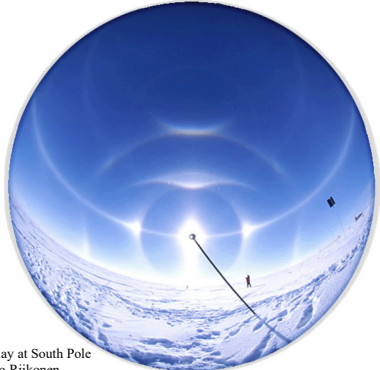


Atmospheric Halos

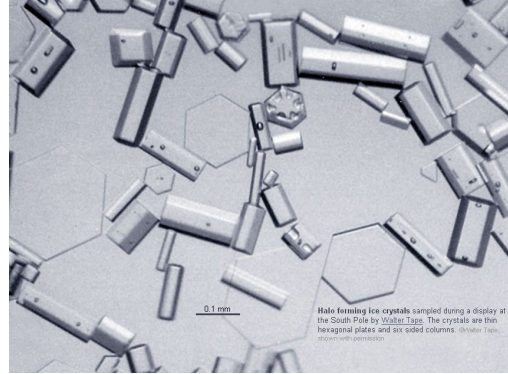
Dr. Christopher M. Godfrey
University of North Carolina at Asheville



Complex Display at South Pole
Image © Marko Riikonen

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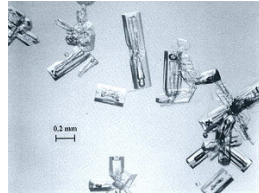
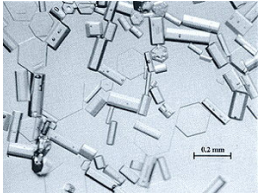
Columnar and Plate Ice Crystals



Halo forming ice crystals sampled during a display at the South Pole by Walter Tape. The crystals are thin hexagonal plates and six sided columns. © Walter Tape, 2007, with permission.

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Good/Bad Crystals for Halo Formation



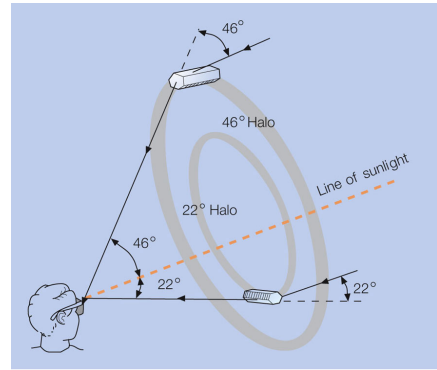
Crystals collected during a superb South Pole display on 17 January 1986. Apart from a few small air bubble inclusions, the crystals really are like their hexagonal plate and column ideals.

Crystals from a mediocre halo display 16 days earlier. They have large inclusions and their faces are imperfect. (Photographs from *Atmospheric Halos* by Walter Tape)

Source: <http://www.atoptics.co.uk/halo/xtalreal.htm>

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22° and 46° Halos



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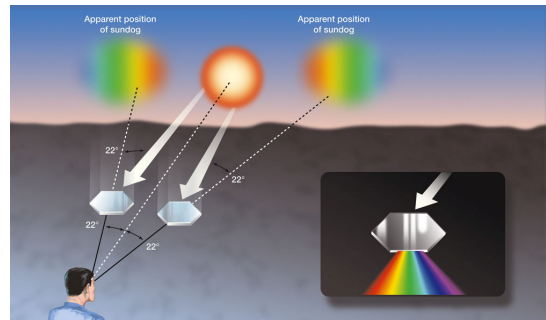
22° Halo



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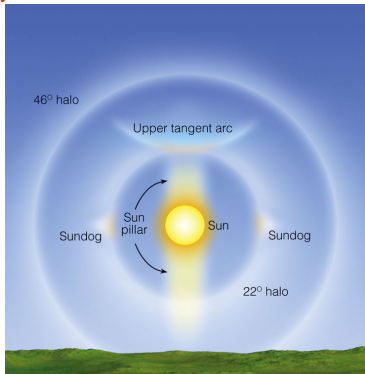
Sundog (Parhelion)



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Ice Crystal Phenomena

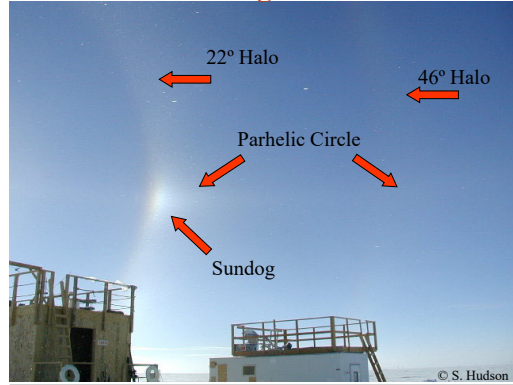


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Halos and Sundog

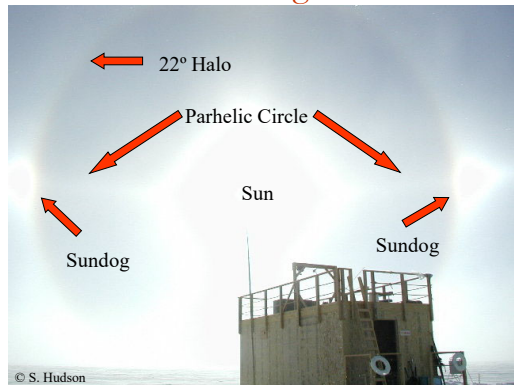


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22° Halo and Sundogs



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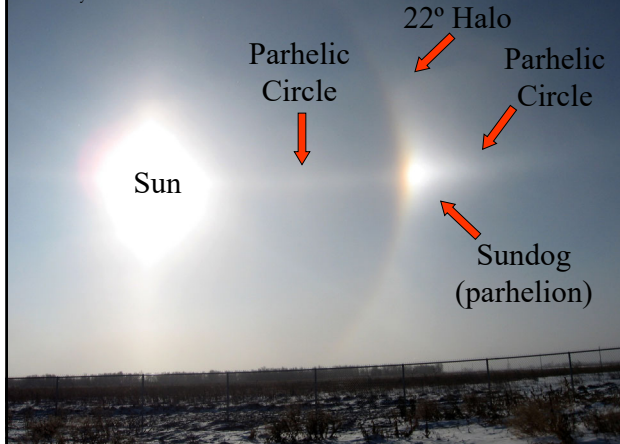


© C. Godfrey

Sundog (parhelion)



© E. Godfrey



Upper Tangent Arc



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- Positioned at top of 22° halo
- Diamond dust was falling when the photo was taken



Circumzenithal Arc

- You are looking almost straight up with the sun at the bottom of the image
- Formed by refraction through hexagonal plate crystals
- The supralateral arc is more common than, and is often mistaken for, the 46° halo
- Sun is below 32° elevation

© C. Godfrey

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Upper Tangent Arc with Circumzenithal Arc

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Sundog, parhelic circle, 22° halo, and a dim upper tangent arc

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More information

Image © Jim Hoida (<http://apod.nasa.gov/apod/ap060923.html>)

For more great images and explanations, visit <http://www.atoptics.co.uk/halosim.htm>

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