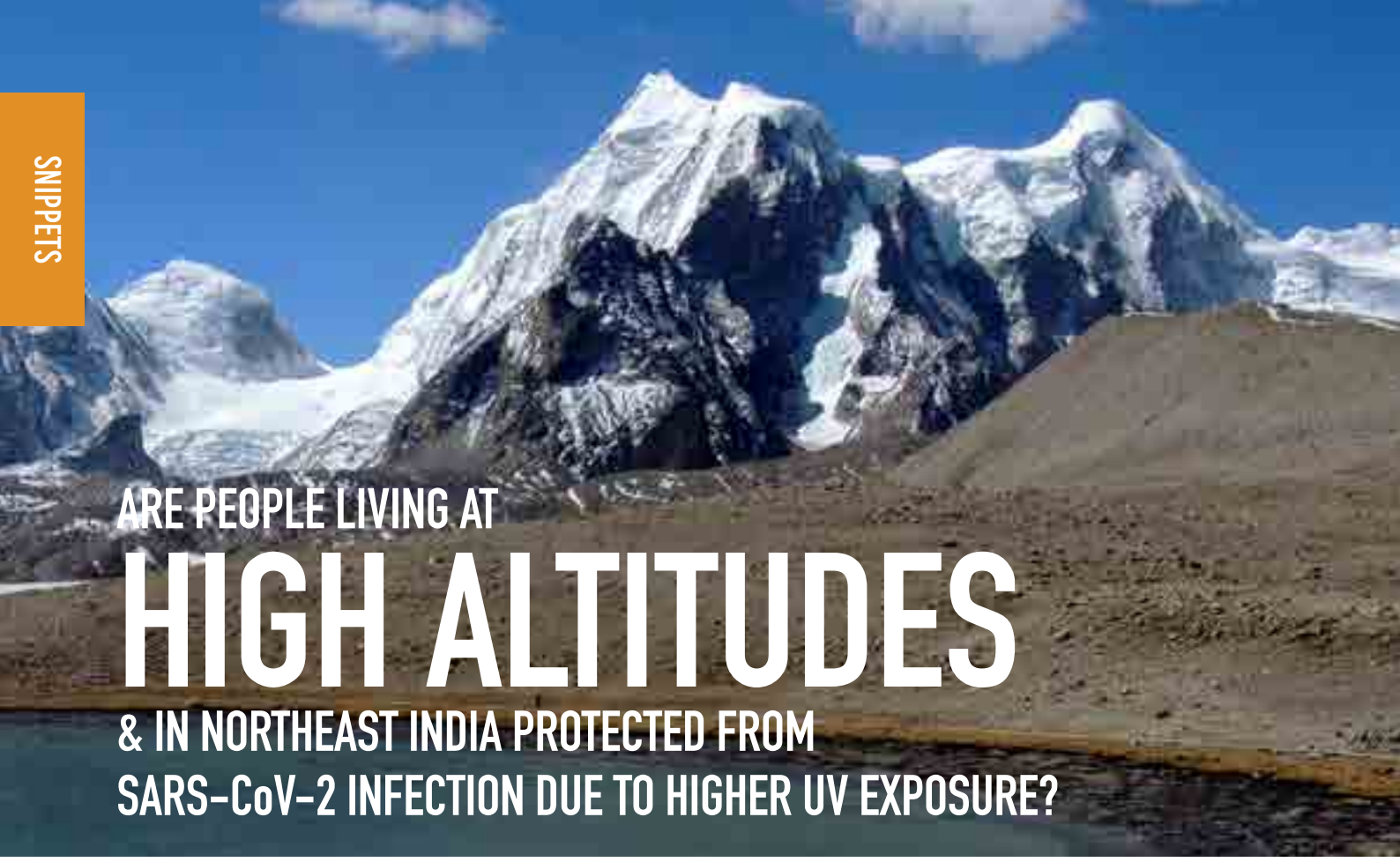

ARE PEOPLE LIVING AT HIGH ALTITUDES & IN NORTHEAST INDIA PROTECTED FROM SARS-CoV-2 INFECTION DUE TO HIGHER UV EXPOSURE?

Electromagnetic radiation in the Ultraviolet (UV) wavelength is generally harmful to living organisms. There are three subtypes of UV light:

- **UVC (200-280 nm):** UVC is absorbed by RNA and DNA bases, and can damage them photochemically. It is, however, completely filtered out by the ozone layer.
- **UVB (280-320 nm):** UVB can also cause damage to RNA and DNA bases, but it is 20-100 times less efficient than UVC. Almost 90% of UVB is absorbed by the ozone layer.
- **UVA (320-400 nm):** UVA is the major UV component in sunlight (~95%) that reaches the Earth's surface.

Thus, by the time solar radiation reaches the Earth's surface, its UV component is not sufficient to kill viruses. For example, a study showed that a UVC light intensity of > 90 uW/cm^2 for about 60 minutes is required to inactivate the SARS-CoV virus (which caused the 2003 SARS outbreak). Subsequent studies showed that SARS-CoV can be completely inactivated in 15 minutes by increasing the intensity of the UVC lamp to ~4 mW/cm^2. However, the same study showed that there was no obvious virus inactivation using UVA. In the laboratory, far-UVC (222 nm) can kill influenza viruses without damaging mammalian cells. However, none of these experiments have been performed in humans yet. Importantly, trying to disinfect one's skin with UVB/C light can cause skin irritation, sunburn, vision impairment and, sometimes, skin cancer.

Finally, even though UV irradiance increases with altitude (~10-12% per kilometre), the UV index (which measures the strength of sunburn producing UV radiation) in many regions in the Indian Northeast are similar or lower compared to the rest of the country. This means that hilly areas or the Northeast states are not necessarily protected from COVID-19 infection due to UV radiation from the sun.

Notes:

1. This response was first published on the Indian Scientists' Response to CoViD-19 (ISRC) website.
2. Source of the image used in the background of the article title: https://commons.wikimedia.org/wiki/File:Gurudongmar_Lake-North_Sikkim.jpg. Credits: Sandeep pai1986, Wikimedia Commons. License: CC-BY-SA.

Indian Scientists' Response to CoViD-19 (ISRC) is a group of more than 500 Indian scientists, engineers, technologists, doctors, public health researchers, science communicators, journalists and students who voluntarily came together in response to the COVID-19 pandemic. This group can be contacted at indscicov@gmail.com.