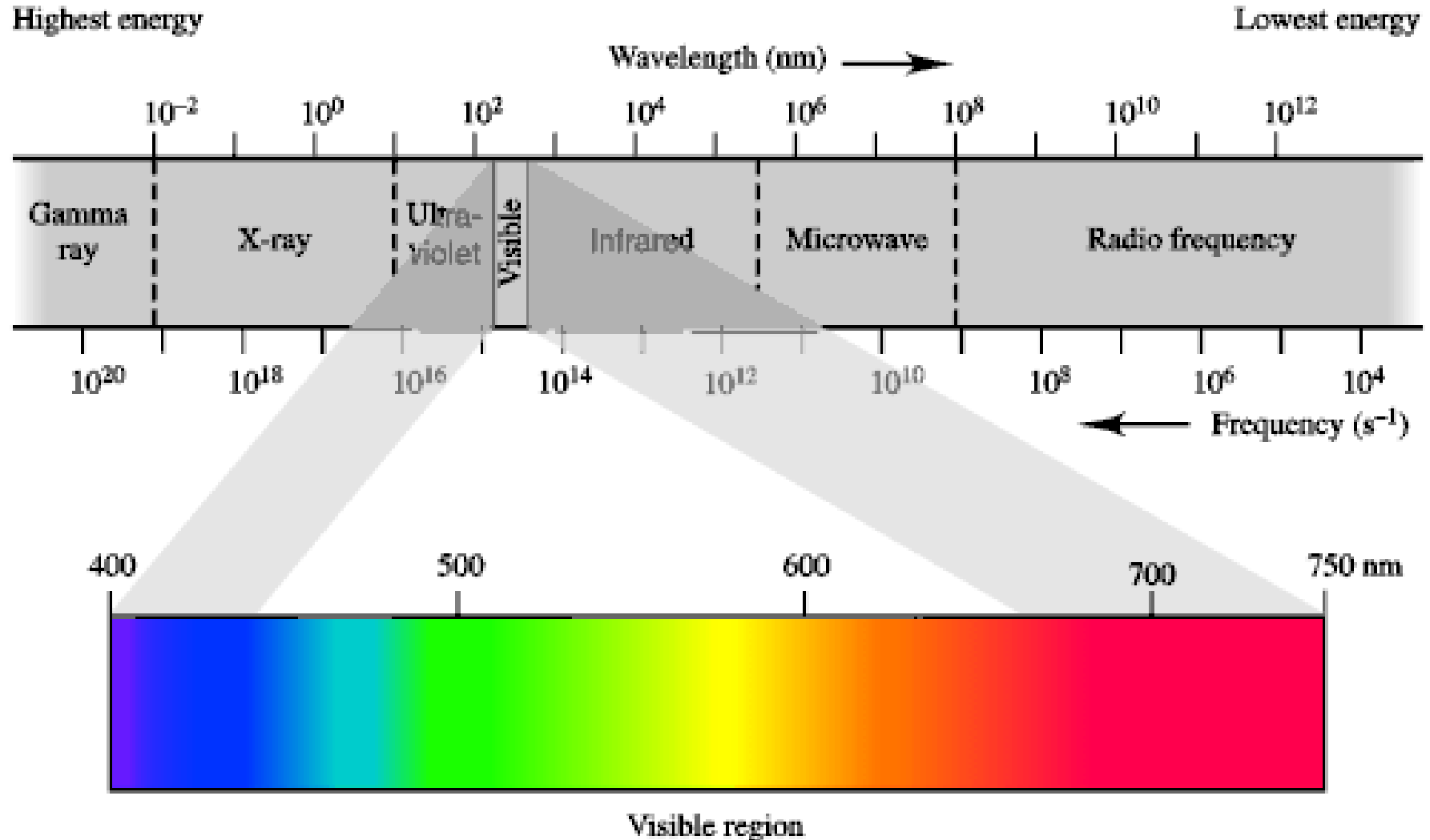Trent University, Peterborough, ON
maymyklebust@trentu.ca

Modis Lab

Electromagnetic radiation
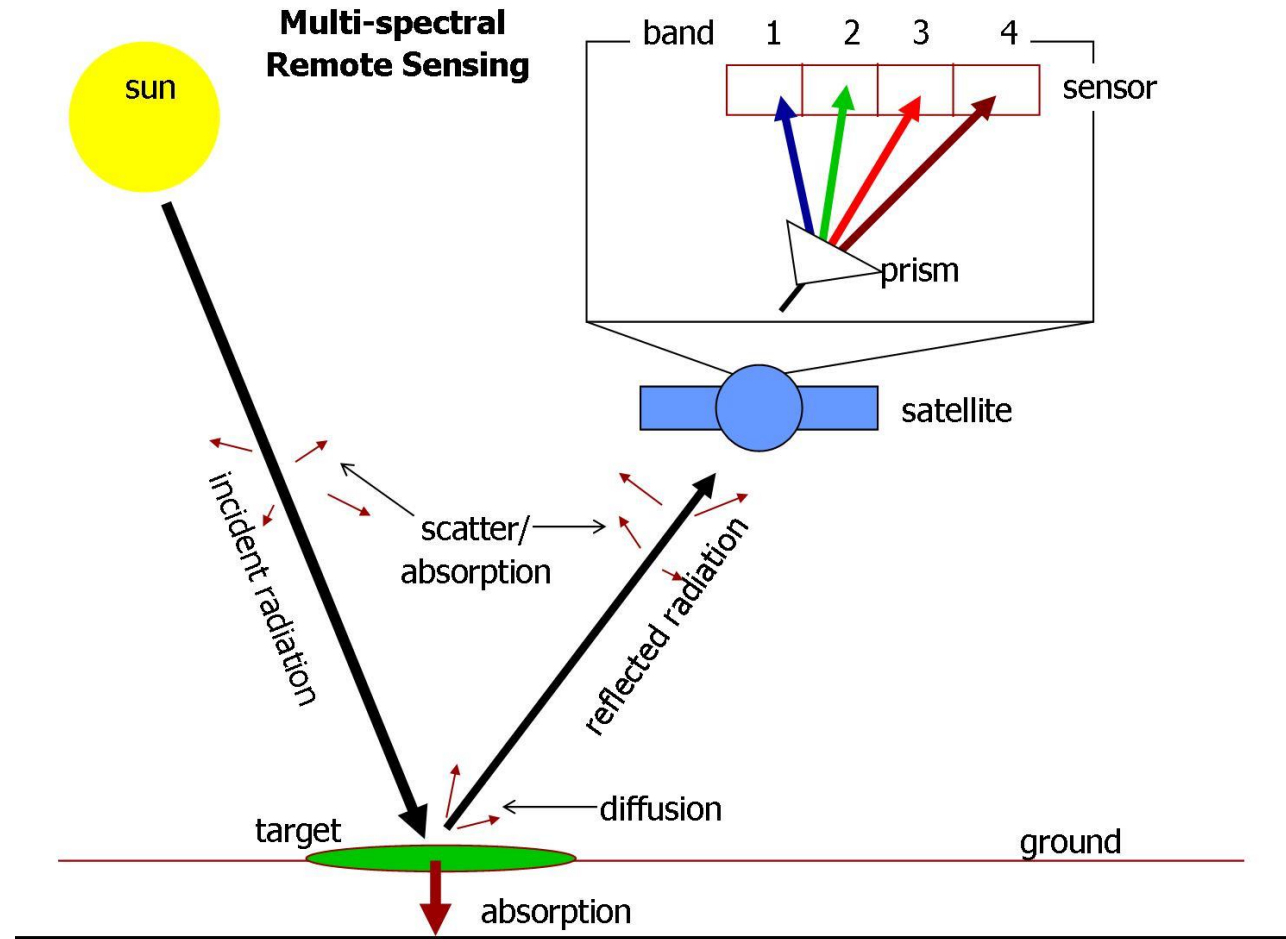

Highest energy

Lowest energy

Wavelength (nm) →

| 10^{-2} | 10^{0} | 10^{2} | 10^{4} | 10^{6} | 10^{8} | 10^{10} | 10^{12} |

Gamma ray | X-ray | Ultra-violet | Visible | Infrared | Microwave | Radio frequency

| 10^{20} | 10^{18} | 10^{16} | 10^{14} | 10^{12} | 10^{10} | 10^{8} | 10^{6} | 10^{4} |

← Frequency (s^{-1})

400   500   600   700   750 nm

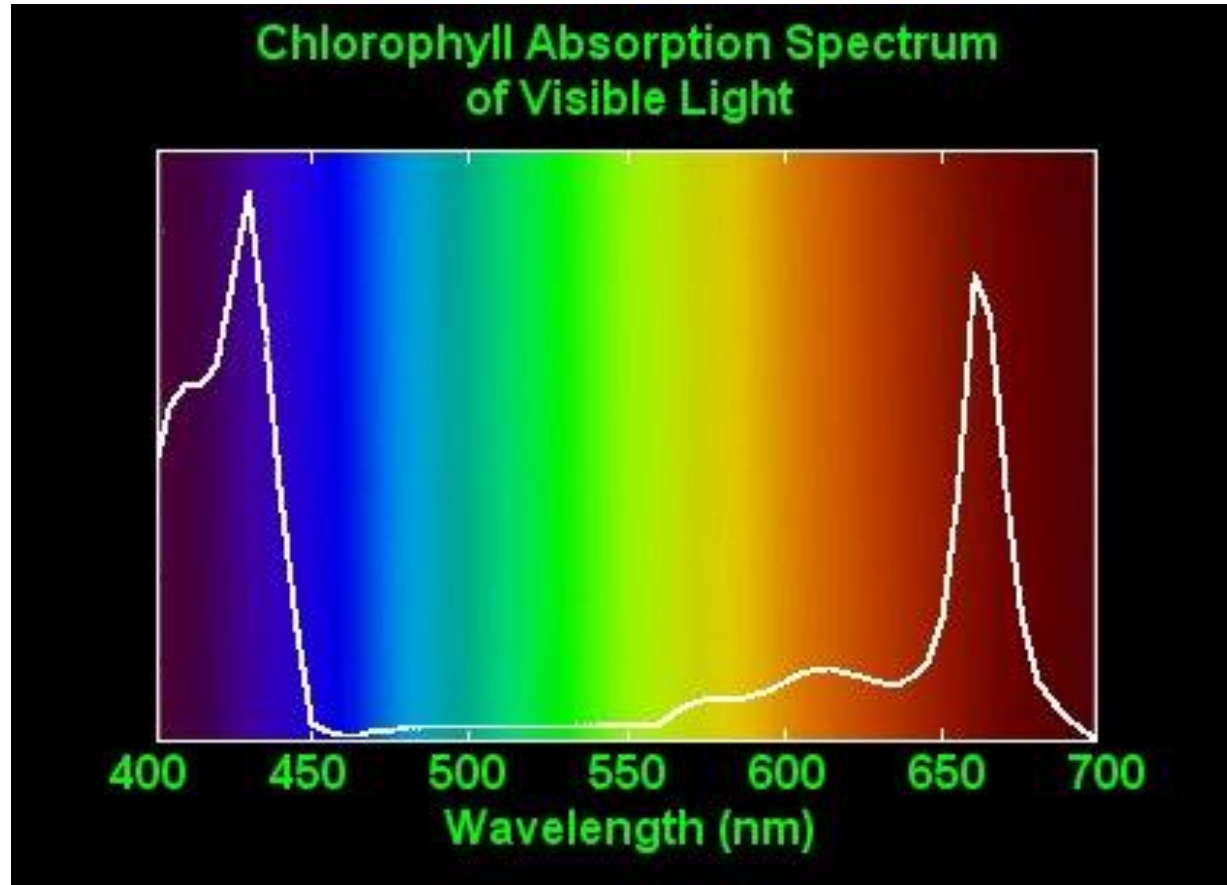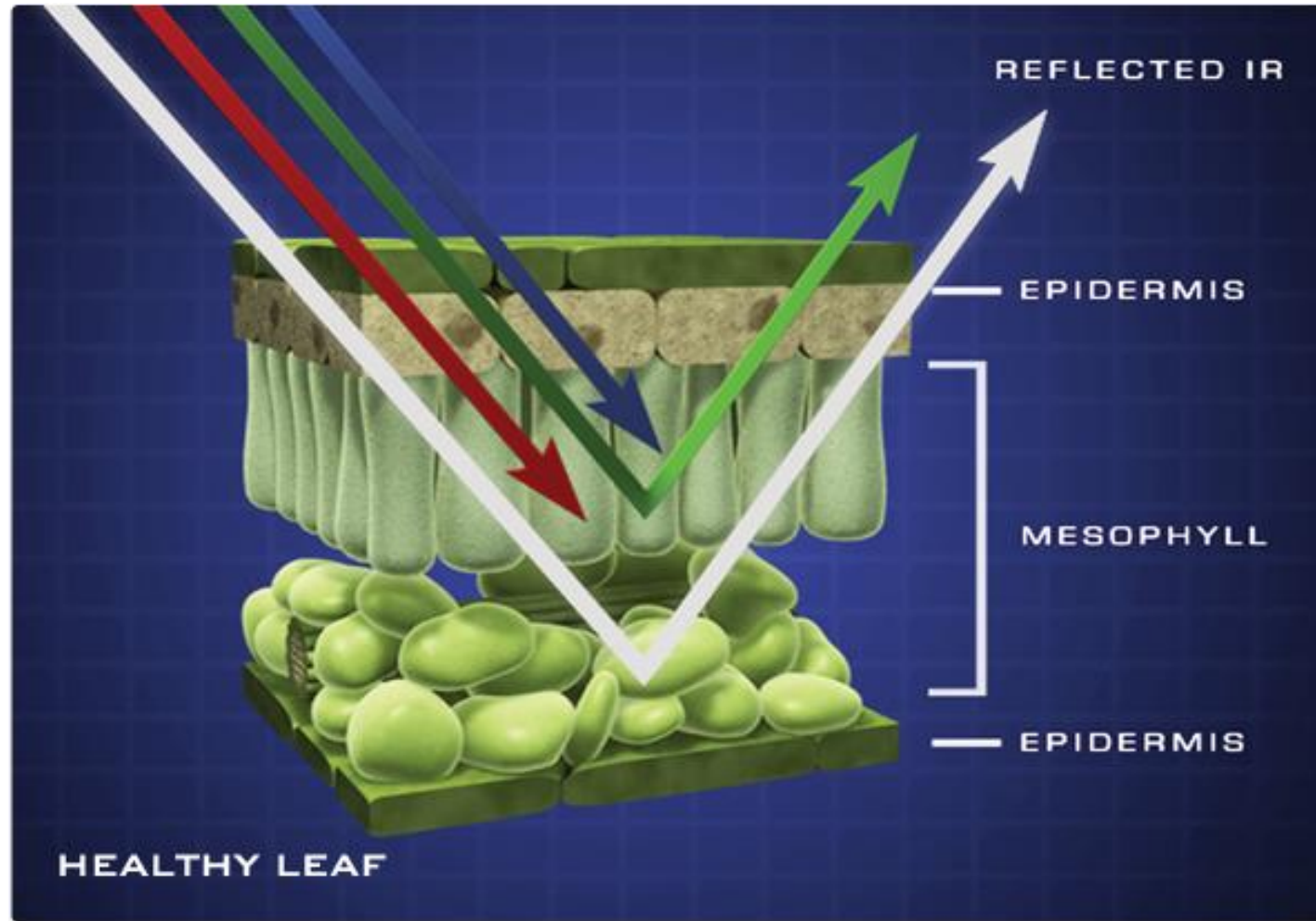Visible region

Remotely Sensed Radiation Reflectance
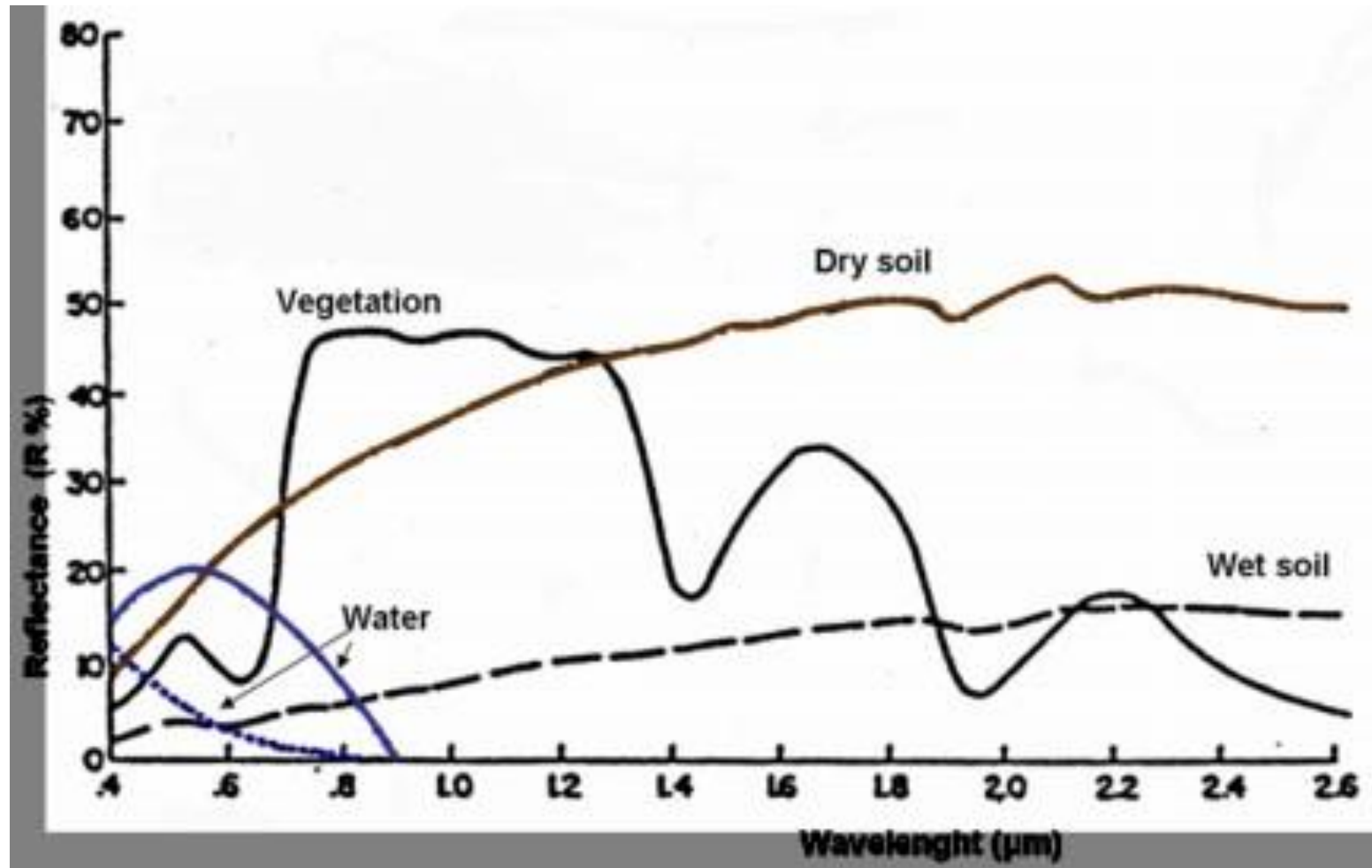
Chlorophyll absorption spectrum

Chlorophyll reflectance of radiation

Surface reflectance of solar radiation

Vegetation reflectance of radiation

Normalized difference vegetation index (NDVI)

NDVI = (NIR-RED)/(NIR+RED)

NDVI is an estimate of leaf area using remote sensing data of reflectance of red (RED) and near infrared (NIR) wavelengths from the surface.

Support for NDVI
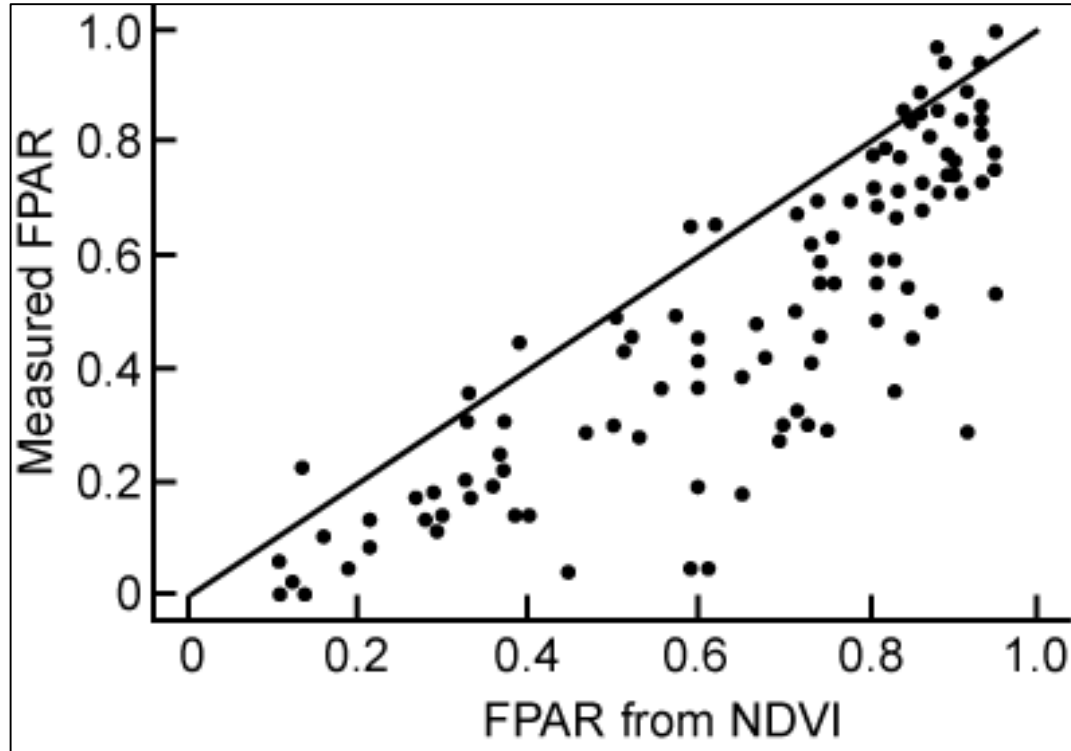
FPAR is the fraction of incoming solar radiation that is absorbed by vegetation and is roughly equivalent to NDVI.

*Note: there are problems with estimates from remotely sensed data but it`s a good start to measuring surrogates to GPP on a global scale.

Lab Instructions

Generate a hypothesis and prediction from something you have heard about that has caused a change in vegetation cover.

Example: There has been a large impact on the (vegetation type/surface cover) in (location) due to (type of disturbance/climate change) over (time period). It has caused the conversion of (vegetation type/surface type) to (reduced or increased vegetation cover) across an area the size of (number).

Hypothesis: Due to the large-scale change in vegetation cover at (location) over (time period), and the sensitivity of NDVI to leaf area, we should detect a difference in NDVI at (location) over (time period).

Prediction: We predict that the NDVI of a homogenous surface area at (location) is (higher/lower) at (date) compared with (date).

Go to the Modis website and order your NDVI data here:
http://daac.ornl.gov/cgi-bin/MODIS/GLBVIZ_1_Glb/modis_subset_order_global_col5.pl

daac.ornl.gov/cgi-bin/MODIS/GLBVIZ_1_Glb/modis_subset_order_global_col5.pl

Search

Lat/Lon *OR* Field Site
then Continue

Latitude:44.51089317238087
Longitude:-78.02522629875

Map | Satellite

Select the Country to Contain a MODIS Site as the Center Pixel
[Sites within the Selected Country will be Presented in Subsequent Choices]

Algeria
Angola
Antarctica
Argentina
Australia
Austria
Belgium
Benin
Bolivia
Botswana

OR
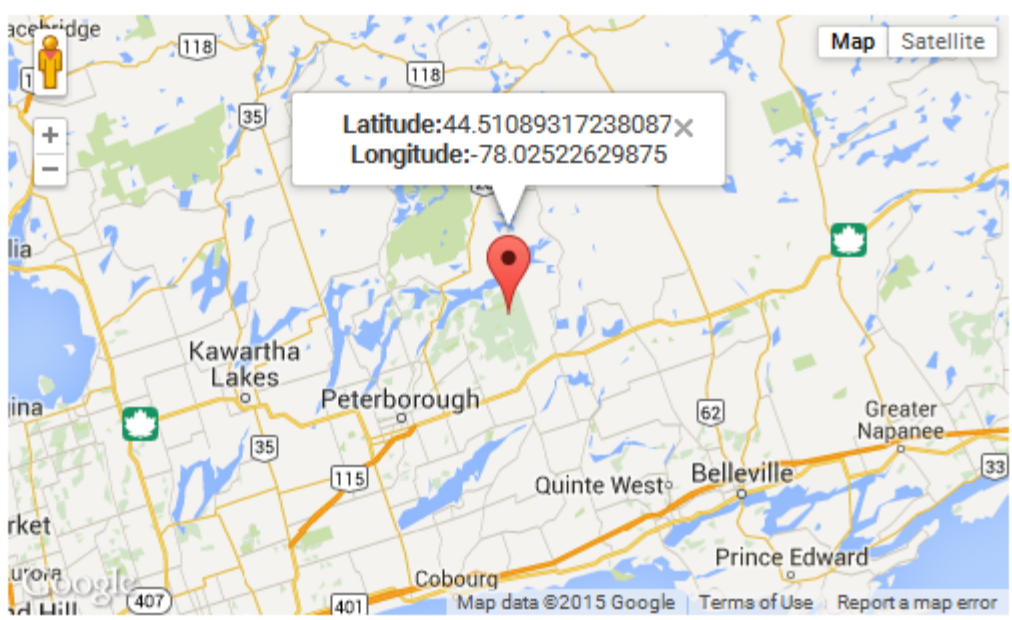
Closest matching address:
1353–1397 County Road 40, Norwood, ON K0L 2V0, Canada

Enter Signed Decimal Latitude and Longitude of Center Pixel in WGS84 datum
[for example, Walker Branch TN is 35.958767 –84.287433]

Latitude | Longitude

44.510893172: | -78.025226298

Continue

Restart this Visualization

okanagan college employ... | Job Postings | Okanagan College Employ... | ndvi - Yahoo Canada Searc... | ornl modis - Yahoo Canad... | MODIS Global Subsets: Cre...

daac.ornl.gov/cgi-bin/MODIS/GLBVIZ_1_Glb/modis_subset_order_global_col5.pl | Search

st Visited | Welcome to Facebook... | Netflix | Sign-out | Peterborough, Ontario... | The Economist - Worl... | Gmail: Email from Goo... | Trent University :: My ...

MODIS Land Subsets
Oak Ridge National Laboratory DAAC

MODIS Global Subsets: Data Subsetting and Visualization

Latitude [44.51089317238087] Longitude [-78.02522629875]
1km Horizontal Tile [12] Vertical Tile [4] Sample [523] Line [658]
Select a Product and Subset Size, then Click on "Continue"

[MCD43A] MODIS/Terra+Aqua BRDF and Calculated Albedo
[MCD43A4] MODIS/Terra+Aqua Nadir BRDF-Adjusted Reflectance 16-Day L3 Global 500m SIN Grid
[MOD09A1] Surface Reflectance
[MOD11A2] Land Surface Temperature and Emissivity
[MOD13Q1] Vegetation Indices (NDVI, EVI)
[MOD15A2] Leaf Area Index (LAI) and Fraction of Photosynthetically Active Radiation (FPAR) 8 Day Composite
[MOD15A2GFS] Terra Gap-Filled,Smoothed Leaf Area Index (LAI) 8 Day Composite [Collection 4]
[MOD16A2] Evapotranspiration
[MOD17A2_51] Gross primary production (GPP) [Collection 5.1]
[MOD17A3] Primary Productivity (NPP)

Specify the Number of Kilometers Encompassing the Center Location

Above and Below	Left and Right
(0-100)	(0-100)
3	3

Continue

Restart this Visualization

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Tel: +1 (866) 241-3952 or E-mail: USO

Revision Date:Wed Feb 4 14:23:25 2015

MODIS Global Subsets: Data Subsetting and Visualization

MODIS/Terra Vegetation Indices (NDVI/EVI)
16-Day L3 Global 250m SIN Grid [Collection 5]

Latitude [44.51089317238087] Longitude [-78.02522629875]
1km Horizontal Tile [12] Vertical Tile [4] Sample [523] Line [658]
250m Horizontal Tile [12] Vertical Tile [4] Sample [2092] Line [2634]
The Requested Data Area is Approximately 6.25 Kilometers Wide and 6.25 Kilometers High

Select Starting Date	Select Ending Date
Day 049 of the Year 2000 [Feb. 18,2000]	Day 273 of the Year 2014 [Sep. 30,2014]
Day 065 of the Year 2000 [Mar. 05,2000]	Day 289 of the Year 2014 [Oct. 16,2014]
Day 081 of the Year 2000 [Mar. 21,2000]	Day 305 of the Year 2014 [Nov. 01,2014]
Day 097 of the Year 2000 [Apr. 06,2000]	Day 321 of the Year 2014 [Nov. 17,2014]
Day 113 of the Year 2000 [Apr. 22,2000]	Day 337 of the Year 2014 [Dec. 03,2014]
Day 129 of the Year 2000 [May. 08,2000]	Day 353 of the Year 2014 [Dec. 19,2014]
Day 145 of the Year 2000 [May. 24,2000]	Day 001 of the Year 2015 [Jan. 01,2015]
Day 161 of the Year 2000 [Jun. 09,2000]	Day 017 of the Year 2015 [Jan. 17,2015]
Day 177 of the Year 2000 [Jun. 25,2000]	Day 033 of the Year 2015 [Feb. 02,2015]
Day 193 of the Year 2000 [Jul. 11,2000]	Day 049 of the Year 2015 [Feb. 18,2015]

[Pre-selected Dates Reflect ALL Available Dates for the Selected Product/Location]

-Data available

Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

GeoTIFF Options

◉ Generate GeoTIFF in MODIS Sinusoidal Projection

◯ Generate GeoTIFF and Reproject to Geographic Lat/long

9:56 A

Day 113 of the Year 2000 [Apr. 22,2000]
Day 129 of the Year 2000 [May. 08,2000]
Day 145 of the Year 2000 [May. 24,2000]
Day 161 of the Year 2000 [Jun. 09,2000]
Day 177 of the Year 2000 [Jun. 25,2000]
Day 193 of the Year 2000 [Jul. 11,2000]

Day 337 of the Year 2014 [Dec. 03,2014]
Day 353 of the Year 2014 [Dec. 19,2014]
Day 001 of the Year 2015 [Jan. 01,2015]
Day 017 of the Year 2015 [Jan. 17,2015]
Day 033 of the Year 2015 [Feb. 02,2015]
Day 049 of the Year 2015 [Feb. 18,2015]

[Pre-selected Dates Reflect ALL Available Dates for the Selected Product/Location]

-Data available

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000												
2001												
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2014												
2015												

GeoTIFF Options

○ Generate GeoTIFF in MODIS Sinusoidal Projection

○ Generate GeoTIFF and Reproject to Geographic Lat/long

Enter Your Email Address
[You will be notified via email when the data has been prepared]

Continue

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Lab Report

Title	Informative description of the essence of the paper
List of Authors	Names of people who actively participated in the experiment
Introduction	Describes your study's objectives, and how it fits in with your previous knowledge in this area. The Introduction explains why your study is important, and how it seeks to extend your knowledge. It also provides the rationale for any hypotheses that you hope to test.
Methods	Explains, in a way that is repeatable, how the study was conducted.
Results	Shows the summarized data, usually some form of graphic illustration, from your study; and tells the reader what was found from the data collected.
Discussion	Describes your results to the reader. Here you can say if you supported your hypothesis, describe how your results relate to existing knowledge, talk about inconsistencies in the data, discuss sources of error, and future extensions of your work.
References	Journal articles, textbooks, or peer-reviewed websites that you referred to in the body of your paper (subject to strict formatting rules).
Appendix	Data used to compile graphic illustrations used in the Results, along with samples of any calculations used to manipulate the data.

Length 6-10 pages