



**Radiation Safety
Institute of Canada**
Institut de radioprotection du Canada

Radiation Safety &
Wellness Webinars



May 26, 2022

Solar Radiation and Sun Safety at Work

With Guest Dr. Cheryl Peters, PhD
Followed by Mandel Fraser from PowerYoga West

Good Science in Plain Language®

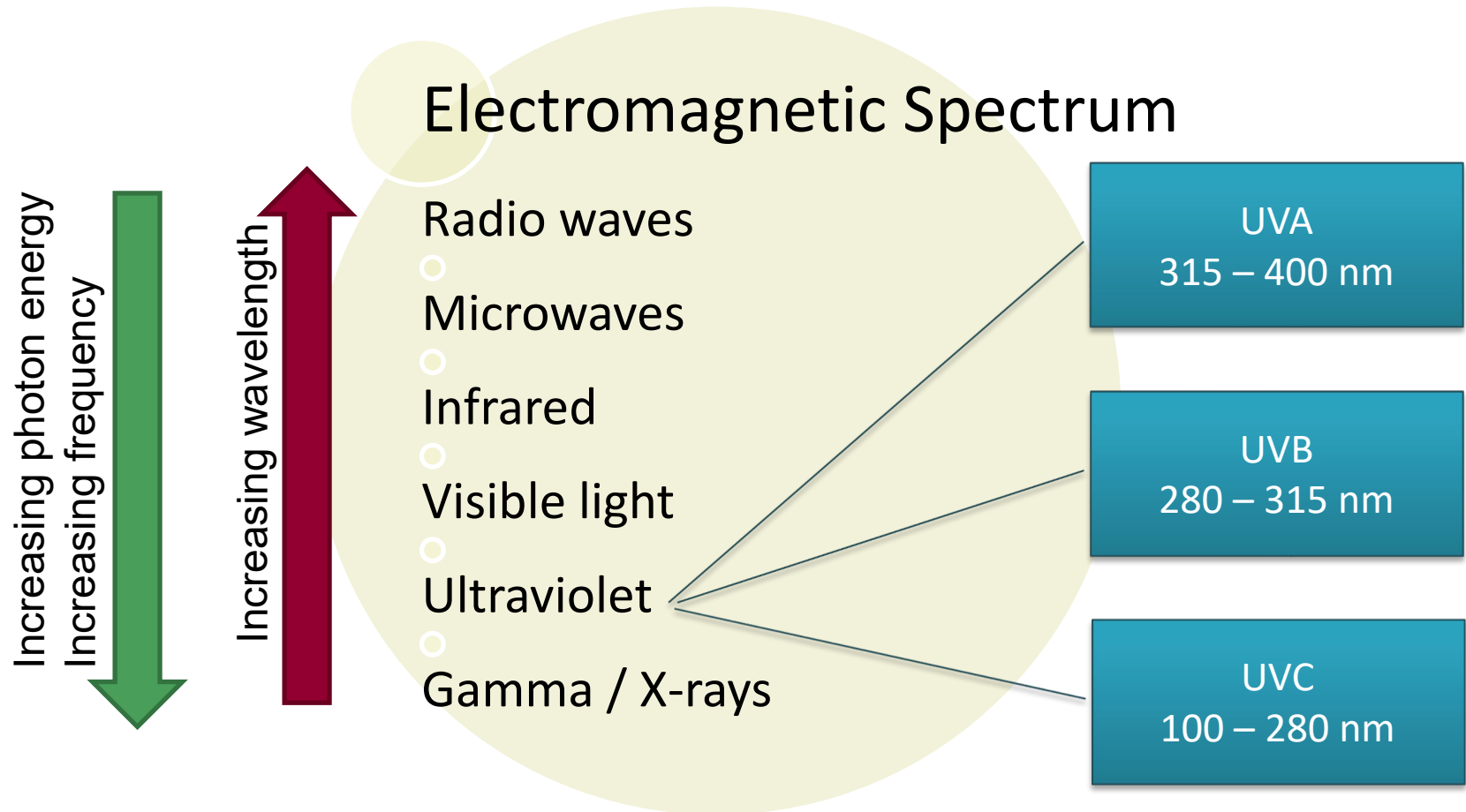


- Audio and video
 - During the presentation, from the presenters only
 - Use computer or telephone (call in)
 - Computer seems to give the best sound quality
 - Technical difficulties: 1-800-263-5803 x321
- Use the “Chat” feature to enter comments and questions
- Posted on webinar page
 - Video, answers to questions, copy of the slides
- Follow up email will be sent
 - Topics covered, time of attendance
- It may be possible to change your Zoom view if the controls are hiding the closed captioning.



- Presentation
 - Ultraviolet radiation
 - Units of measurement
 - Recommended levels
- Interview
 - CAREX Canada
 - Occupational exposures
 - Best practices
 - Resources
- Q&A
- Wellness





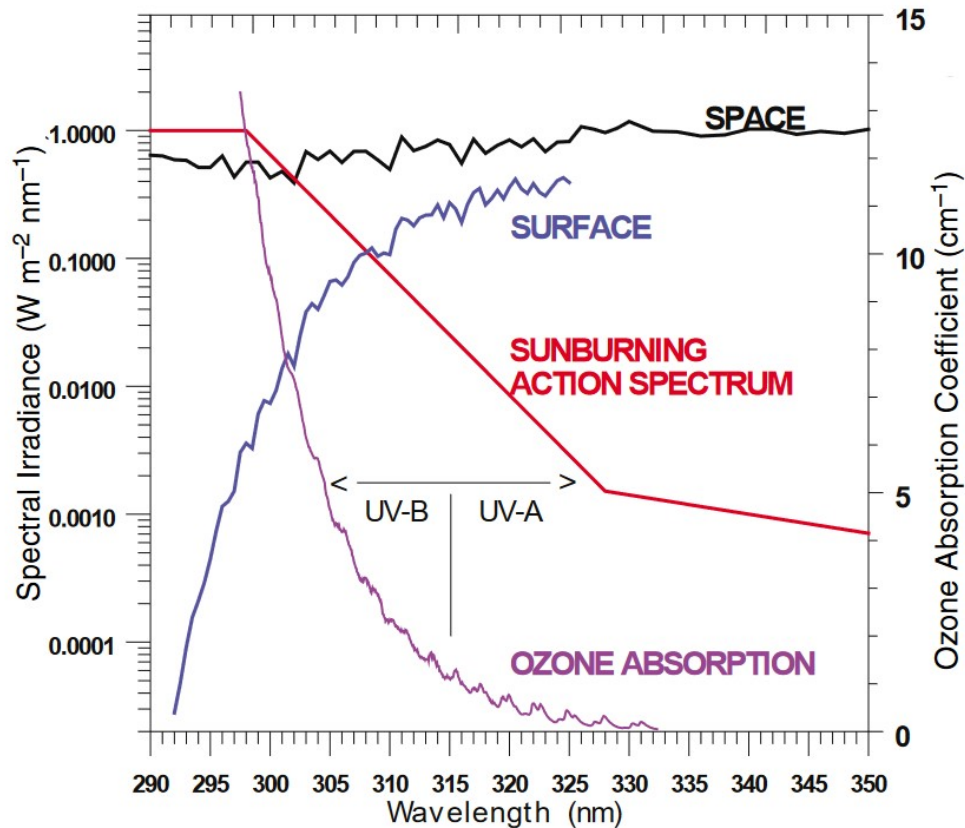


Fig. 1 Ultraviolet radiation measured from space (black) and on the ground at noon during the summer (blue). Absorption by stratospheric ozone is the main cause for the decrease by several orders of magnitude with decreasing wavelength. Also shown is the erythral action spectrum illustrating that sunburning potential increases with decreasing wavelength. In general, most biological species show increasing sensitivity with decreasing wavelength in the UV-B.

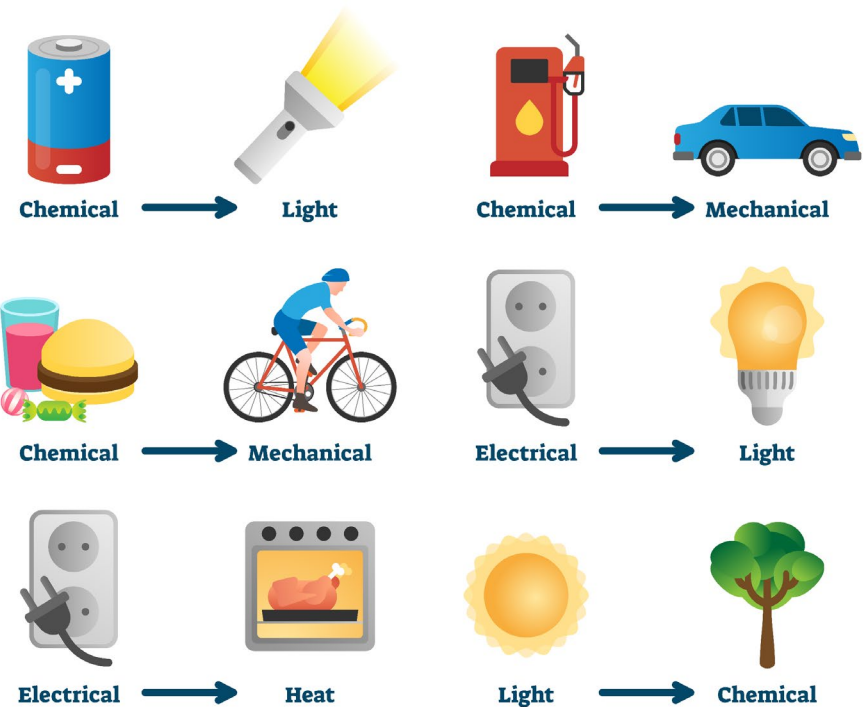
J.B. Kerr & V.E. Fioletov (2008) Surface ultraviolet radiation, *Atmosphere-Ocean*, 46:1, 159-184, DOI: 10.3137/ao.460108

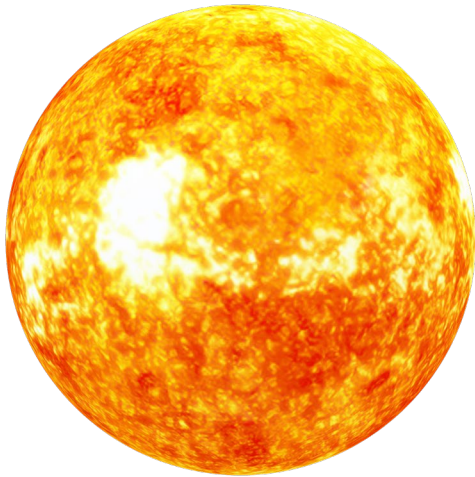
- Main natural source of exposure
- Atmospheric filtering
 - All UVC, most UVB



- Energy
 - Ability to change matter
 - Different types
 - Measured in joules
- Power
 - Rate of energy conversion
 - Energy/unit time
 - 1 watt = 1 joule/second

ENERGY TRANSFORMATIONS





- Measure of energy arriving, not total output
- Energy per unit of surface area
- J/m^2 or J/cm^2



- Power per unit of surface area
- W/m^2 or W/cm^2



Arthurcala, CC BY-SA 4.0, via Wikimedia Commons



Standard Erythema Dose



- SED
- CIE 125-1997 & ANSI/IES LS-1-21
- Tissues respond differently to different frequencies
- Accounts for these differences

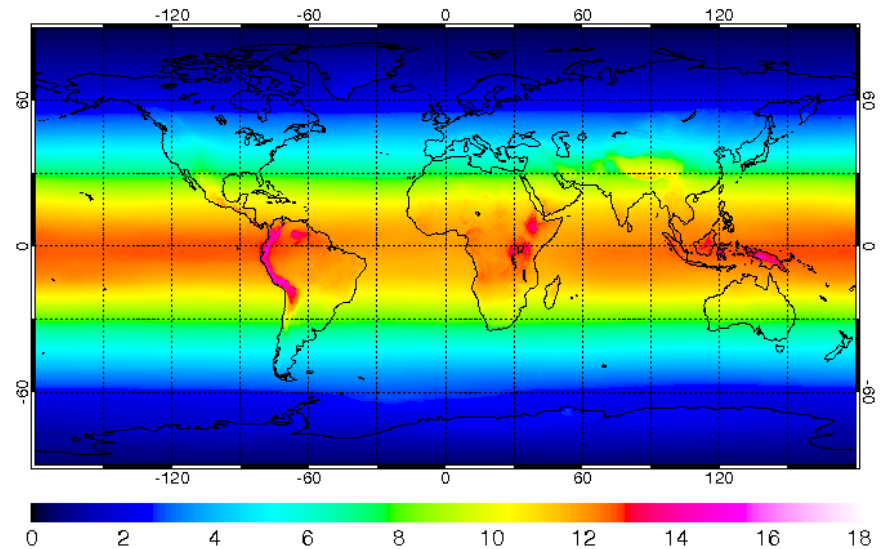
Steve & Jem Copley, CC BY-SA 2.0, via Wikimedia Commons



- Canadian invention
- Now global adoption through WHO and UNEP
- UV index 1.0 = 0.9 SED/hr
- Based on meteorological conditions, ozone layer thickness, angle of the sun
- Forecast maximum for the day

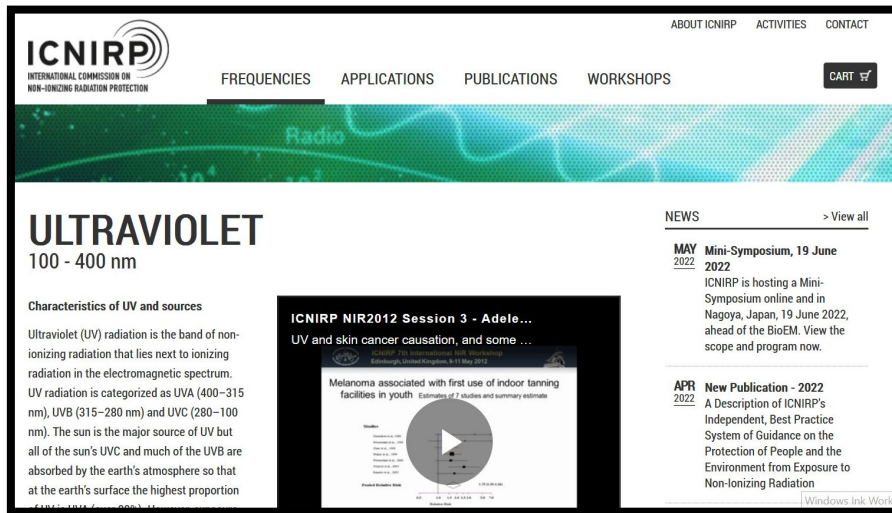
Erythral UV index -- climatology
GOME - KNMI/ESA

local solar noon
full year



Solar noon UV Index average for 1996-2002, based on GOME spectrometer data from ESA's ERS-2 satellite, as published by KNMI (Royal Netherlands Meteorological Institute)

KNMI, Public domain, via Wikimedia Commons



- UV energies span ionizing and non-ionizing
- ICRP makes recommendations for ionizing
- ICNIRP makes recommendations for non-ionizing
 - Including UV
- Document on worker protection for UV



- American Conference of Governmental Industrial Hygienists
- TLVs
- BEI
- Not legal standards





- Interview Questions
- Questions posted in the chat room
- To ask a question verbally
 - use “raise hand” button
 - When asked, press spacebar or unmute to speak
- Questions we do not get to
 - Answers will be posted to our website and link to resources emailed out





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“Good science in plain language”[®]

Thank you for listening!

www.radiationsafety.ca

1-800-263-5803

info@radiationsafety.ca



- <https://www.canada.ca/en/environment-climate-change/services/weather-health/uv-index-sun-safety/about.html>
- <https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/types-sources/ultraviolet.html>
- https://www.carexcanada.ca/profile/uv_radiation_solar-occupational-exposures/
- https://www.carexcanada.ca/profile/uv_radiation_solar/
- https://www.ccohs.ca/oshanswers/phys_agents/ultravioletradiation.html?&wbdisable=true
- <http://hps.org/hpspublications/articles/uv.html>



- <https://www.icnirp.org/en/applications/uv-index/index.html>
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- <https://www.ies.org/definitions/standard-erythemal-dose/>
- https://www.techstreet.com/cie/standards/cie-125-1997?product_id=1210047
- [https://www.who.int/news-room/questions-and-answers/item/radiation-ultraviolet-\(uv\)](https://www.who.int/news-room/questions-and-answers/item/radiation-ultraviolet-(uv))



- J.B. Kerr & V.E. Fioletov (2008) [Surface ultraviolet radiation, Atmosphere-Ocean](#), 46:1, 184, DOI: 0.3137/ao.460108
- Johnson, T. E. (2017). Nonionizing Radiation Safety. In *Introduction to Health Physics* (5th ed., pp. 747–754). McGraw-Hill Education.
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