



Where Snow isn't White

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(passcode: water)

Abstract: Clean snow/ice is only white in the visible wavelengths. It's dark and even black in shortwave infrared regions, and pollution can darken it substantially in the visible wavelengths. This unique spectral signature forms the basis of optical remote sensing of snow. In the Western US and many other mountainous parts of the world, snow albedo controls snow melt rates, and affects global climate.

In this talk I will: 1) provide a technical definition of albedo, in relation to other reflectance quantities; 2) distinguish between intrinsic and apparent albedos; 3) give an overview of how snow albedo is usually poorly measured and modeled, both in situ and from satellites; and 4) present new research to address these challenges. Last, 5) I will show how during the COVID-19 lockdowns, water supplies were dramatically affected in the Indus River Basin as the snow/ice surface became 30% cleaner due to pollution reductions.



Speaker Bio: Edward (Ned) Bair is an Associate Researcher at the Earth Research Institute at the University of California, Santa Barbara. He uses remote sensing and field techniques to study the cryosphere. He specializes in applying highly-parallel computational solutions to: climate, remote sensing, spectroscopy, and the energy balance in montane regions. His work spans a range of scales, from the photon scale to thousands of km² at the mountain range scale. He has worked for the US Army Corps of Engineers, as a consultant, a ski patroller, and a climbing guide. He is the Research Chair for the American Avalanche Association and lives in Mammoth Lakes, California. He is glad to see life moving on after the Marshall fire and is too familiar with similar disastrous fires in the Sierra Nevada.