



The Ozone Layer and the UV Index

The ozone layer forms a thin shield high in the sky. It protects life on Earth from the sun's ultraviolet (UV) rays. In the 1980s, scientists began finding clues that the ozone layer was going away or being depleted. This allows more UV radiation to reach the Earth's surface. This can cause people to have a greater chance of getting too much UV radiation. Too much UV can cause bad health effects such as skin cancer and eye damage.

What is stratospheric ozone?

Ozone is a natural gas that is found in two different layers of the atmosphere. In the layer around the Earth's surface (the troposphere), ground-level, or bad ozone, dirties the air and helps make smog. The troposphere extends up to the stratosphere layer, where good ozone protects life on Earth by absorbing some of the sun's UV rays. Stratospheric ozone is found most often between 6 and 30 miles above the Earth's surface.

What is ozone depletion?

Recently, chlorofluorocarbons (CFCs) were used a lot in industry and elsewhere to keep things cold, make foam, and make soaps. Strong winds carry CFCs into the stratosphere. This can take two to five years. When CFCs break down in the stratosphere, they release chlorine. Each chlorine atom attacks ozone by joining with and breaking apart as many as 100,000 ozone molecules during the time it is in the stratosphere.

Other ozone-eating chemicals are pesticides such as methyl bromide, halons used in fire extinguishers, and methyl chloroform used in industry.

What is being done?

Countries around the world, including the United States, have seen the threats created by ozone depletion and agreed to a treaty called the Montreal Protocol. This Protocol will require humans to stop making and using ozone-depleting chemicals.

How does ozone depletion affect UV levels?

Scientists predict that ozone depletion should peak between 2000 and 2010. As worldwide controls reduce the release of CFCs and other ozone-depleting substances, nature will repair the ozone layer around the middle of the twenty-first century. Until then, we can expect higher levels of UV radiation at the Earth's surface. Higher UV levels can lead to a greater risk of bad health effects.

What are the health effects of UV radiation?

There are two prices to pay for overexposure to UV radiation: a severe sunburn following an intense short-term overexposure, and the more serious skin cancers developing after long-term overexposure. Melanoma, the more deadly of the two types of skin cancer, occurs when the patient has been subjected to several intense short-term overexposures. Non-melanoma skin cancers, which are almost 100% curable, occur in people who are overexposed for very long periods of time, such as construction workers, farmers, or people who fish. Long-term overexposure to UV radiation has been linked to the formation of cataracts in the eyes as well.



What is the UV Index?

The ozone layer shields the Earth from harmful UV radiation. Ozone depletion, weather, and the seasons cause different amounts of UV radiation to reach the Earth. The UV Index is a next-day forecast of the amount of skin-damaging UV radiation expected to reach the Earth's surface at the time when the sun is highest in the sky (solar noon). The National Weather Service (NWS) and EPA determine the UV Index. It predicts the next day's UV levels on a 0-11+ scale that helps people decide what to do to be safe from the sun. You can find out what the UV Index forecast is where you live by visiting <http://epa.gov/sunwise/uvindex.html> and entering your zip code.

What are the most important health messages related to the UV Index?

Damage from the sun can happen even with a low UV index. The higher the UV Index, the greater the dose rate of skin-damaging (and eye-damaging) UV radiation.

2 or less: Low UV Index

Low danger from the sun's UV rays for the average person:

- Wear sunglasses on bright days. In winter, reflection off snow can nearly double UV strength.
- If you burn easily, cover up and use sunscreen (a Sun Protection Factor of at least 15).

3–5: Moderate UV Index

Moderate risk of harm from unprotected sun exposure.

- Take precautions, such as covering up and using sunscreen, if you will be outside.
- Stay in shade near midday when the sun is strongest.

6–7: High UV Index

High risk of harm from unprotected sun exposure.

- Protection against sunburn is needed.
- Reduce time in the sun between 10 a.m. and 4 p.m.
- Cover up, wear a hat and sunglasses, and use sunscreen.

8–10: Very High UV Index

Very high risk of harm from unprotected sun exposure.

- Take extra precautions. Unprotected skin will be damaged and can burn quickly.
- Minimize sun exposure between 10 a.m. and 4 p.m. Otherwise, seek shade, cover up, wear a hat and sunglasses, and use sunscreen.

11+: Extreme UV Index

Extreme risk of harm from unprotected sun exposure.

- Take all precautions. Unprotected skin can burn in minutes.
- Try to avoid sun exposure between 10 a.m. and 4 p.m.
- Seek shade, cover up, wear a hat and sunglasses, and use sunscreen.

Sources:

U.S. Environmental Protection Agency. *Sun Wise Kids—Ozone*. Retrieved April 1, 2005, from http://epa.gov/sunwise/kids/kids_ozone.html.

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